

Reading: Guidelines for Inclusive Learning Programmes

Department of Education, Pretoria

A reading to accompany Unit Six of the module:
Teaching and Learning Mathematics in Diverse Classrooms

Guidelines for Inclusive Education Learning Programmes

Overview

This Reading consists of two extracts from a document produced by the Department of Education in June 2005.

Extract One: pages 6 - 18:

Introduction and Section One of the Guidelines.

Extract Two: pages 59-66

Learning Area: Mathematics – a table of barriers to learning, with implications and strategies.

Extract One

Introduction

In 1996 the government of South Africa amalgamated 17 Departments of Education, which had been designated along racial lines, to one Department of Education with one curriculum (Interim Syllabus) for all South African learners. Prior to 1996, learners experiencing barriers to learning and development were catered for in Special Schools, which were designated along categories of disability. Where learners who experienced barriers to learning did attend ordinary schools, it was largely by default, and very little was done by these schools to adapt teaching methods, the learning environment and assessment procedures to accommodate them. Learners were expected to adapt to the school. The majority of learners experiencing barriers to learning and development were unable to access education.

In July 2001 the Ministry of Education launched the Education White Paper 6 Special Needs Education: Building an Inclusive Education and Training System. White Paper 6 reminds us that our constitution challenges us to ensure that all learners pursue their learning potential to the fullest. (EWP6 p.11). It commits the state to the achievement of equality and non-discrimination. The policy framework outlined in White Paper 6 outlines the ministry's commitment to "the provision of educational opportunities, in particular for those learners who experience or have experienced barriers to learning and development or who have dropped out of learning because of the inability of the education and training system to accommodate the diversity of learning needs, and those learners who continue to be excluded from it". (EWP6 p 11)

Education White Paper 6 on Inclusive Education sets out to address the needs of all learners in one undivided education system. It moves from the categorisation of learners according to disability (medical model) to assessing the needs and levels of support required by individual learners to facilitate their maximum participation in the education system as a whole. The focus is on ensuring that there is sufficient differentiation in curriculum delivery to accommodate learner needs and making the support systems available for learners and schools. It departs from the previous notion of referring learners with particular disabilities to specific special schools, but permits all schools to offer the same curriculum to learners while simultaneously ensuring variations in mode of delivery and assessment processes to accommodate all learners.

The guidelines to inclusive learning, teaching and assessment offered here take into consideration that flexibility has already been built into the Revised National Curriculum Statement.

The rationale for curriculum adaptation is based largely on Education White Paper 6 on Special Education Needs: Building an Inclusive Education and Training System.

These include:

- The components hamper the realistic and effective implementation of the curriculum or do not accommodate and respect diversity. [Education White Paper 6 p. 12 par 1.1.7]
- When they do not meet the needs of all learners. [Education White Paper 6 p16 par. 1.4.1]
- When they do not minimise barriers to learning [Education White Paper p. 6 par.1.4.2]
- When they do not encourage or create opportunity for life long learning for all learners e.g. for learners for whom achievement of a GETC is unlikely or when content of the curriculum becomes a barrier to learning. Time available to complete the curriculum and the pace of teaching may also be negative factors. [Education White Paper 6 p. 19 & 31 par. 2.2.6.1]
- When the components do not lend themselves to adequate flexibility across all bands of education so that they are accessible to all learners irrespective of their learning needs.
- When they do not promote the opportunity for specific life skills training and programme-to-work linkages in special schools. [Education White Paper 6 p. 21 & p. 32 par. 2.2.6.3]

In the light of what has been said, these guidelines for developing inclusive learning programmes, provides guidance to teachers, administrators and other personnel on how to deal with diversity in the classrooms and schools of our country. The guidelines are divided into six sections. Section 1 deals the flexible features of the Revised National Curriculum Statement (RNCS) and barriers to learning. Section two discusses adaptation of learning programmes, work schedules and lesson plans. Section 3 provides guidance on how to go about adapting lesson plans within each of the Learning Areas of the RNCS. Section 4 deals extensively with teaching methodologies to accommodate diverse learner needs. Section 5 outlines inclusive strategies for learning, teaching and assessment. Section 6 provides information on learning styles and multiple intelligences.

Section One

1.1 The Revised National Curriculum Statement (RNCS)

The Revised National Curriculum Statement adopts an inclusive approach by specifying minimum requirements for all learners. The special educational, social, emotional and physical needs of learners will be addressed in the design and development of appropriate learning programmes (DOE, 2002: Overview of Revised National Curriculum Statement, p10.)

Adaptations to the RNCS should not be viewed as creating a new or alternative curriculum to the RNCS. It is intended to supplement the

Teacher's Guides for the Development of Learning Programmes for the Foundation Phase and those for the different Learning Areas (Intermediate Phase and Senior Phase) of the General Education and Training Band. The purpose of this guide with the guidelines that follow is to provide guidance to teachers on how they could adapt the Revised National Curriculum Statement so all learners who experience barriers to learning can access the curriculum. Learning programmes, work schedules and lesson plans can be adapted to cater for the individual needs of learners.

Curriculum adaptations are modifications that relate specifically to instruction or content of a curriculum. A curricular adaptation is any adjustment or modification to: (i) learning, teaching and assessment environment, (ii) learning, teaching and assessment techniques, (iii) learning, teaching and assessment support material that enhances a learner's performance or allows at least partial participation in a learning activity (iv) structure and number of learning programmes and (v) assessment. The RNCS has several components that are flexible enough to allow for adaptation. Examples of these flexible features include:

- “The outcomes and assessment standards emphasise participatory, learner-centred and activity-based education. They leave considerable room for creativity and innovation on the part of teachers in interpreting what and how to teach.” (DOE, 2002: Overview of Revised National Curriculum Statement, p14.)
- Learning outcomes do not prescribe content or method. Therefore, content and methodology could be appropriate for a learner's needs. (DOE, 2002: Overview of Revised National Curriculum Statement, p14.)
- Activities can be flexible. (DOE, 2003: Teacher's Guide for the development of Learning Programmes, p.10)
- The context can be made relevant to the learners' needs. (DOE, 2003: Teacher's Guide for the development of learning Programmes, p.10)
- More time can be provided for assessment and execution of a task. (DOE, 2003: Teacher's Guide for the development of Learning Programmes, p.11)
- Assessment strategies are flexible. (DOE, 2003: Teacher's Guide for the development of Learning Programmes, p.1)
- The learning programme can be structured to meet the needs of the specific learners. (DOE, 2003: Teacher's Guide for the development of Learning Programmes, p.2)
- Learners can communicate using SA sign language, Braille, assistive devices or any other communication method. (DOE, 2003: Teacher's Guide for the development of Learning Programmes, p1)
- Expectations can be adapted to the abilities of the learner within the framework of high expectations. (DOE, 2002: Overview of Revised National Curriculum Statement, p12.)

- The curriculum emphasizes the principles of social justice, healthy environment, human rights and inclusivity. (DOE, 2003: Teacher's Guide for the development of Learning Programmes, p.5)
- Teachers are encouraged to consider any particular barriers to learning and/or assessment that exist in different Learning Areas and make provision for these when developing learning programmes. (DOE, 2003: Teacher's Guide for the development of Learning Programmes, p.7)
- assessment standards can be broken into finer components. (DOE, 2003: Teacher's Guide for the development of Learning Programmes, p.1)
- A lesson plan time allocation can range from a single activity up to a term's teaching or more time if necessary, depending on the needs of the learner. (DOE, 2003: Teacher's Guide for the development of Learning Programmes, p.1)
- Time allocation and weightings regarding learning outcomes and learning programmes should vary according to the learner's needs. (DOE, 2003: Teacher's Guide for the development of Learning Programmes, p.6)
- The number and nature of learning programmes at a special school, special school as resource centre or full service school can vary depending on the availability of staff, resources and the needs of learners.
- Flexibility in the selection of appropriate assessment standards according to the individual needs of a learner is possible on the recommendation of the assessment team in the case of a learner not capable of achieving a GETC.
- Work Schedules are not limited to a grade/year. Differently gifted learners may require acceleration or slowing down of the process.

The scale and scope [extent] of any curriculum adaptations will only be determined after a thorough assessment of individual learners. Learning programmes, work schedules and lesson plans have to be designed on the basis of the needs and strengths (profile) of the majority of learners at a school or in a phase or grade. Lesson plans have to provide differentiated learning, teaching and assessment activities to ensure effective multi-level teaching. However, adaptation of learning, teaching and assessment activities will be required at lesson plan level for learners in a class who need **specific additional support** because of individualised barriers to learning. Those involved in this process of adaptation must include the teachers, parents, school based and district based support teams (where they exist). Other relevant professionals from the community can also be consulted.

1.2 An introduction to barriers to learning and development

All barriers to learning and development should be addressed in our classrooms and schools. Amongst the more frequent causes of barriers are:

- Disability as a barrier
- Language and Communication
- Lack of Parental Recognition and Involvement
- Socio-economic Barriers
- Attitudes
- Inadequate opportunity for programme-to-work linkages (White Paper 6, p.21 and 32 par. 2.2.6.3)

1.2.1 Disability as a barrier

Understanding disability as a barrier to learning and development

Most understandings of disability relate to individual deficit. Therefore, disability has always been regarded as a barrier to learning. These barriers include:

- Visual barriers
- Auditory barriers
- Oral barriers
- Cognitive barriers
- Physical barriers
- Medical barriers
- Psychological barriers

Policy implications and guidelines for addressing disability as a barrier

Learners who experience barriers to learning as a result of disability should be welcomed in ordinary school environments provided that the necessary support is in place for learners to achieve their full potential. Teams that include parents, teachers and other relevant professionals should establish the nature and extent of support needed by the learner. Below are a few examples of how the system could be modified or changed to meet different kinds of support that individual learners may require:

- Modified access to buildings e.g. ramps, adapted toilets and speaker systems in where applicable.

- Brailed signage on doorframes, passages and outbuildings.
- Enlarged print.
- Appropriate assistive devices e.g. Brailers, hearing aids, tape recorders, splints, adapted computers, wheelchairs, walkers, modified tricycles and standing frames.
- Therapeutic intervention.
- Learner based and learner paced teaching.

1.2.2 Language and communication

What are the common barriers associated with language and communication?

There are normally three main barriers related to language. Firstly, learners are often forced to communicate and learn in a language which they do not usually use at home and are not competent to learn effectively.

Secondly, learners who use South African Sign Language as a language for teaching and learning and as a (language) subject did not have access to the language.

Thirdly, learners experience difficulties with communication. Learners who are non-speaking due to the severity of their disability experience enormous barriers to learning and development. These barriers arise from the general unavailability of augmentative and alternative communication (AAC) strategies to enable them to engage in the learning process, and more often than not find themselves totally excluded from learning and development experiences. AAC systems could consist of alternative communications systems, supplements to vocal communication and communication through facilitators.

Policy implications and guidelines to address language and communication barriers

- All learners are to learn their home language and at least one additional official language which include South African Sign Language. Braille as a code can be used as a medium of teaching and learning.
- When learners enter a school where the language of learning and teaching is not their home language, the teachers of all the learning areas/programmes and the school should provide support and supplementary learning in the language of learning and teaching until such time that learners are able to learn effectively through the medium of that particular language. It is the responsibility of each individual teacher to ensure that the language of learning and teaching does not become a barrier to learning in such instances. Ideally, parents should be encouraged to participate in interventions regarding language.

- Learners should receive extra support in the language (“subject”) which is also the language of learning and teaching. The learner should work towards and be assessed against the assessment standards of the appropriate language level (Home Language, First Additional Language or Second Additional Language).

1.2.3 Lack of parental recognition and involvement

Barriers and difficulties which arise as a result of a lack of parental recognition and involvement

- Parents whose children do not utilise oral communication experience communication barriers with their children.
- Difficulties around parental support of learners may arise due to a range of situations e.g. a parent who cannot read Braille would not be able to support a grade one learner with his or her Braille homework.
- Parents are not always adequately informed of their children’s problems or progress, and therefore are often deprived of the opportunity to participate in their children’s development.
- Parents who are unable to understand the emotional and/or behavioural problems of their children may aggravate their barriers
- Non-involvement and non-recognition of parents by the system creates a lack of respect for parents as, informed role players in the assessment and future development of their children.
- A lack of communication and support around HIV/Aids infected or affected families creates barriers for learners from such families.
- Some parents abdicate all responsibility for all their children.

Policy implications and guidelines for addressing lack of parental recognition and involvement

- At school level, partnerships should be established with parents in order to equip them with skills and knowledge to participate effectively in their children’s learning and school life.
- Parents should also be fully involved and informed regarding the identification, screening and assessment and placement of their children.
- Parents should be encouraged to take an active interest in the teaching, learning and assessment of their children.
- In order to facilitate early intervention for children with disabilities parents may consult community based clinics and/or other professional practitioners including teachers to conduct an initial assessment and to plan a suitable course of action for the learner.

- Schools which use South African Sign Language are encouraged to run accredited SA Sign Language courses for parents and teachers.
- Braille courses should be run to enable parents to communicate with their children and assist them with homework, reading and writing in Braille.
- General newsletters can assist in keeping parents informed of developments and programmes at the school. This is particularly important for boarding schools where distance separates parents from the school.
- Schools can run information sessions and workshops to enable parents to better understand their children and their emotional and behavioural problems. Staff from district based support teams, including psychologists and social workers, could assist at such workshops.
- Where appropriate, school-based support teams should be strengthened with expertise from the local community, district-support teams and higher education.
- It is essential that schools maintain open channels of communication with families infected and/or affected by HIV/Aids, and render support to parents and learners wherever possible. This could be facilitated by openly displaying a clear HIV/Aids policy for the school. Shared HIV and Aids status could also help destigmatise the disease

1.2.4 Socio-economic barriers

Barriers created as a result of socio-economic factors

- Poor reading and print background (learners have not had pre-school exposure to literacy and print in general). Parents of such learners have often had limited education opportunities.
- Lack of exposure to numerical concepts.
- Sensory deprivation, resulting from a lack of opportunities during early childhood to explore the environment and wider world.
- Poor oral language development as a result of a lack of communication, interaction and learning opportunities.
- Poor self-image.
- Latch key children often experience social isolation and developmental deprivation.
- Impact of alcoholism and violence.
- Dysfunctional and anti-social behaviour patterns e.g. minor stealing and lying.

- Depression and hopelessness in both adults and learners.
- Substance abuse by learners, most commonly dagga and thinners.
- Teenage pregnancy.
- Learner headed households and poor homes require additional responsibilities from learners.
- Mobility of families creates lack of continuity in learning as a result of school hopping.
- Learners move from nuclear family to extended family.
- Late enrolment at school.
- Learners with offending behaviour including theft, housebreaking, assault and sexual misconduct.

How do we overcome the socio-economic barriers?

This is not a welfarist approach to poverty but rather a serious concern about the pedagogical implications of poverty.

- Teachers need to be sympathetic towards learners by creating a welcoming and supporting environment.
- Experiences that involve stimulation, enrichment and play must be created to compensate for the previous deprivation regarding reading, mathematics, spatial development and sensory experiences. These could often be enrichment programmes that involve first hand experiences (actual experience), play with concrete objects and reading to learners so they understand that print is meaningful.
- At social level, an environment should be created that is comforting, that listens to the voice of learners, that is able to detect distress and depression. Appropriate referral to professionals should be made for formal assessment of depression.
- The school needs to reach out to poor communities, and should be a secure haven for learners.
- School nutrition programmes should act as incentives for poor and hungry learners to attend school.
- Schools should establish meaningful relationships with the courts, police, relevant NGO's [e.g. child welfare and SANCA] and the Department of Social Services. Joint procedures to discourage any form of abuse should be developed. When learners become the perpetrators of abuse and crime the above contacts are essential.
- Where district based support teams have been established they should be called upon to assist in matters of abuse and other learner related

issues. Where such support teams do not exist, institution level support teams must be established.

- Use of accelerated academic bridging programmes and programmes-to-work linkages are vital for learners who enter the system late or who have experienced severe interruption in their schooling as a result of socio-economic factors.
- Baseline assessment should be used to establish current academic level and facilitate placement in the appropriate grade and/or set of learning programmes.
- Fast tracking to acquire basic literacy, numeracy and life skills through accelerated programs with a view to assisting the learner to catch up with his /her age cohort.

1.2.5 Negative attitudes

Understanding negative attitudes as barriers to learning

Negative and harmful attitudes towards difference in our society remain critical barriers to learning and development. Discriminatory attitudes resulting from prejudice against people on the basis of race, class, gender, culture, disability, religion, ability, sexual preference and other characteristics manifest themselves as barriers to learning when such attitudes are directed towards learners in the education system.

How do we overcome negative attitudes towards learners who experience barriers and their inclusion in ordinary education?

- Labelling of learners should be discouraged since it makes it difficult for learners to grow beyond the limitations of the label. It is important for teachers, parents and peer groups to adopt positive attitudes towards learners who experience barriers. Even learners who were once regarded as ineducable benefit from appropriate intervention.
- Learners should not be categorized since they often are placed in a particular learning environment merely because of the category and not because of the particular learning needs of the individual learner. In many cases, the categorisation was convenient for the system and not in the best interests of the learner.
- Do not discriminate against learners who are HIV positive or who have AIDS since a lack of knowledge about this issue has led to negative assumptions associated with the disease. All learners and staff should be treated equally. When it comes to blood all cases are treated as universally HIV positive.
- All learners should be viewed in a positive light and there should be a determined effort to establish what their real strengths are for the purpose of further development.
- Do not create conditions for fear of learners with disabilities to develop, since negative attitudes often result from beliefs that are illogical and encourage discrimination.

- Schools must be welcoming environments for all learners, since any negative attitude by adults in a school environment influences learners.
- Schools should embark on positive awareness campaigns about difference and the value of celebrating diversity based on new South African policy and principles.
- Acknowledge and respect differences in learners, whether due to age, gender, ethnicity, language, class, disability or HIV status, sexual preference, etc.

1.2.6 Inadequate Programme-to-Work Linkages

(White Paper 6, p. 21 and p.32 par. 2.2.6.3)

How do we understand the barriers created by inadequate programme-to-work linkages?

- Learners with cognitive barriers who are unlikely to achieve a full GETC as well as learners who, due to age constraints and social barriers, need specific programme-to-work linkages.
- Appropriate accreditation and certification for the level of skills achieved need recognition to facilitate life long learning.
- A lack of partnerships between education and industry which would facilitate job accessibility could be a stumbling block to learners.

How do we overcome the inadequate programme-to-work linkages?

- Weighting of learning areas and time allocation can be adjusted to allow for chosen learning areas or learning programmes to become the major tool or vehicle for learning, thus fulfilling the vision of Education White Paper 6 of providing more options for learners as ways to learn and to provide programme-to-work linkages.
- Linkages across learning areas will allow for assessment standards from various learning areas and from different grades to be achieved within the skills learning programmes allowing for work related linkages.
- Collaboration between teachers within and across a phase or grade would be essential in the planning of learning programmes for specific learners or groups of learners to ensure effective programme-to-work linkages.
- At local school level partnerships with industry should be established to assess the educational requirements of future employers and to facilitate hands-on work experience for learners.
- Schools may issue a certificate of competency that includes specific reference to Learning Programmes that reflect programme-to-work linkages to learners who do not achieve a GETC.

Learners should not be expected to show competence in all the learning areas for the end of the GETC band at the same time, but should be allowed to show their competence in the different learning areas/programmes over a period of time in order to be eventually awarded a GETC or Grade 9 promotion.

Proposed Recommendations For Changes To Legislation

- The schools section within the Department of Education should establish partnerships with SAQA, Umalusi and other relevant stakeholders.
- Qualifications should be developed and assessed for appropriate accreditation leading to life long learning for those learners who cannot achieve the GETC.

Extract Two

3.4.2 Learning Area: Mathematics

Learning Outcomes and Assessment Standards

Learning outcomes 1 (Numbers, Operations and Relationships), 2 (Patterns, Functions and algebra), 3 (Space and Shape [Geometry]), 4 (Measurement) and 5 (Data Handling) all need adaptation to accommodate all learners irrespective of their barriers.

- Activity based learning is essential. Practical experience and practical examples are therefore very important. Learners experiencing barriers may need to use real objects, pictures, graphic, concrete objects etc. for a longer period in order to grasp Mathematical concepts. Moving into the abstract too soon may hinder the understanding of concepts.
- Practice of memory training techniques, especially for number is very important.
- The use of resources such as balances, counters, different tools are needed in order to assist learners to master concepts in the assessment standards meaningfully. These visual supports will help the learners to see the relationships between numbers.
- Learners experiencing barriers to learning may require more time for mastering of concepts understanding the terminology (vocabulary and grammar), executing tasks, acquiring mathematical thinking and for

assessment activities. The number of examples and activities to be completed should be adapted to accommodate learners experiencing barriers to learning. However, the thinking process that you are using to do the calculation or to solve the problem should not be compromised. The quality of the skill to solve problems should not be comprised for the quantity (number) of problems solved.

- The use of a calculator should be allowed once a learner has understood the basic concepts of addition, subtraction, multiplication and division. It could also be used to verify calculations.
- Solving problems involving money could involve using real money and real objects (or empty containers)
- Learners struggling to understand the number system should still try all other areas of the Learning Area Mathematics (learning outcomes and assessment standards), e.g. simple fractions, measurement, plots and graphs.
- Follow the step by step formal approach: first teach count sequence, then cardinality (how many), then teach count on, then addition, before the learner will understand commutativity and place value.

Barriers Experienced By Learners	Implications	Strategies
<p>Numbers, Operations and Relationships:</p>	<p>Learners may:</p> <ul style="list-style-type: none"> ▪ rote count with no understanding of one-on-one correspondence. ▪ not recognise number symbols or number names. ▪ not count and say the numbers in a one-to-one correspondence. ▪ not understand quantity. ▪ not remember/be able to visualise and remember how many they have counted. (Cardinality) When the learner is asked 'how many' they invariably recount the objects as their response. 	<ul style="list-style-type: none"> ▪ Pair off: Give the learner any amount of shapes. The learner must place the shapes on the number line e.g. from number 1 to 5. Do a few of these exercises. ▪ Body exercises for pairing off: Beat the tin with the wooden spoon. Learner has to walk rhythmical on the beat of the drum. One step for each number. ▪ Constant exposure by drawing attention to numbers through everyday experiences, e.g. age, house numbers, clocks, money. Learners must make the connection that the spoken number is represented in a visual form. ▪ Matching number cards, pointing to number on number line, matching number cards to their position on the number line. <p>☐ Touch counts each sequenced</p>

Barriers Experienced By Learners	Implications	Strategies
		<p>number.</p> <ul style="list-style-type: none"> ▣ Move the object into a line as the number is spoken ▪ When counting objects on paper, cross out the object with a pen as the number is spoken. ▪ Draw a number line on the floor. Learner stands on the naught. Bounce the ball once on each number. No bounce on naught because it is an empty group! ▪ Count real objects often. Allow learners to touch or point to the objects while counting. One word goes with one item. Encourage learner to slow down when counting. Use shapes that are not too large or small and do not roll. ▪ Pairing off together with estimation: Use the number line from 1 to 10. Ask the following questions: In my hand I have 8 shapes / blocks. Are there enough shapes for all the blocks? Yes / No. The learner can now put the blocks on the different numbers on the number line. Do the same with other numbers. ▪ Matching number with shapes/pictures, e.g. 3 = ◆◆◆ ▪ The learner needs to be taught that ‘how many’ means to retain and recall the last number counted rather than recounting the number sequence. Teach the cue ‘put the number in your head’ e.g. ‘How many?’ Response should be 5 and NOT 1,2,3,4,5 ▪ Play counting games, which end before the whole set has been counted, also to encourage understanding of cardinality.
	Learners may	<ul style="list-style-type: none"> ▪ Play counting games that start at numbers other the one.

Barriers Experienced By Learners	Implications	Strategies
	<ul style="list-style-type: none"> ▪ Confuse Next number / One more / One less and equal ▪ Experience problems with number concept ▪ Not understand ordinal numbers: 1st, 2nd, 3rd 	<ul style="list-style-type: none"> ▪ Repeated modelling and practice is needed to teach the learner to count from the given number. ‘Count to 10. Start at 5.’ ▪ Initially use a number line / number grid as a visual prompt. The learner can now visually check which is more or less ▪ Quantity – Use everyday experiences (particularly food) to estimate which is more / less. <ul style="list-style-type: none"> ▫ Check by pairing objects for each group. The learner then selects which group is preferred more. ▫ Using numbers with the same ‘ten’ e.g. which is more, 25 or 21? ▫ Using multiples of 10 e.g. which is more, 30 or 20? ▫ Using any two numerals e.g. which is more, 27 or 31? ▪ Games <p>Walk to number 3.</p> <p>Give 1 step forward. Where are you now? 4, therefore 4 steps are more than 3 steps.</p> <p>Learner goes back to number 3.</p> <p>Walk 2 steps forward. Where are you now? 5, therefore 5 steps are more than 3 steps.</p> <p>Learner goes back to number 3.</p> <p>Walk 1 step backwards. Where are you now? 2, therefore 2 steps are less than 3 steps.</p> <p>Learner goes back to number 3.</p> <p>Walk 2 steps backwards. Where are you now? 1, therefore 1 step is less than 3 steps.</p> <p>Do a lot of these exercises.</p>

Barriers Experienced By Learners	Implications	Strategies
		<ul style="list-style-type: none"> ▪ Work with each number in isolation until mastered. ▪ These numbers must relate to real life experiences e.g. lining up at the door and sports day. Support auditory memory with a card (visual cue) e.g. visually and verbally identify 1st, 2nd, 3rd.
	<p>Learners may</p> <ul style="list-style-type: none"> ▪ not be able to count in 2's, 3's (Skip or interval counting) ▪ not understand addition ▪ not be able to do subtraction ▪ not understand borrowing ▪ not understanding commutativity ▪ experience difficulty with place value 	<ul style="list-style-type: none"> ▪ Learners group real objects e.g. in twos and then count in twos moving two objects at a time as they count. ▪ Initially the learner will need to be shown how to miss alternate numerals e.g. jumping / stepping over cards on the floor, 'jumping' over numbers on a number line. ▪ To prepare for addition, play counting games that start at numbers other than one. ▪ Being able to add, it is very important for understanding place value. ▪ Introduce the vocabulary/symbol to be used while showing the process of adding objects together. Record the number sentence underneath the concrete process. ▪ Pairing off with classification: Take different coloured shapes (two colours, e.g. red and yellow). Place 3 yellow blocks left and 7 red blocks right on the number line. $3 + 7 = 10$ ▪ Number charts: Learner has to match the number on the number charts with the matching number on the number line. ▪ The open number line: Walk up to number 5. Ask the following questions: How many steps must you take before you reach number 9?

Barriers Experienced By Learners	Implications	Strategies
		<p>$5 + \quad = 9$</p> <p>Walk up to number 6. Place a shape or block on the number 6. Now the learner has to bounce a ball on each number up to number 10.</p> <p>How many times did the ball bounce up to number 10? 4 times.</p> <ul style="list-style-type: none"> ▪ Therefore $6 + \quad = 10$ Do more examples. ▪ Introduce visually using the game of ten-pin bowling. Verbalise the process i.e. ten empty bottles, five knocked down, five left’. <p>Record the number sentence. Use a variety of other concrete materials to support the process.</p> <ul style="list-style-type: none"> ▪ When learning subtraction, some learners do well until they are asked to regroup or borrow. It seems that no matter how many times you say, ‘Take the bottom number from the top number they will subtract the smaller number from the larger number.’ <p>Colour code numbers, making the top number red and the bottom number green. Say, ‘Take the green number from the red number.’ By using colour to organise the thinking, the learner seems able to grasp the concept.</p> <p style="margin-left: 40px;">$3 \ 4$ (red)</p> <p style="margin-left: 40px;">$-2 \ 7$ (green)</p> <ul style="list-style-type: none"> ▪ Commutative: (Train game) <p>Put 4 red shapes / blocks on number line (numbers 1 to 4). Put 5 blue shapes / blocks on the following numbers of the number line.</p> <p>Now put the two colours together on the right hand side of the number line. Teacher writes the calculation on the black board.</p> <p>$4 + 5 = 9$</p> <p>Repeat the calculation but now the</p>

Barriers Experienced By Learners	Implications	Strategies
		<p>learner uses 5 red blocks and 4 blue blocks. Now put all the blocks together on the left hand side of the number line. Teacher writes the calculation on the black board.</p> <p>The learners are now allowed to compare the 2 rows of blocks</p> <ul style="list-style-type: none"> ▪ Writing numbers helps the learner to understand place value in terms of how we write large numbers but addition helps the child to understand $10 = 10$ units, $5 = 5$ units, $2 = 2$ units and then $12 = 10 + 2$ ▪ Until the learner understands tens and units, he has no basis to cope with the decimal system for money or for weights and measure.
<p>Patterns, Functions and Algebra:</p>	<p>Learners may</p> <ul style="list-style-type: none"> ▪ not be able to follow or design simple patterns 	<ul style="list-style-type: none"> ▪ Start by copying simple sequences using colour or objects e.g. red, blue, red blue, ..., or objects e.g. crayon, block, crayon, block, ... ▪ Make the sequences more complex using 3 and later 4 colours, shapes etc. Learners should understand that a pattern is a repetition of e.g. a sequence or actions ▪ Sequence numbered unifix blocks horizontally or vertically. Give verbal and visual cues. ▪ Let them repeatedly add the same number e.g. ▪ $1 + 2 = 3 + 2 = 5 + 2 = 7 + 2 = 9 + 2 = 11 + 2 =$
<p>Shape and Space (Geometry)</p>	<p>Learners may</p> <ul style="list-style-type: none"> ▪ have difficulty with the following concepts of shape and space: naming shapes identifying shapes sorting according to shape 	<ul style="list-style-type: none"> ▪ Identifying and describing shapes <p>The learner feels the outside of the shape while naming the shape and the characteristics.</p> <ul style="list-style-type: none"> ▪ Multiple choice: Practice identifying the shape from a selection of two/more e.g. 'Give me the circle'. Repeat these steps until

Barriers Experienced By Learners	Implications	Strategies
	<p>over/under through by in/out on/off inside/outside behind/in front top/bottom near/next to forward/backward back/front across high/low middle side/corner/edge toward/away from around</p> <ul style="list-style-type: none"> ▪ left/right: 	<p>mastered.</p> <ul style="list-style-type: none"> ▪ Practice and Generalisation: ▪ Sorting shapes of varying size, texture, colour and thickness <ul style="list-style-type: none"> ▫ finding the shape in the environment ▫ drawing the shape ▫ tracing around the shape ▫ making the drawn shape into a picture ▫ select the shape – by touch alone – from a small selection ‘feely bag’ ▪ The following procedure for concept development is recommended: <ul style="list-style-type: none"> ▫ Model of concept: <p>The concept is modelled to the learner using verbal cues, e.g. adult or peer shows the concept, moves behind the chair/ places a plastic object behind the chair.</p> ▫ Experience the concept: <p>The learner repeatedly experiences the concept while hearing and using the language e.g. playground equipment, classroom situations e.g. hiding behind the chair.</p> ▫ Practice with 3-Dimensional Objects: <p>The learner uses 3 dimensional socio-dramatic play equipment to practice the skill, e.g. Duplo doll’s house, Fisher Price garage, tea sets.</p> ▫ Practice with 2-Dimensional Objects: <p>The learner identifies / uses the</p>

Barriers Experienced By Learners	Implications	Strategies
		<p>concepts in books/worksheets.</p> <ul style="list-style-type: none"> ▪ The following activities give practice at developing spatial skills in each step in the procedure: <ul style="list-style-type: none"> ▫ barrier games: A simple game based on giving and receiving instructions. Set it up by providing each learner with an identical set of materials. The instructor arranges his materials and instructs the listeners on how to reproduce this arrangement. The listener uses questions to clarify information, which is incomplete or unclear. When the instructions are completed the players compare their placement of materials. Prevent left-right confusions by seating the learners next to each other, facing the same way. Turn all the pieces face up before starting the game. ▫ listening skill games (using peers/audio tapes) ▫ drama and dance using positional concepts ▫ use everyday routines to practice spatial concepts <p>Peer/cross age tutors can be utilised to give instructions in the above activities in order to practise these concepts.</p> <ul style="list-style-type: none"> ▪ Initially teach left/right in relation to the learner's own hands and feet. 'Hokey Pokey' is a very good game for reinforcing these concepts. Use practical activities to reinforce the concept. Visual scanning left to right on the keyboard, number line and games, all need to be specifically taught and practised.
Measurement	<p>Learners may</p> <ul style="list-style-type: none"> ▪ Experience difficulty with time: 	<ul style="list-style-type: none"> ▪ Constant use of a clock, pictures of real events and/or calendar is very important when introducing a new time concept:

Barriers Experienced By Learners	Implications	Strategies
	<p> night/day morning/afternoon today age before/after date on written work birthday: day and month 7 days in one week order of days of the week weekdays/weekend yesterday/today/tomorrow O'clock related to daily activities day/month/year am/pm seasons special days/events calendar </p> <ul style="list-style-type: none"> ▪ struggle to understand measuring: <ul style="list-style-type: none"> length capacity/mass temperature 	<ul style="list-style-type: none"> ▣ discuss and describe vocabulary, e.g. morning is before lunch, afternoon is after lunch. ▣ relate to learners events for that time using pictures/individual learner photos etc., e.g. photo/picture of learner in bed at night, walking to school etc. ▣ use individual timetables (displayed in visual form) showing the sequence of events. ▣ teach recording of date e.g. 12 January 2004. ▣ memorise date and month of birthday and know how to plot it on a calendar. ▣ introduce concepts of weekdays/weekends i.e. weekdays go to school; weekends no school. ▣ learner places flashcard with words <i>yesterday</i> and <i>tomorrow</i> on blank calendar. <ul style="list-style-type: none"> ▪ Introduce the learner to units of measurement. Learner needs to be given the opportunity to measure many items using a ruler, string and other resources. Select a range of everyday containers to compare volumes. Generalise the skill to cooking. A similar process is used for mass. Compare learners' heights and weights. ▪ Weather – Relate to the maximum and minimum temperatures from the TV/radio or newspapers. Record in a graph.