

The Principal's Role in *Ensuring Numeracy Development*



Numeracy

- Not a synonym for school mathematics
- However numeracy skills are underpinned by some mathematics

Definition

- Numeracy is the knowledge skills and appreciations needed for an individual to understand and utilize mathematical ideas, techniques and applications

Numeracy involves the use of skills including

- Interpreting
- Applying and
- Communicating mathematical information in commonly encountered situations to enable full, critical and effective participation in a wide range of life roles

Basic life roles which require numeracy skills

- Counting
- Reading a clock
- Working with money
- Reading a calendar
- Finding a page in a book
- Checking a bank statement or utility bill

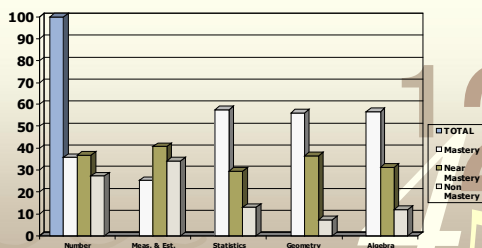
Requirements of Society

- A deep understanding of basic mathematical concepts
- The ability to reason and communicate mathematically

Design of the Curriculum

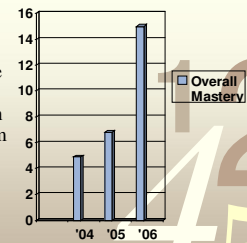
- Number
- Measurement and Estimation
- Geometry (Spatial issues)
- Algebra (identification of patterns)
- Statistics (data handling)

Grade 3 Diagnostic Test - 2006



The Grade 3 Data

- Overall mastery speaks to students who were able to master all five strands
- The graph shown indicates the percentage of students able to attain overall mastery between 2004 and 2006 increasing from 4.9 – 15%

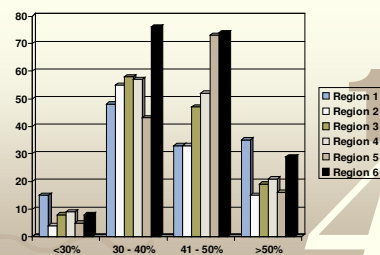


Source - SAU, MOE

Grade 6 Achievement Test

- 2006 the National Average was 53% with 73% of primary schools obtaining averages at or below the National Average
- In 2007 the National Average fell to 46% with 71% of schools obtaining averages at or below the National Average
- National Average of 56% in 2008

GSAT Performance by Region for 2007



CSEC

- Used to assess attainment at the Secondary Level
- In 2006 19,241 students sat the examination
- 35.7% of those sitting the mathematics examination in 2006 attained Grades I, II or III
- If the cohort size is considered – actual attainment levels fall to 13.7%

CSEC 2007

- 18,606 students sat the examination
- 35.5% of those sitting were able to attain Grades I, II or III
- If the cohort is used to determine attainment of the cohort, attainment levels fall to approximately 14%

What are some possible reasons for the low levels of attainment?

- Poor student attitudes
- Poor teacher attitudes
- Teacher and student fears of the subject
- Weak educational leadership
- Quality of teaching/delivery
- Failure to align concepts with reality

Reasons for Low Levels of Attainment

- Failure to align methodology to the age and stage of students
- Ineffective methodology
- Class size
- Availability of resources

Components of an Effective School

- Orderly and safe environment
- High expectations of student attainment
- Frequent assessment of student progress
- The effective leading of learning with an emphasis on the acquisition of the basic skills of literacy and numeracy

* Strong parental &/or community support

The Principal's Primary Role

Leader
of
Learning

What is the role of the Leader of Learning?

- Guiding curriculum delivery
- Ensuring skills necessary for personal and professional growth and development are developed
- Ensuring numeracy is a consistent focus and its development facilitated
- Ensuring balance in the delivery of the total curriculum

How do I begin the process of ensuring numeracy development?

Conduct Gap Analysis

- Create a Mathematics Team (benefits)
- Develop a Hypothesis – What is/are the factor (s) you believe is/are contributing to your present levels of student performance?

Gather Data to assess needs

- 1) Talk with teachers and students
 - Assess views on mathematics
- 2) Develop a culture of using data to guide the decision-making process
 - a) Review teacher qualification and placement
 - b) Review student performance data

Gather data to assess needs cont'd.

- 3) Review the school timetable
- 4) Begin observing classes to determine what methodology is being used
- 5) Review student performance data to determine areas of strength and weakness
- 6) Audit resources in school which support mathematics teaching and learning

Conduct Gap Analysis

- Use the Data
- Develop a Data-Based Plan
- Monitor progress and document success

What are some of the strategies I can use to ensure Numeracy Development?

- Institute Common Planning Time
- Invest in Mathematics Manipulatives and Literature

Ensure teachers employ the three-part lesson structure

- Starter
- Main Lesson
- Plenary

The Lesson Starter

- 5 – 10 Minutes
- May or MAY NOT be related to the main lesson
- Should promote mental calculations
- Should involve interaction between students and teachers
- Should be fun and exciting

**The Main Lesson –
Focused on
Concept Development & Understanding**

- 30 – 40 Minutes
- Lesson should be focused on students understanding the related concepts through the use of
 - Thinking Based Approaches
 - Guided Discovery

Why Conceptual Understanding?

- ‘If we want students to know what mathematics is, as a subject, they must understand it. Knowing mathematics, really knowing it, means understanding it. When we memorize rules for moving symbols around on a paper we may be learning something, but we are not learning mathematics.’ (Ainsworth, Christinson, 2006)

Why Conceptual Understanding?

‘When we memorize names and dates we are to learning history; when we memorize titles of books and authors we are not learning literature. Knowing a subject means getting inside it and seeing how things work, how things are related to each other, and why they work like they do...’

(Hiebert, 1997, p. 4)

Why Conceptual Understanding?

‘...Investigations have consistently shown that an emphasis on teaching for meaning has positive effects on student learning, including better initial learning, greater retention, and increased likelihood that the ideas will be used in new situations. These results have also been found in studies conducted in high-poverty areas...’

(Cawelti, 1999, p. 120)

Why Conceptual Understanding?

‘...If students don’t understand the concepts, then it’s likely that they are going to forget, and the teachers are going to have to go back ad review and review...’

(Hiebert, 2003, p. 24)

Main Lesson

- Provide opportunities for the development of Computational Fluency
- Ensure that students Problem Solving Skills are developed – more than worded problems
- Students are engaged in discussions with each other and their teacher
- Focused on the development of Number Sense
- Students are engaged in the analysis and discussion of their errors

The Plenary

- 5 – 10 Minutes
- Presentation/Marking of work
- Overview of concepts which evolved from lesson
- Informal assessment by teacher through questioning of students
- Identification/development of any generalizations which can be made

Reorganize Staff

- Utilize Team Teaching approach
- Provide Professional Development opportunities for teachers to strengthen their pedagogical content knowledge
- Promote collaborative assessment of student work (test setting and marking)
- Block the teaching of mathematics at the secondary level
- Facilitate demonstration lessons

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Create mathematics corners in each classroom

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Be strategic in your efforts to change student attitudes

Establish a mathematics club

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Encourage Parental Involvement

- Institute a Numeracy slot at PTA Meetings
- Provide parents with literature to help them support the development of the numeracy skills of their child(ren)

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Websites/Resources

- www.subtangent.com (Sample Starters)
- <http://mathforum.org/>
- <http://web.naesp.org/nprc/wpntk.htm>
- www.mathsolutions.com
- www.figurethis.org/fc/family_corner_math.htm (For families)

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Contact Information

- Tamika Benjamin 429-2994
- Novlet Plunkett (Region 3) 466-3430
- Pauline Thames-Baker (Region 2) 841-0099
- Claudette Henry-Harris (Region 2) 323-7033
- Bernadette Miller (Region 5) 833-0744
- Camay Hunter (Region 1) 437-5470
- Carlton Mason (Region 6) 430-0716
- Syreeta Kenny-Bennett (Region 6) 349-7349