

ATTACHMENT 8B: Flow of implementation in cycle three**1. Tuesday 30 July 2002, Lesson 1: What is matter? (Video Tape 13)**

During this lesson I introduced the concept of reading to learn as opposed to reading for enjoyment and entertainment. Then I worked through the necessity for using a strategy when reading in this way and also explained the process that we would use during the lessons. After working through the reading approach as explained in the planning section we discussed the questions on the worksheet and dealt with the difficult words that they had identified. The process of categorization was discussed and then groups were then given a cooperative task of categorising a list of objects from the environment. In this way matter was divided into living and non-living things. The differences between living and non-living things were discussed. The students were then asked to transfer the concept by adding their own examples. Through cognitive questioning we established a definition of matter.

2. Wednesday 31 July 2002, Lesson 2: The properties and states of matter. (Video Tape 14)

Using cognitive questioning and the use of equipment I dealt with the properties of matter by comparing the properties of two substances. This was generalised to the two properties that all matter possesses viz. that they all take up space and have mass. The fact that substances are identified through the use of their properties was then covered. The three states of matter were then demonstrated by heating ice until it melted to water, and then heating the water until it boiled and formed steam. During this time cognitive questioning and especially the skill of prediction was used to establish the three states nl. solid, liquid and gas. Groups were then asked to categorise a list of different substances into three states and to add a few of their own to each state.

3. Friday 2 August 2002, Lesson 3: Measuring things. (Video Tape 15)

This lesson was observed, assessed and triangulated by a competent observer. This was the second reading lesson and dealt with two issues. First it covered early ways of measuring things and then different instruments used in making measurements. The reading strategy as explained in the planning phase was used again. After the reading exercise two individual tasks were completed. In the first the skill of estimation was required. I asked them to estimate the length of a line drawn on the board, a piece of music I played them and the mass of a tin of cold drink. After writing their different estimations

in their worksheets we measured the three items accurately and compared their estimations to the results. In this way they discovered that estimations or guessing is often not very accurate. To introduce the students to the concept of a measuring instrument and a measuring unit, I asked the groups to measure and record the lengths of various objects using parts of their bodies and the old measuring units they had read about such as cubits, spans, hands and feet. We then discussed and recorded problems with this method so that they would discover the need for more accurate measuring instruments and units.

4. Monday 5 August 2002, Lesson 4: Classifying measuring instruments. (Video Tape 16)

The methodology used in this lesson was a combination of demonstration, explanation and cognitive questioning. A wide range of commonly used measuring instruments used to measure time, length, mass, temperature and capacity were shown to and handled by the the students. They were asked where each was used and what units were used with each. The learners were then given the task of practically categorising the instruments and then to record this classification in their workbooks.

5. Tuesday 6 August 2002, Lesson 5: The measurement of length. (Video Tape 17)

This was the third of the reading lessons using the reading for information strategy. It covered the concept of length and the instruments and the units used used to measure length. Again the practical equipment was available and after the reading lesson I dealt with the skill of using tables to record information explaining the elements of rows, columns and cells. Finally the students were given the task of using a table to classifying the instruments used to measure length into those that were used to measure short, medium and long distances and the diameters of things.

6. Thursday 8 August 2002, Lesson 6: The practical measurement of length. (Video Tape 18)

This lesson consisted of practical, hands on use of instruments such as the ruler, metre stick, tape measure and callipers to measure length. We discussed and practised the correct way to make a measurement using a ruler, a metre stick and a tape measure and dealt specifically with the error of parallax. Pairs were then given a number of things to measure. These included the length of match box, a text book, the classroom and the inside and outside diameter of a plastic pipe. These were chosen so that different instruments and units would have to be used. I also dealt with the conversion of the

observed lengths on the instruments to the written form.

7. Monday 12 August 2002, Lesson 7: Measuring area. (Video Tape 19)

The fourth reading for information lesson covered the concept of area, the units of area and finding the area of squares and rectangles. The concept of area being a surface was consolidated by asking the students to colour in and name different shaped surfaces on their worksheets. Using a classification process and cognitive questioning the properties of squares and rectangles were established. The square metre was introduced and named by building one using dowels. The students were then asked to estimate how many of the square metres would be needed to cover the classroom floor. This method of calculating the area of the classroom was suggested to the students and addressed. Finally the students were given square centimetres and their use to measure the area of smaller surfaces discussed.

8. Wednesday 14 August 2002: Lesson 8: Determining area. (Video Tape 20)

After providing individuals with cardboard squares and rectangles, an envelope containing many square centimetres was given to them. The square centimetre was studied again and its properties and name established through questioning and measurement. Individuals and groups then found the area of the squares and rectangles by covering the shapes with square centimetres and then counting them. The results were fed back to me and a table was built up on the chalk board of the number of squares along the length, the breadth and the total used. The areas of each shape was then stated and the areas of each compared. The students were then asked to study the data in the table and see if they could come up with an easier way of determining area than by covering the shapes with the square centimetres. In this way the formula for determining the area of squares and rectangles was discovered. Finally finding the area of larger areas using the square metre and square kilometre was dealt with.

9. Friday 16 August 2002, Lesson 9: Measuring volume. (Video Tape 21)

This was the sixth and last of the reading strategy lessons. It covered the concept of volume and the units of volume. Because of the difficulty of the topic much time was given to the pre-reading and clarification of difficult words. Time was spent using cognitive questioning in establishing the properties of cubes and rectangular blocks.

10. Monday 18 August 2002, Lesson 10: Determining volume. (Not video taped)

After dealing with the concept of a cubic centimetre a rectangular block was shown to the students and the problem of finding its volume put to them. After stating that its volume could be found by building the object with cubic centimetres and counting them this was done practically in groups. The data concerning the number of cubes that were used in the length, breadth and height and the total number used was captured in a table on the board. Using this data and cognitive questioning together we established the generalised formula and process for finding the volume of cubes and rectangular blocks. The problem of using cubic centimetres for determining the volume of large and very small cubes and rectangular blocks was discussed and the cubic metre and cubic millimetre dealt with as a solution. Finally, the groups were given different sized cubes and rectangular blocks and asked to determine their volumes using measurement and calculation.

11. Friday 23 August 2002, Administration of the teacher questionnaire.

On this day two teachers completed the questionnaire. The question asked was: What are your thoughts about teaching street children?

12. Monday 16 September 2002: Written achievement test number three.

Because of the very practical nature of the content covered, I decided to make some changes to the design of the test. Some of these were:

- The test required the use of more equipment. For example:
 Question 3: Look at the substance in the bottle. Is it a solid, liquid or gas. Why have you given it this name?
 Question 5: I am going to hold up some measuring instruments. Write down their names, what they measure and what units they use.
- At times I moved away from concrete objects and real life pictures to a more symbolic representation of objects. For example:
 Question 20: What formula would you use to find the volume of this shape?
- I made use of many practical measuring tasks and simple calculations. For example:
 Question 10: What is the distance right around this shape?

- Estimation was used in the test. For example:
Question 9: Look at the height of the classroom. Put a ring around what you think the correct height is. 300 cm 4 m 2000 mm 1 km 50 m
- I used problem solving and intuitive manipulation of formula. For example:
Question 17: You are told that the area of this square is 25 m^2 . What is the length of the square?

13. Tuesday 17 September 2002: Learner questionnaire.

On this day the learner questionnaire was administered to the grade 8 class. Nine boys responded.

14. November 2002 - Final year Mathematics and Science examinations.

These examinations covered all the work I had taught throughout the year for all four grades.