

**MINISTRY OF EDUCATION, YOUTH
AND CULTURE**

**MATHEMATICS
AND
NUMERACY POLICY**

APPENDIX I

KEY LEARNING PRINCIPLES

1.0 Key Learning Principles

Key Learning Principles reflect precepts that are fundamental to the development of high levels of numeracy and must be used to guide the teaching and learning process. These Key Learning Principles must be used in conjunction with the Mathematics Standards 1-11.

1.1 Number and Computation

Number is central to numeracy. It is used in society in a variety of ways: to count, order, calculate, measure, predict and justify. From the very earliest stages in a learner's mathematical development, number and computation play important roles.

Key Learning Principles

- i. Pupils must be aided to develop quick recall of number facts based on sound understanding. This understanding should be the basis of the application of these number facts in all areas of study, as well as in everyday contexts.
- ii. Pupils must be given ample opportunity in the classroom to develop facility with real-life applications of number.
- iii. Pupils must be encouraged to (a) use their own methods whenever these are appropriate and (b) justify the methods they have chosen.
- iv. Pupils must be encouraged to check their answers to determine if they make sense in the context being used.
- v. Pupils must be encouraged to communicate using mathematics vocabulary.
- vi. Calculators must be used at all levels of the system, as tools to increase speed and accuracy in computations and in recognition that they will be widely used in out-of-school situations.
- vii. Pupils must be encouraged to use short-cuts and informal jottings in calculations.
- viii. In spite of the advantages of using calculators, pupils must be given the opportunity to develop mental agility with numbers by the regular infusion of activities which will nurture and develop such thinking.

- ix. Pupils must be provided with opportunities to use a range of computational techniques.

1.2 **(Pattern) and Algebra**

Investigating patterns and relationships is fundamental to the development of good algebraic skills. It is through these experiences that learners are able to develop mathematical thinking skills such as specialising, generalizing, representing, justifying and explaining.

Key Learning Principles:

- i. Ample opportunity must be provided for pupils to describe patterns and relationships, and to represent them through the use of symbolic expressions, graphs or tables.
- ii. Appropriate contexts must be used in order to build an awareness of the usefulness of algebra in solving real world problems so that algebraic manipulation is not viewed as mere routine.
- iii. Pupils must be provided with opportunities to work systematically, make and test conjectures and to make predictions.

1.3 **Measurement**

A practical understanding of measurement is vital. It is important that pupils develop a “feel” for measures of varying forms and be comfortable with the use of these measures in other school subjects as well as in situations which may arise in their role as consumers and users of measurement information.

Key Learning Principles:

- i. Pupils must be aided to develop “intuitive notions” of measures through extensive practical activities.
- ii. Pupils must be encouraged to use a variety of standard and non-standard units of measures in order to develop an understanding of the measurement process.

- iii. The use of measurement and measuring units in other subject areas such as science, social studies, geography, home management, and physical education must pervade the teaching of measurement.
- iv. Students must be provided with opportunities to assess the nature of the unit to be used which is “fit for purpose”, for example, in purchasing lengths of fabric, in measuring rainfall and dosages of medication, volume (millilitres, litres etc); and to determine when particular units should be used, for example in measuring the length of a pencil compared to measuring the distance between two towns.
- v. Pupils must be encouraged to use estimates before accurate measurement.

1.4 Data Handling

The reading and interpreting of quantitative information which may be presented in any form (tables, charts etc) are essential requisites for functioning in society.

Key Learning Principles

- i. Pupils must be provided with ample opportunity to collect, sort, represent, and analyze data.
- ii. Pupils must be aided in developing a facility with the interpreting of different types of data presentations including tables, charts, and graphs.
- iii. Pupils must be made aware of, and given opportunity to discuss, simple statistical notions in order that they may be able to make informed judgements.
- iv. Pupils must be provided with which will enable them to develop a sense of how mathematics can be used to manipulate data and to represent or misrepresent trends and patterns.
- v. The study of probability must focus on enabling the understanding of its use in predicting, in determining risks, and in estimating chances, odds and proportions.

1.5 Shape and Space

The study of shape and space is important to the overall mathematical development of the average citizen. It is here that visualization skills are honed, and the learner is enabled to understand the world through two-dimensional shapes and three-dimensional objects.

Key Learning Principles:

- i. Kinesthetic experiences must be fundamental to classroom activity. Hence, practical tasks should play a major role in the classroom experiences.
- ii. Students should be aided to develop skills of applying geometry through modelling and problem solving in real world contexts.
- iii. Students must be aided to develop spatial awareness, geometric intuition and the ability to visualize.
- iv. Students should be provided with experiences involving both two and three dimensions
- v. Students should be provided with learning tasks which will enable the development and use of conjecture, deductive reasoning and proof.

While the Key Learning Principles serve largely to guide the focus of the learning environment, they do not address important affective traits of confidence and attitude which were identified as important to the attainment of high levels of numeracy. **It is therefore necessary to recognize that learning goals must include confidence-building and the development of positive attitudes towards mathematical activity.**