



## Mathematical Thinking Course Outline

### SP Phase

The AIMSSEC Mathematical Thinking residential course (SP phase) concentrates on grades 7 and 8, with specific reference to the following areas:

- Number
- Patterns, functions and algebra
- Geometry
- Measurement
- Probability and statistics
- Planning for learning
- Information technology skills (for either beginners or advanced users)

The course content is related to the CAPS (Curriculum Assessment Policy Statement) and is introduced with accompanying pedagogical approaches. The content areas are broken down as follows:

#### Number (3 lessons)

- **Calculation techniques:** including knowing times tables up to twelve
- **Prime numbers:** up to 100; working out the prime factors of three-digit numbers
- **Lowest common multiples and highest common factors:** up to three-digit numbers
- **Powers:** square numbers and square roots; cube numbers and cube roots
- **Fractions and decimals:** addition, subtraction, multiplication and division

#### Patterns, functions and algebra (6 lessons)

- **Numeric and geometric patterns:** identifying and extending numeric and geometric patterns; describing and justifying the general rule
- **Algebraic expressions:** writing, interpreting and simplifying expressions; identifying variables, constants, coefficients and exponents; addition, subtraction, multiplication and division
- **Algebraic equations:** setting up equations; analysing, interpreting and solving number sentences and equations
- **Functions and their graphs:** using various representations of functions, including graphs; recognising the equivalence of these various representations

#### Geometry (6 lessons)

- **Two-dimensional shapes:** classifying and defining two-dimensional shapes; defining straight, parallel and perpendicular lines; describing the properties of similar and congruent shapes; recognising and solving problems with different types of angles
- **Three-dimensional shapes:** sorting and comparing polyhedra by the number of faces, vertices and edges; making three-dimensional models from nets
- **Transformations:** describing and performing transformations of given shapes; drawing enlargements and reductions of given shapes

#### Measurement (2 lessons)

- **Conversion between units**
- **Two-dimensional shapes:** calculating the perimeters and areas of squares, rectangles, triangles and circles; calculating the perimeters of irregular polygons

### Probability and statistics (4 lessons)

- **Statistics:** data-handling cycle – asking and answering questions using statistical techniques; data collection; recording data in tally tables and stem and leaf diagrams; using summary measures, including measures of central tendency and dispersion for grouped and ungrouped data, and graphs, to analyse data and draw conclusions; the appropriate use of various graphs and charts
- **Probability:** language of probability and probability scale; introduction to probability through practical experiment; data recorded on tree diagrams and 2-way tables; relative frequency; deriving theoretical probabilities from expected results; multiplication rule for independent events

### Planning for learning (3 lessons)

As educators, we tend to concentrate on *planning for teaching* to ensure curriculum coverage. These sessions will help educators to shift from *planning for teaching* to *planning for learning*; it explains how this practice can enhance their effectiveness in the classroom to address issues of inclusion, differentiation and progression. Educators are expected to engage with relevant learning resources that they can use with learners in their schools.

### Information technology skills (4 lessons)

Beginner level	Advanced level
<ul style="list-style-type: none"><li>• <b>General computer skills:</b> logging on to a computer; opening and using programs; saving and renaming software files;</li><li>• <b>Internet skills:</b> online research and communication; use of specialist websites such as the Aiming High Teachers' Network and Moodle;</li><li>• <b>Specialist software:</b> the use of mathematical software, programs and resources appropriate to the teachers and their learners, such as Microsoft Word and Microsoft Excel.</li></ul>	<ul style="list-style-type: none"><li>• <b>Internet skills:</b> online research and communication; use of specialist websites such as the Aiming High Teachers' Network and Moodle;</li><li>• <b>Specialist software:</b> the use of mathematical software, programs and resources appropriate to the teachers and their learners, such as Microsoft Excel and GeoGebra.</li></ul>

In addition to the above mentioned content areas, AIMSSEC provides plenary sessions on a variety of mathematical topics and cross-cutting issues related to the teaching and learning of mathematics.

To complete the course successfully, educators are expected to write a test on the work covered during the course and to submit two assignments. These assignments are based on *planning for learning* and the use of learner-centred activities in the classroom.

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