



Mathematical Thinking Course Outline

IP Phase

The AIMSSEC Mathematical Thinking residential courses focus on the first two grades of the IP phase, and specifically cover the following content areas:

- Number, Operations and Relationships
- Patterns, functions and algebra
- Space and Shape (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 Statements) and it also includes pedagogical approaches. The content areas are broken down as follows:

Number (9 lessons)

- **The number system:** counting, ordering and comparing numbers; place value
- **Operations:** addition, subtraction, multiplication and division
- **Calculation techniques:** doubling, halving, compensating, number lines, inverse operations; using the commutative, associative and distributive properties
- **Common fractions:** comparing and ordering fractions, recognising equivalent forms, adding and subtracting proper fractions and mixed numbers with the same denominators, finding fractions of whole numbers, solving problems in context

Patterns, functions and algebra (2 lessons)

- **Identifying and extending patterns:** patterns with constant difference or constant ratio
- **Functions:** describing observed relationships, using flow diagrams

Geometry (3 lessons)

- **Two-dimensional shapes:** describing, sorting and comparing regular and irregular shapes
- **Three-dimensional shapes:** nets, making three-dimensional models of polygons
- **Transformations:** using rotations, translations and reflections to form composite shapes; tessellation; describing patterns in nature, life and cultural heritage

Measurement (3 lessons)

- **Conversion between units**
- **Techniques of measurement:** estimating the measurements of two and three-dimensional objects; measuring the mass and volume of three-dimensional objects by estimating, comparing and ordering
- **Time:** reading, telling and writing the time in a variety of formats

Probability and statistics (4 lessons)

- **Probability:** language of probability and probability scale; introduction to probability through practical experiment; random events; listing outcomes
- **Statistics:** data-handling cycle – asking and answering questions using statistical techniques; data collection; recording data in tally tables; using measures of central tendency and spread for ungrouped data, and graphs, to analyse data and draw conclusions

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

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.
