

# Mathematics KS3 Course Overview

Years 7-9, 2010-2011

## Introduction

This document sets out the Mathematics curriculum for Years 7 to 9 at ICHK. Its main aims are to establish a clear vision for teaching and learning and to translate this vision into a framework for everyday use.

## General Vision

In keeping with the [ICHK vision statement](#), it is hoped that through the application of this curriculum students will:

- Be challenged to learn at a **high** but **appropriate** level;
- Work **collaboratively** in a spirit of **sharing** and **inclusion**;
- Work with increasing confidence and flexibility to solve unfamiliar problems;
- Solve problems with **creativity**, **innovation** and **critical analysis**;
- Develop positive attitudes towards mathematics and increasingly make connections between different aspects of mathematics;
- Use **ICT** as they learn the subject;
- Be asked to take **responsibility** for their own learning.

## Mathematics Vision

To make new learning more accessible to students, teachers will draw upon the knowledge and skills students have acquired in previous years, thereby activating prior knowledge. It is important to assess where students are in their mathematical growth and to bring them forward in their learning.

Students in a mathematics class typically demonstrate diversity in the ways they best learn. It is important, therefore, that students have opportunities to learn in a variety of ways – individually, cooperatively, independently, with teacher direction and through hands-on experience. In mathematics, students are required to learn concepts, procedures, and processes and to acquire skills. They become competent in these various areas with the aid of instructional and learning strategies best suited to the particular type of learning taking place. The communication and reflection that occur in class will also help students not only to articulate and refine thinking but also to see the problems they are solving from different perspectives.

The aims of the Mathematics curriculum at ICHK are to encourage and enable students to;

- enjoy mathematics and to develop curiosity through constant questioning
- develop an understanding of the principles and nature of mathematics
- communicate clearly and confidently in a variety of contexts
- develop logical, critical and creative thinking in solving real-life problems
- develop power of generalization
- appreciate the international dimension in mathematics through an awareness of the universality of mathematics and its multicultural and historical perspectives

## Structure

The study of mathematics will enable students to apply their knowledge, skills and understanding to relevant real-world situations.

The study of mathematics will include 3 main strands in each of the Year 7-9 classes:

- Number and algebra
- Geometry and measures
- Statistics

### Year 7

- **Number and algebra**

By the end of this course students will:

- represent, compare and order numbers, including integers;
  - demonstrate an understanding of addition and subtraction of fractions and integers, and apply a variety of computational strategies to solve problems involving whole numbers and decimal numbers;
  - demonstrate an understanding of proportional relationships using percent, ratio, and rate;
  - represent simple linear growing patterns using graphs, and algebraic expressions;
  - solve simple algebraic equations using a variety of strategies, including inspection and guess and check.
- **Geometry and measures**  
By the end of this course students will:
    - determine the relationships among units and measurable attributes, including the area of a trapezium and the volume of a right prism;
    - construct related lines, and classify triangles, quadrilaterals, and prisms;
    - describe location in the four quadrants of a coordinate system.
- **Statistics**  
By the end of this course students will:
    - display data using charts and graphs, including circle graphs;
    - make and evaluate convincing arguments, based on the analysis of data.

### Year 8

- **Number and algebra**  
By the end of this course students will:
  - represent, compare, and order equivalent representations of numbers, including those involving positive exponents;
  - solving problems involving whole numbers, decimals, fractions, and integers, using a variety of computational strategies;
  - solve problems by using proportional reasoning in a variety of meaningful contexts;
  - represent linear growing patterns using graphs, and algebraic expressions, and equations;
  - solve and verify algebraic equations using a variety of strategies, including inspection, guess and check, and using a “balance” model.
- **Geometry and measures**  
By the end of this course students will:
  - demonstrate an understanding of the geometric properties of quadrilaterals and circles and the applications of geometric properties in the real world;
  - develop geometric relationships involving lines, triangles, and polyhedra, and solve problems involving lines and triangles;
  - represent transformations using the Cartesian coordinate plane, and make connections between transformations and the real world.
- **Statistics**  
By the end of this course students will:
  - display data using charts and graphs, including frequency tables with intervals, histograms, and scatter plots;
  - apply a variety of data management tools and strategies to making convincing arguments about data.

### Year 9

- **Number and algebra**  
By the end of this course students will:
  - demonstrate an understanding of the exponent rules of multiplication and division, and apply them to simplify expressions;
  - manipulate numerical and polynomial expressions, and solve first-degree equations;
  - demonstrate an understanding of the characteristics of a linear relations;
  - connect various representations of a linear relation.

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- **Geometry and measures**

By the end of this course students will:

- solve problems involving the measurements of two-dimensional shapes and the surface areas and volumes of three-dimensional figures;
- determine the relationship between the form of an equation and the shape of its graph with respect to linearity and non-linearity;
- determine, through investigation, the properties of the slope and y-intercept of a linear relation;
- solve problems involving linear relations.

- **Statistics**

By the end of this course students will:

- display data using charts and graphs, including frequency tables with intervals, histograms, and scatter plots;
- apply a variety of data management tools and strategies to making convincing arguments about data;
- use probability models to make predictions about real-life events.

ICHK has a vision that requires our teachers to execute and differentiate learning opportunities to maximize the performance of each student. Students in our classes will have the opportunity to be exposed to extension material but will operate at a rate that is more suitable at their current developmental stage. Mathematics teachers of all classes will closely monitor their individual student progress.

## Assessments

Each Year group will complete units from their textbook that cover the strands and assessments designed to fulfill requirements of the National Curriculum Key Stage 3. This will be used in conjunction with the ICHK assessment scale and Nation Curriculum statements (see attached). All assessments will be differentiated to enable students that require support to achieve realistic improvement and to extend gifted and talented students with challenging, problem solving experiences.

Formative assessments will take place throughout each unit and will take many forms (discussions, written work, student reflections, practical tasks, projects, investigations, research assignments). Various units will culminate in summative assessments which will aim to provide a summary of content taught through the Units and several common detailed formative assessments will ensure an holistic perspective of the students level of achievement at the end of each Term. There will be approximately 2-3 summative assessments per term plus an additional End of Term Test.

A final level of achievement will be reported on the basis of all the evidence collected throughout the year - that is consistent with Level of Achievement as demonstrated by the reference samples provided by the UK National Curriculum Framework for Assessing Pupil's Progress (APP) Standards File at Key Stage 3 (KS3). Formative assessments cover most of the strands and therefore produce a true reflection of the levels achieved by students at KS3. The exposure to the nature of Test formats provides experience for students in preparation for IGCSE in the next stage of their development.

## Differentiation

Throughout the Mathematics course in Years 7-9, students will be supported to ensure the curriculum is accessible to all, whilst providing appropriate challenge. Some of the ways in which this will be achieved are:

### Resources:

Students will be exposed to different ICT opportunities of differing complexity for students who may be working at different levels, e.g. Videos, Interactive multimedia software, use of Microsoft powerpoint, word and excel software.

Students will be exposed to Bloom's Taxonomy of Learning, Cooperative Learning Strategies and de Bono's Six Thinking Hats, Lateral thinking, Dr Kaplan's Icon Prompts, Critical thinking and Socratic questioning.

**Support:**

Individual students may receive additional teaching assistance as specified in their IEP. Students will also be supported by the class teacher; through varied activities or expected outcomes; through more detailed explanations or support during a task; or by varying the physical requirements or presentation aspects of a task (e.g. other than written information).

After school tuition, opportunities for help during Break 1 and Break 2 and email of Q & A after hours can be arranged with teachers.

**Outcomes:**

It is envisaged that students will work within or above the level expected as per the ICHK assessment scale, unless stated in their IEP. All activities set will enable students to work within or beyond the level expected for their year group whilst a focus of enquiry learning will enable many students to develop their ideas and projects. However, some activities will need to be adjusted to ensure they are accessible to those students who are not working at the expected level for their year group. Each activity will be individually assessed for its suitability for the students within the class and adjusted accordingly.

**Main Resource Requirements**

Mathematics textbooks follow the Nelson Thornes New National Framework Series used in UK schools and conforming to the National Key Stage 3 Standards. There are three levels of textbooks tailored to the needs of students, the \*, Core and Plus pupil books. While the \* pupil book is an ideal resource for less able students, the Core and Plus pupil books provide challenging differentiated questions for more able students. In addition, all students are provided with a companion workbook that allows further differentiated assessment. A scientific calculator plus graphing and stationary equipment will be required by each student.

**Links to Relevant Syllabus and Curriculum Documents**

Please refer to the following documents for related information:

- [Level Descriptions for Mathematics](#)
- [Mathematics KS3 Curriculum document](#)
- [Assessing Pupils' Progress \(APP\) in mathematics at KS3](#)

**ICHK Teaching & Learning & ICHK Student Documents**

Please refer to the following documents for related information:

- [ICHK Curriculum document for Years 7-9](#)
- ICHK Teacher document
- [ICHK Assessment Scale](#)
- ICHK Academic Honesty Policy
- Mathematics Assessment Rubric for Y7-9
- Mathematics National Curriculum Equivalent Levelled Assessment Statements

**Calendar**

Although formative assessment will take place continuously in class, below are the details of the main end of unit/term and summative assessment opportunities:

Term 1	Term 2	Term 3
Years 7 and 8: Number I & II  Year 9: Fractions, Decimals & Percentages		

Term 1	Term 2	Term 3
	CNY Holiday	Years 7 - 9: Statistics & Probability Years 7 - 9: EoT 3 Tests
Mid Term Break	Year 7: Intro to Algebra Year 8: Coordinate Geometry Year 9: Geometry & Measures	
	Years 7 - 9: EoT 2 Tests	Summer Break
CAS Week		
Year 7: Lines & Angles Year 8: Intro to Algebra Year 9: Linear Algebra Years 7 - 9: EoT 1 Tests	Easter Holidays	
Christmas Holidays		

## Reflections/Points to Note from 2010/11

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Created By/Date	Reviewed	Signed
J. Lam/ Friday, January 28, 2011		