

MANUKAU CHRISTIAN SCHOOL

**CAMBRIDGE INTERNATIONAL
PROGRAMME
YEARS 7 AND 8
CHECKPOINTS**

**MATHS
SCIENCE
ENGLISH**

MATHEMATICS

MATHEMATICS

OVERVIEW

Year 7

NUMBER AND NUMERATION

Sets: subsets, union of, intersection of, finite and infinite, number sets.

Ratios: comparisons of two sets.

Comparing ratios.

Using proportions.

Percent.

Exponents: in base 10, expanded notation.

Integers: absolute value, adding on the number line, rules for addition and subtraction, multi-step problems, multiplication and division.

FRACTIONS

Revise terms.

Fractional form vs fractions.

Equivalent fractions.

Renaming.

Lowest terms.

Addition, subtraction, multiplication and division.

Comparing.

Cross multiplication.

Renaming mixed numbers in fractional form.

Addition, subtraction, multiplication and division of mixed numbers.

Multiplying and dividing fractions.

Cancelling.

Reciprocals.

Fractional form division.

Decimal fractions.

GEOMETRY

Geometric shapes in nature.
Revision of terms.
Planes and angles.
Measuring and drawing angles using a protractor.
Types of angles, related angles.
Related lines.
Constructions.
Polygons.
Triangles.
Quadrilaterals.
Congruent and similar figures.
Solid figures.

MATHEMATICAL PROCESSES

Commutative property of addition and multiplication.
Associative property of addition and multiplication.
Distributive property over addition and subtraction.
Properties of 0 and 1.
Addition, subtraction, multiplication and division of large numbers.
Multiplying and dividing by powers of 10.
Rounding and estimating.
Interpretation of mathematical sentences.
Equal and unequal equations.
Problem solving: multi-step, using open sentences.
Factorisation: prime, factor trees and factor ladders.
Primes and composites.
Tests of divisibility.
Least common multiples.

DECIMAL FRACTIONS

Equivalent decimals.
Terminating and repeating decimals.
Addition, subtraction, multiplication and division of decimals.
Percents and decimal numbers.

MEASUREMENT

Metric units of measurement. Prefixes and symbols.

Metric conversion.

Perimeter.

Area of polygons, parallelograms, triangles.

Trapezoids, circles.

Surface area of solid figures.

Volume of solid figures.

STATISTICS

Graphing ordered pairs.

PATTERNS AND ALGEBRA

YEAR 8

OVERVIEW

NUMBER AND NUMERATION

Sets: subsets, finite and infinite, equivalent, union and intersection.

Number sets: natural numbers, whole numbers, integers, rational numbers.

Ratio.

Proportions.

Percent.

Comparing numbers.

Integers: opposite and order, absolute value, addition, adding groups, subtraction, multiplication and division, graphing ordered pairs.

Exponents: positive and negative, base 10, multiplication and division of powers of 10, scientific notation.

Numeration systems: the decimal system, different bases.

Square roots.

Irrational numbers.

MATHEMATICAL PROCESSES

Logic: deductive reasoning, proofs.

Rounding and estimating.

Addition: subtraction, multiplication and division of large numbers.

Mathematical properties.

Inverse operations.

Factorisation: prime.

Divisors: exact divisors, divisibility tests.

Prime and composite numbers.

Least common multiples.

Fractions: equivalent, comparing, renaming, mixed numbers, rational numbers, decimals.

Multiplication: fractions, rational numbers, decimals.

Division: of fractions, reciprocals, rational numbers, decimals.

Decimal fractions: converting fractions to decimals, rational numbers.

Multiplying and dividing by powers of 10.

Problem solving.

MEASUREMENT

GEOMETRY

Angles: measuring, related lines.

Definitions of: polygons, types of triangles and quadrilaterals.

Congruent and similar figures.

Geometric proofs.

STATISTICS

Graphing ordered pairs.

Graphing functions.

Statistical measures.

Organising data

Representing data: a histogram, frequency polygon.

Probability.

PATTERNS AND ALGEBRA

Equivalent equations.

Solving equations: by adding, subtracting, multiplying and dividing.

Problem solving.

Multi-step equations.

Solving inequalities.

Functions: the functional statement, the function table, examining functions.

Finding ordered pairs

The Curriculum Framework for Mathematics

Standards and Benchmarks for Year 7

Introduction

Mathematics should develop students' abilities to manipulate numbers and solve a range of numerical problems, It should allow students to interpret charts and tables and to understand the concepts of numbers and shapes. Although mental arithmetic strategies are key skills in Mathematics, they will not be assessed in these tests. It is, however, assumed that they will play an important role in developing students' skills in Mathematics and, as such, have been included in the Curriculum Framework. Because one paper permits the use of a calculator and the other does not, it is important that students are able to solve problems in both situations.

NUMBER

Properties

Students should:

- Np 1 Understand decimal notation and place value
Multiply and divide integers and decimals by 10, 100 and 1000
- Np2 Multiply and divide three digit by two digit whole numbers.
Know and use the order of operations, including brackets, with simple calculations.
- Np3 Use fraction notation to describe parts of shapes and to express a smaller whole number as a fraction of a larger one

- Convert terminating decimals to fractions
- Know that a recurring decimal is a fraction
- Use division to convert a fraction to a decimal
- Add and subtract fractions with common denominators
- Calculate fractions of quantities (whole number answers) and
- Multiply a fraction by an integer
- Recognise the equivalence of percentages, fractions and decimals
- Np4 Recognise and use multiples, factors, common factors, highest common factor, lowest common multiple, primes and use simple tests divisibility
- Recognise triangular numbers, squares and the corresponding square roots
- Np5 Know and use the symbols =, \neq , $<$, $>$
- Order fractions, decimals and percentages by magnitude

Problem Solving

Students should:

- Ns1 Understand, use and calculate simple percentages
 - Use percentages to compare simple proportions
 - Express one quantity as a percentage of another
 - Calculate percentage increase and decrease
- Ns2 Understand and use negative numbers
 - Order, add, subtract, multiply and divide positive and negative integers in context
- Ns3 Understand the relationship between ratio and proportion
 - Use ratio notation
 - Reduced a ratio to its simplest form and divide a quantity in a given ratio
 - Solve simple problems involving ratio and proportion in context
- Ns4 Round large positive whole numbers to the nearest 10, 100 or 1000 and decimals to the nearest whole number of 1 decimal place
- Ns5 Use a calculator to
 - (a) multiply and divide whole numbers (up to 3-digits).
 - (b) carry out calculations involving brackets, the memory, the square root and sign change keys
 Interpret a calculator display in different contexts

- Ns6 Without using a calculator
- (a) add and subtract whole numbers and decimals (up to two places)
 - (b) multiply and divide whole numbers and decimals (up to two places) by single digit whole numbers

Data Handling

Students should:

- Nd1 Collect and organise data
Design a data collection sheet or questionnaire to use in a simple Survey
Construct frequency tables for discrete data, grouped where appropriate in equal class intervals
Construct and interpret bar-line graphs, pictograms and frequency diagrams for grouped discrete data
Draw conclusions based on the shape of graphs
Compare two simple distributions using the range and one of the mode, median or mean
- Nd2 Find the mode (or modal class for grouped data), median and range
Calculate the mean, including from a simple frequency table
- Nd3 Understand and use the probability scale from 0 to 1
Find probabilities based on equally likely outcomes in simple contexts
Use experimental and theoretical probabilities in simple contexts

ALGEBRA

Manipulation

Students should:

- An1 Use letters to represent unknowns and variables
 - Simplify linear algebraic expressions by collecting like terms
 - Evaluate simple formulae
 - Knowing the meaning of words, term, expression and equation
- An2 Construct and solve simple linear equations with integer coefficients and factors

Graphs

Students should:

- Ag1 Plot graphs of simple linear functions
 - Generate co-ordinate pairs that satisfy a simple linear equation
 - Recognise the equation of lines parallel to the x-axis or the y-axis
- Ag2 Draw and interpret graphs of simple linear functions arising from practical situations
- Ag3 Understand and use 2-D Cartesian co-ordinates in all four quarters
- Ag5 Generate and describe simple integer sequences
 - Find simple term-to-term rules

SPACE

Measure

Students should:

- Sm1 Convert from one metric unit to another
Read and interpret scales on measuring instruments
- Sm2 Understand and use the 12-hour and 24-hour clock systems
Use and interpret timetables
- Sm5 Know and use the formula for the area of a rectangle
Calculate the perimeter and area of compound shapes made from rectangles and triangles
Deduce and use the formula for the area of a triangle, parallelogram and trapezium

Geometry

Students should:

- Sg3 Use a ruler and protractor to:
 - ...(a) measure and draw lines to the nearest millimetre and angles to the nearest degree
 - (b) construct a triangle given two sides and the included angle or two angles and the included side
- Sg4 Understand and use the language and notation associated with:
 - ...(a) reflections, translations and rotations
 - ...(b) enlargementRecognise the transformations:- reflection in a given line, translation, rotation about a given point
Enlarge 2-D shapes, given a centre of enlargement and a positive whole number scale factor

The Curriculum Framework for Mathematics

Standards and Benchmarks for Year 8

Number

Properties

- Np1 Understand place value
Multiply and divide integers and decimals by 0.1 and 0.01
- Np2 Add, subtract, multiply and divide integers
Multiply and divide integers and decimals (up to two places)
Know and use the order of operations, including brackets, with more complex calculations
- Np3 Multiply and divide an integer by a fraction
- Np4 Write a number in terms of its prime factors
Use squares, square roots and cubes of numbers
- Np6 Use index notation for positive integer powers

Problem Solving

- Ns3 Reduce a ratio to its simplest form, including a ratio expressed in different units
Use the unitary method to solve simple problems involving ratio and direct proportion
- Ns4 Round positive numbers to any given power of 10
Round decimals to the nearest whole number or to 1 or 2 decimal places
- Ns5 Use an electronic calculator to carry out more sophisticated calculations involving powers and fractions
- Ns6 Recall known number facts, including simple fraction to decimal conversions and vice-versa
Use known facts to multiply simple fractions together
Use known facts to multiply simple decimals together
Recall simple squares, square roots and cubes
Solve simple problems mentally

Data handling

- Nd1 Know the difference between discrete and continuous data
Identify and collect data to answer a question, choosing the method of data collection and the degree of accuracy needed
Construct frequency tables with given equal class intervals for sets of continuous data
Construct and interpret stem-and-leaf diagrams, pie charts, frequency diagrams for discrete and continuous data, simple line graphs for time series and simple scatter graphs
Compare two distributions using the range and one or more of the mode, median or mean
- Nd2 Calculate statistics, including the range, mean, median and mode and, for grouped data, the modal class
- Nd3 Know that if the probability of an event occurring is p then the probability of the event not occurring is $1-p$
Find and record all possible mutually exclusive outcomes for a single event
Understand the difference between mutually exclusive and independent events

ALGEBRA

Manipulation

- An1 Simplify or transform linear expressions by collecting like terms
Transform simple formulae
Evaluate formulae, including quadratic and cubic expressions
- An2 Construct and solve linear equations
- An3 Understand and use inequality signs
Represent the solution set on a number line

Graphs

- Ag1 Construct tables of values and plot graphs of linear functions, where y is given explicitly in terms of x
Recognise that equations of the form $y = mx + c$ correspond to straight-line graphs
Find the gradient of a straight line graph
Rearrange linear equations in the form $y = mx + c$ and know the significance of the numbers m and c
Find term-to-term and position-to-term rules

- Ag2 Recognise when two quantities are directly proportional.
Draw and interpret the graphs of linear functions arising from practical solutions
- Ag5 Recognise and continue number patterns

Space

Measure

- Sm1 Use names and abbreviations of units of measurement to measure, estimate calculate and solve problems in everyday contexts involving mass, length, area, capacity, mass, time and angle
Use rough metric equivalents of imperial measures to solve problems
- Sm3 Calculate using money, including converting between different currencies
Solve simple problems involving personal and household finance, including simple interest, discount, profit, loss and tax
- Sm5 Know and use the formula for the volume of a cuboid
Calculate the volume and surface areas of cuboids and shapes made from cuboids
Calculate length, surface areas and volumes in right prisms, including cylinders
Know and use the formulae for the circumference of a circle

Geometry

- Sg1 Understand and use the vocabulary, notation and labelling convention for lines, angles and shapes
Identify parallel and perpendicular lines
Use and interpret the vocabulary of triangles, quadrilaterals and polygons
Know that the exterior angles of a polygon add up to 360°
Understand and use the formula for the sum of the interior angles of a regular polygon
Know the definition of a circle and the names of its parts

- Sg2 Know the sum of angles at a point, on a straight line and in a triangle
Recognise vertically opposite angles
Identify alternate angles and corresponding angles
Know and use angle properties of equilateral, isosceles and right-angled triangles and special quadrilaterals to solve problems
Know that if two 2-D shapes are congruent, corresponding sides and angles are equal
- Sg3 Use a straight edge and compasses to construct:
(a) the perpendicular bisector of a line segment
(b) the bisector of an angle
(c) the perpendicular from a point to a line
(d) the perpendicular at a point on a line
- Sg4 Recognise the line symmetry of a 2-D shape
Recognise and state the order of rotational symmetry of a 2-D shape
Transform 2-D shapes by simple combinations of rotations, reflections and translations

SCIENCE

The Curriculum Framework for Science

Introduction

Science should develop the skills and processes necessary for the basic understanding of scientific concepts in the world around us. The framework of study describes the topics that will be assessed in the areas of Biology, Chemistry and Physics. It is expected that, where possible, these topics will be approached through practical work and related to everyday experience.

Students will be expected to demonstrate:

- Knowledge with understanding
- Application of scientific knowledge to explain everyday occurrences
- Knowledge of practical procedures
- Ability to present and process data
- Ability to perform simple calculations
- Correct use of scientific vocabulary and terminology

BIOLOGY

CELLS AND ORGANISMS

Students should:

- Bc1 Investigate the characteristics of living organisms
- Bc2 Investigate animal and plant cells and understand the functions of the main components; define what is meant by a tissue, an organ and an organ system

HUMANS AS ORGANISMS

Students should:

- Bh1 Recognise the positions and know the functions of the major organ systems
- Bh2 Investigate nutrition, including balanced diets and the effects of deficiencies
- Bh3 Learn about the organs and basic functions of the alimentary canal

- Bh4 Learn about the components and basic functions of the circulatory system
- Bh5 Understand the relationship between diet, fitness and the circulatory disorders
- Bh6 Learn about the structure and basic function of the component
Parts of the respiratory system; gas exchange and effects of Smoking
- Bh7 Learn about respiration, including a definition and word Equation

PLANTS

Students should:

- Bp1 Recognise the positions and functions of the major organs in flowering plants
- Bp2 Learn about photosynthesis, including a word equation for the process
- Bp3 Learn about the mineral requirements and the transport of Water in flowering plants
- Bp4 Understand sexual reproduction in flowering plants including pollination, fertilization, seed formation and dispersal

VARIATION AND CLASSIFICATION

Students should:

- Bv1 Consider examples of variation within species and between species
- Bv2 Use keys to identify plants and animals
- Bv3 Classify living organisms into major groups
- Bv4 Understand that selective breeding can lead to new varieties

ECOSYSTEMS

Students should:

- Be1 Investigate adaptations of living things to their habitat or daily and seasonal changes
- Be2 Understand energy flow, food chains and food webs and use appropriate terminology
- Be3 Learn about factors affecting the size of populations
- Be4 Appreciate human influences on ecosystems

CHEMISTRY

MATERIALS

Students should:

- Cm1 Become familiar with the symbols of common elements and Understand that elements are made of atoms
- Cm2 Understand the idea of compounds and be able to name some common compounds including oxides, hydroxides, chlorides, sulphates and carbonates
- Cm3 Understand the differences between elements, mixtures and compounds
- Cm4 Understand the distinction between metals and non-metals
- Cm5 Investigate everyday materials and their physical properties

STATES OF MATTER AND PHYSICAL CHANGE

Students should:

- Cs1 Investigate solids, liquids and gases and their inter-conversion
- Cs2 Use simple kinetic particle theory to explain changes of state, Dissolving and diffusion
- Cs3 Meet a variety of methods of obtaining pure substances from different mixtures
- Cs4 Understand the distinction between physical and chemical changes

CHEMICAL CHANGE

Students should:

- Cc1 Meet different chemical reactions and word equations, including formation of oxides from metals, neutralization and displacement reactions
- Cc2 Investigate chemical reactions which are not useful e.g. rusting
- Cc3 Understand the idea of exothermic and endothermic reactions
- Cc4 Investigate the reactivity of metals (with oxygen, water and dilute acids), and a reactivity series and examples of displacement reactions
- Cc5 Describe neutrality, acidity and alkalinity and use indicators and the pH scale
- Cc6 Learn about neutralization and its applications
- Cc7 Prepare some common salts by reactions of metals or metal carbonates with acid
- Cc8 Understand the effect of concentration, particle size, temperature and catalysts on the rate of reactions (qualitative only)

PERIODIC TABLE

Students should:

- Cp1 Learn about the structure of atoms and relate this to the first Twenty elements of the periodic table
- Cp2 Learn about trends in groups and periods

PHYSICS

MEASUREMENT AND PROPERTIES OF MATTER

Students should:

- Pp1 Use appropriate apparatus for measurements
- Pp2 Understand the way that particles are arranged and move in Solids, liquids and gases and be able to apply this
- Pp3 Understand the expansion of solids, liquids and gases
- Pp4 Determine the density of solids and liquids

FORCES AND MOTION

Students should:

- Pf1 Calculate average speed and interpret simple distance/time graphs
- Pf2 Investigate the effect of forces on the motion and shape of Objects
- Pf3 Appreciate the effect of a force on an area resulting in a pressure (qualitative treatment only)
- Pf4 Explain pressure in gasses and fluids (qualitative only)

ENERGY

Students should:

- Pe1 Recognise the major sources of energy and alternative sources of energy such as solar and wind
- Pe2 Become familiar with energy as the ability to make things happen (do work) and its conversion and conservation
- Pe3 Learn about the thermal energy transfer processes of conduction, convection and radiation

LIGHT

Students should:

- PI1 Understand the rectilinear propagation of light, and how the propagation of light may be represented by rays
- PI2 Apply the rectilinear propagation of light to shadow formation
- PI3 Learn that non-luminous objects are seen because light scattered from them enters the eye
- PI4 Investigate reflection at plane surfaces and understand the law of reflection
- PI5 Investigate refraction at the boundary between air and glass or air and water
- PI6 Know that white light can be dispersed to give a range of Colours
- PI7 Learn about colour addition and subtraction, and the absorption and reflection of coloured light

SOUND

Students should:

- Ps1 Understand the properties of sound waves in terms of movement of air particles
- Ps2 Recognise the link between loudness and amplitude, pitch and frequency

MAGNETISM

Students should:

- Pm1 Investigate the properties of magnets
- Pm2 Investigate magnetic field patterns produced by a bar magnet
- Pm3 Construct and use an electromagnet

ELECTRICITY

Students should:

- Pc1 Investigate conductors and insulators
- Pc2 Learn about electrostatics and the concept of charge
- Pc3 Interpret and draw circuit diagrams and design simple series and parallel circuits
- Pc4 Understand how the number and common types of component, including cells, affect current
- Pc5 Understand how current divides in parallel circuits
- Pc6 Measure current in circuits

TEST SPECIFICATION FOR SCIENCE

Science will be assessed using two papers. Each paper will be taken in a 45-minute session.

Questions will be set on the Biology, Physics and Chemistry sections of the Curriculum Framework in both papers.

Both papers will contain questions totalling 50 marks with a variety of response types including multiple choice and short answer. The questions will demand a variety of skills including recall and application of the concepts.

All the questions on both papers will be compulsory. As far as possible the questions will be arranged in difficulty through the paper in a repeating pattern of topic. On paper 1 the pattern will be Biology, Chemistry, Physics and on Paper 2 the pattern will be Physics, Chemistry, Biology.

ENGLISH

The Curriculum Framework for English

Introduction

The teaching of English should develop students' abilities to use language effectively, to communicate in speech and in writing and to respond with understanding and insight to a wide range of texts. Whilst speaking and listening are not tested at this level, their importance in language development is such that they should play a major part in the Curriculum alongside reading and writing. An integrated curriculum is envisaged in which speaking and listening activities commonly support learning.

READING

Students should:

- Read a wide range of narrative, non-fiction and media texts—these may include novels, short stories, drama scripts, poetry, journals, diaries, letters, leaflets, magazines, newspapers and advertising matter.
- Recognise explicit meaning; select, collate and summarise facts and ideas, using their own words where appropriate to demonstrate understanding
- Recognise and comment on opinions expressed by the writer
- Understand vocabulary and comment on a writer's use of language, such as in an informal or a formal style, the choice of words to create an atmosphere or to persuade the reader
- Recognise implied meaning, such as the inference of character from what someone says or does in a text, or the meaning contained in an image
- Comment on the main features of narrative writing, such as character, setting, theme, and the way in which a plot is put together
- Demonstrate understanding of features of narrative, non-fiction and media texts by developing them in their own discussion and writing, for example, a further episode about a family portrayed in a book, or providing the wording for an advertisement.

WRITING

Students should:

- Write for a variety of purposes, such as to inform, explain, describe, explore, imagine, entertain, argue, persuade, instruct, analyse, review and comment
- Write in a wide range of forms, such as stories, poems, play scripts, autobiographies, personal letters, diaries, formal letters, persuasive writing, advertising copy, newspaper reports and articles, reviews, arguments, information sheets, notes and leaflets
- Begin to develop a sense of audience and to engage the reader's attention
- Structure their writing, using paragraphs and sequencing events, details and ideas within paragraphs
- Use varying styles of writing appropriate to different forms

USAGE

Students should:

- Use full stops, capital letters, commas and question marks to make meaning clear, and show awareness of other forms of punctuation, including the presentation of dialogue
- Spell correctly most of the words they use
- Learn a range of vocabulary appropriate to their needs, and use vocabulary in speech and in writing to clarify meaning and to interest their audience
- Use a range of increasingly complex sentence structures to communicate meaning and to give fluency to their speech and writing
- Use correct grammar, including tense, case and word order
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SPEAKING AND LISTENING

Students should:

- Speak for a variety of purposes, such as to explain, describe, narrate, explore, analyse, imagine, discuss, argue and persuade
- Participate in speaking and listening activities in order to discuss and prepare assignments
- Begin to make significant contributions to group discussions and help to plan and to give group presentations
- Hold conversations with others on familiar subjects
- Develop the ability to listen courteously to others and to be sensitive to turn-taking
- Practice speaking fluently at an appropriate pace
- Practice speaking clearly at an appropriate volume
- Use a range of vocabulary and sentence structure to make speech interesting and convincing

*Speaking and listening will not be assessed in the tests.

