Checkpoint Maths Scheme of Work

Year 1

Unit 2: Algebra

Key Learning Outcomes
Pupils should be able to:

- use letters and symbols to represent unknown quantities
- simplify and solve simple linear equations; evaluate simple formulae
- use Cartesian (*x, y*) co-ordinates in two dimensions
- plot the graphs of simple linear functions
- describe sequences of numbers using term-to-term rules.

Links
The Checkpoint curriculum references are given in the Learning outcomes column.
IGCSE Syllabus Topics 1, 17, 18, 20, 24.
Chapter references in *Checkpoint Maths 11-14 (Book 1) by Ric Pimental and Terry Wall* are given in the Resources column.

Vocabulary
Algebra, axis, brackets, co-ordinate pair, co-ordinates, equals (=), equation, evaluate, expression, graph, linear, not equal to (≠), *n*th term, origin, parallel, quadrant, sequence, solution, substitute, symbol, term, term-to-term rule, unknown, value, variable, *x* – axis, *x* co-ordinate, *y* – axis, *y* co-ordinate.

Learning Outcomes		Suggested Teaching Activities	Resources
An1 Np5	Use letters to represent unknown numbers or variables. Know the meaning of the words term, expression and equation. Know and use the symbols =, ≠.	For a whole class activity practise using mathematical vocabulary by picking out terms, expressions, variables and equations from various examples. Show that expressions can only be simplified (or evaluated) but that equations in one variable can be solved. Discuss equations in two variables. Show that terms can contain brackets.	http://illuminations.nctm.org/lessonplans/6-8/bridges/index.html *Checkpoint Maths 11-14 (Book 1) Chapter 2*
An1 An2	Simplify linear algebraic expressions by collecting like terms. Construct and solve simple linear equations with integer coefficients; evaluate simple formulae.	Start by using words as the variables when simplifying algebraic expressions. For example, a shopping basket contains 6 apples and 2 bananas and 2 apples. This leads to 6a+2b+2a. Use 'think of a number' games to construct simple equations. Find out what formulae are being used in students' other subjects and make use of them. Use currency conversion formulae.	http://atschool.eduweb.co.uk/ufa10/currency.htm *Checkpoint Maths 11-14 (Book 1) Chapter 2* *Checkpoint Maths 11-14 (Book 1) Chapter 17* *Checkpoint Maths 11-14 (Book 1) Chapter 22*
Ag1 Ag3	Understand and use 2-D Cartesian co-ordinates in all four quadrants. Generate co-ordinate pairs that satisfy a simple linear equation. Plot graphs of simple linear functions. Recognise the equation of lines parallel to the *x*-axis or parallel to the *y*-axis.	Use spreadsheets here to plot graphs as well as pencil & paper. Practise plotting and reading the co-ordinates of points in all four quadrants. On a spreadsheet play games such as 'battleships' using all four quadrants. Find points that satisfy simple word equations such as 'the *y*-co-ordinate is twice the *x*-co-ordinate' using both integers and simple decimals. Discover that all points on the line satisfy the equation. Find rules for existing lines. Use a spreadsheet to show that equations in two variables can have many solutions and that these can be displayed on a graph.	www.mathsnet.net/nns/index.html *Checkpoint Maths 11-14 (Book 1) Chapter 8* *Checkpoint Maths 11-14 (Book 1) Chapter 12*

Learning Outcomes		Suggested Teaching Activities	Resources
Ag2	Draw and interpret the graphs of simple linear functions arising from practical situations.	Use the currency conversion formulae to draw conversion graphs.	http://standards.nctm.org/document/eexamples/chap6/6.2/index.htm
Ag5	Generate and describe simple integer sequences. Find simple term-to-term rules.	Use a calculator to generate sequences with simple rules such as 'add three each time'. Predict, for example, the 10th term and check using a calculator. Generate sequences from simple geometric patterns using, for example, lines or dots or squares. Working in pairs, one student generates a sequence, the other works out the rule.	http://math.rice.edu/~lanius//Lessons/Patterns/rect.html See Matchstick sequencing at: http://www.bgfl.org/bgfl/index.cfm?s=1&m=220&p=136,view_resource&id=102 *Checkpoint Maths 11-14 (Book 1) Chapter 7*