



# MATERIAL TAUGHT IN MATHEMATICS



## FORM 1 TO FORM 2

2010-2011

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### 1. Integers

- Understand place value in whole numbers.
- Understand the use of integers (positive and negative and zero) both as positions and translations on a number line.
- Order integers.
- Simplifying expressions involving the four basic operations (addition, subtraction, multiplication and division) and powers.  
Using the BEDMAS rule.
- Use brackets and the hierarchy of operations.
- Use the terms odd, even and prime numbers, factors and multiples.

### 2. Powers and Roots

- Calculate squares, square roots, cubes and cube roots.
- Express integers as a product of powers of prime factors.  
(e.g.  $720 = 2^4 \times 3^2 \times 5$ )
- Find the Lowest Common Multiple (LCM) and the Highest Common Factor (HCF) of two/three given numbers.
- Identify prime factors, common factors and common multiples.

### 3. Fractions

- Understand and use equivalent fractions. Simplifying fractions by canceling common factors. ( $\frac{8}{60} = \frac{2}{15}$  lowest terms)
- Understand and use mixed numbers and vulgar fractions.
- Conversion between improper fractions and mixed numbers.
- Identify common denominators.
- Applying common denominators to order fractions.

- Calculate a given fraction of a given quantity, expressing the answer as a fraction.
- Express a given number as a fraction of another number.
- Use common denominators to add and subtract fractions (use fractions in problems).
- Convert between fraction, decimals and percentages.  
(e.g.  $\frac{3}{5} = 0.6 = 60\%$ ,  $\frac{4}{9} = 0.4444\dots = 0.\dot{4}$ )
- Understand and use unit fraction as a multiplicative inverse.  
(e.g.  $3 \div 5 = 3 \times \frac{1}{5}$ )
- Multiply and divide a given fraction by an integer, by a unit fraction and by a general fraction.

#### 4. Decimals

- Use decimal notation (understand the position of the figure in decimal numbers).
- Order decimals.
- Recognise that a terminating decimal is a fraction. ( $0.65 = \frac{65}{100} = \frac{13}{20}$ )
- Convert recurring decimals into fractions and fractions into recurring decimals. ( $0.\dot{3} = \frac{1}{3}$ ,  $0.2333\dots = \frac{21}{90}$ ,  $\frac{7}{12} = 0.58\dot{3}$ )
- Apply the BEDMAS rule with decimals.
- Degree of accuracy (decimal places, significant figures).

## 5. Directed Numbers

- Use the BEDMAS rule with directed numbers. (manipulating signs)
- Use directed numbers in practical situations.  
(e.g. temperature, sea-level)

## 6. Algebraic Manipulation

- Evaluate expressions by substituting numerical values for letters.
- Collect like terms.
- Multiply a single term over a bracket.
- Simplifying fractional algebraic expressions.

## 7. Expressions and Formulae

- Understand that a letter may represent an unknown number or a variable.
- Use correct notational conventions for algebraic expressions and formulae. (Evaluate  $2x - 3y$ , when  $x = -2$  and  $y = 4$ )
- Substitute positive and negative integers, decimals and fractions for words and letters in expressions and formulae.
- Use formulae from mathematics and other real life contexts, expressed initially in words or a diagrammatic form and convert it to letters and symbols.

## 8. Linear Equations

- Solve linear equations with integer or fractional coefficients in one unknown in which the unknown appears on either side or both sides of the equation.
- Equations with squares and square roots.
- Solving verbal problems by constructing an equation.

## 9. Applying Numbers (Verbal problems)

- Use and apply numbers in everyday, personal, domestic or community life.
- Carry out calculations using standard units of mass, length, area, volume and capacity (metric units only)
- Understand and carry out calculations using time.
- Carry out calculations using money, including converting between currencies.

## 10. Percentages

- Ratios.
- Understand that percentage means “*number of parts per 100*”.
- Express a given number as a percentage of another number.
- Express a percentage as a fraction and as a decimal.
- Calculate percentages of quantities.
- Find the Cost Price given the Selling price and vice versa.
- Convert simple fractions of a whole to percentages of the whole and vice versa.
- Map ratio (1:n).
- Understand the multiplicative nature of percentages as operations  
(e.g. 15% of 120 =  $\frac{15}{100} \times 120$ )
- Solve simple percentage problems, including percentage increase and percentage decrease (profit or loss).
- Solve simple interest problems.  
(e.g. find the interest earned after one year on £3000 invested at 5% per annum).
- Solve Compound Interest problems.

## 11. Statistics

- Grouping data in tally tables and frequency tables, including grouped data.
- Drawing and using bar charts.
- Drawing and using pictograms.
- Drawing and using pie charts.
- Use pie charts to calculate:
  - (i) the fraction, percentage or decimal of the total represented by each sector.
  - (ii) the number of items represented by each sector.
- Finding the mean, median, mode and range of a set of numbers.

## 12. Probability

- Using the language of probability and technical terms such as outcomes, equally likely, events, random.
- Using a probability scale from 0 to 1.
- Understand that an impossible event has a probability of 0 and an event which is certain has a probability of 1.
- Writing probabilities as numbers (fractions, decimals)
- Estimate probabilities from collecting data.
- The probability of an event happening or not happening.
- Listing systematically all the outcomes for a single event and single lists to find the probability than an event will occur.

## 13. Geometry: Angles and Triangles

- Distinguish between acute, obtuse, reflex and right angles. Estimate the size of angles in degrees.
- Use angle properties of intersecting lines, parallel lines and angles on a straight line. (angles at a point, vertically opposite angles, alternate angles, corresponding angles, perpendicular lines).
- Recognise and give the names of different types of quadrilateral (parallelogram, rectangle, square, rhombus, trapezium, kite).
- Use the angle sum of a quadrilateral to calculate angles in quadrilaterals.

- Use the angle sum of a triangle to calculate angles in a triangle.
- Understand the terms isosceles, equilateral and right-angled triangles and the angle properties of these triangles.
- Understand that the exterior angle of a triangle is equal to the sum of the interior angles at the other two vertices.

#### **14. Trigonometry-Pythagoras theorem**

- Identify the hypotenuse of a right-angled triangle.
- Understand and use Pythagoras' Theorem in two dimensions to find the length of the hypotenuse or the length of one of the shorter sides of a right-angled triangle.
- Use Pythagoras' Theorem to solve problems involving isosceles triangles.

#### **15. Mensuration (Area and Volume)**

- Convert measurements within the metric system to include linear, area and volume units. ( $\text{cm}^2 \rightarrow \text{m}^2$  and vice versa,  $\text{cm}^3 \rightarrow \text{litres}$  and vice versa)
- Find the perimeter of shapes made from triangles and rectangles.
- Find the area of simple shapes using the formulae for the areas of triangles and rectangles.
- Find the area of parallelogram, trapezium, rhombus and kite.
- Find the circumferences and areas of circles using relevant formulae.
- Recognise and give names of solids (cube, cuboid, prism, cylinder, cone, pyramid and sphere).
- Find the volume of right prisms, including cuboids and cylinders, using the appropriate formula.

## 16. Coordinates and Graphs

- Understand and use conversions for rectangular cartesian coordinates.
- Plot points  $(x, y)$  in any of the four quadrants of the graph
- Locate points with given coordinates.
- Determine the coordinates of points identified by geometrical information.
- By able to read and understand any given graph.
- Answer specific questions by referring to a given graph.

## 17. Vectors

- Understand the difference between a scalar and a vector quantity. Understand that a vector has both length (modulus, magnitude) and direction.
- Use vector notation correctly. (e.g.  $\overrightarrow{AB}$ )
- Calculate the length of a vector when given on a diagram, using the Pythagoras' theorem.
- Addition and subtraction of vectors.
- Multiplication of vectors by scalar quantities.