

## **Subject: Mathematics (Higher)**

Department Staff

Mr E DeSouza, Mr E Gakpo, Mr A Hosseinian, Mr P Kelly,  
Mr S McCann, Ms D Thompson, Mr K Pillay, Mr A Sztranyovsky

Year 11 - Autumn Term 2009

### **Contents: what you will study**

#### **Number:**

- Solving real problems
- Division by decimals
- Estimation, Multiples, factors and prime numbers
- Prime factors
- LCM and HCF
- Negative numbers
- One quantity as a fraction of another
- Adding and Subtracting Fractions
- Multiplying Fractions
- Dividing by a Fraction
- Percentage increase and decrease
- Expressing one quantity as a percentage of another
- Compound interest and repeated percentage change
- Finding the original quantity (Reverse percentage)
- Ratio
- Speed, Time and Distance
- Direct Proportional Problems
- Best Buy
- Density

#### **Algebra:**

- Basic algebra : Substitution, Expansion, Simplification, Factorisation, Solving linear equations:
- Fractional equations, Brackets, Equations with variables on both sides, Setting up linear equations, Rearranging Formulae, Simultaneous equations: Solving problems by using simultaneous equations, Trial and improvement

#### **Shape and Space:**

- Recalling terms relating to a circle
- Understanding and using right angles between tangent and radius
- Understanding and using tangents of equal length
- Explaining why the perpendicular from the centre of a chord bisects the chord
- Calculating circumferences, lengths of arcs and areas of circles and sectors
- Using pi in exact calculations
- Understanding and using vector notation
- Calculating the sum and difference of two vectors
- Calculating a scalar multiple of a vector
- Calculating the resultant of two vectors
- Representing graphically the sum and difference of two vectors
- Representing graphically a scalar multiple of a vector
- Solving simple geometrical problems in 2-D using vector methods
- Solving problems involving surface areas of more complex solids
- Solving problems involving volumes of more complex solids

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- Solving problems involving more complex shapes and solids
- Understanding the dimensions of formulae for perimeter, area and volume
- Understanding the effect of enlargement on areas and volumes
- Converting between area and volume measures

### **Data Handling:**

- Designing questionnaires and criticise methods of using questionnaires
- Understanding frequency density
- Constructing histograms for grouped continuous data
- Calculating a mean from simple data
- Calculating a moving average
- Completing cumulative frequency tables
- Plotting cumulative frequency diagrams
- Using cumulative frequency to find the median
- Using cumulative frequency to find quartiles and interquartile range
- Drawing Box plots
- Identifying trends in time series
- Comparing shapes of distributions
- Comparing distributions using measures of average and spread
- Using a calculator for statistical calculations
- Plotting and interpreting scatter diagrams
- Describing correlation from a scatter graph
- Drawing and using a line of best fit
- Estimating probability from theoretical models
- Using relative frequency
- Using the vocabulary of probability to interpret results
- Using probability estimates to compare results
- Selecting and justifying a method of sampling
- Understanding the effect of sample size on probability estimate
- Understanding the concepts of mutual exclusivity and independent events
- Knowing when to add or multiply probabilities
- Using tree diagrams to represent outcomes of compound events

### ***National Curriculum levels at which you will work***

The Higher tier exam enables pupils to achieve a grade C up to an A\* grade

### ***Assessment: how you will be tested this term***

In addition to classwork and homework assignments (2 per week), you will have an end of half term test on all the topics taught this term. You will also do a Mock GCSE paper in December 2009. This will consist of a calculator paper and a non-calculator paper.

**NOTE** - The Maths GCSE no longer requires coursework but you must demonstrate your ability to use and apply Maths concepts.

### ***Equipment you will need for this term's work:***

Pen, pencil, ruler, compass, protractor, exercise book and calculator.

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Year 11 - Spring Term 2010

### ***Contents: what you will study***

#### **Algebra:**

- Setting up equations involving proportion
- Graphical representations of equations involving proportion
- Constructing the graphs of simple loci, including the circle  $x^2 + y^2 = r^2$
- Solving by substitution a pair of simultaneous equations (one non-linear)
- Use simultaneous equations to calculate where a straight-line graph meets a circle
- Using graphs to solve a pair of simultaneous equations (one non-linear)
- Using graphs to show where a straight-line graph intersects a circle
- Drawing, sketching and describing the graphs of trigonometric functions
- Applying transformations to the function  $y = f(x)$ ,  $y = f(x) + a$ ,  $y = f(ax)$ ,  $y = f(x + a)$ ,  $y = af(x)$  (for linear, quadratic, sine and cosine functions)

#### ***National Curriculum levels at which you will work***

The Higher tier exam enables pupils to achieve a grade C up to an A\* grade

#### ***Assessment: how you will be tested this term***

In addition to classwork and homework assignments (2 per week), you will have an end of half term test on all the topics taught this term. You will also do a second Mock GCSE paper.

#### ***Equipment you will need for this term's work:***

Pen, pencil, ruler, compass, protractor, exercise book and calculator.

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Year 11 - Summer Term 2010

***Contents: what you will study***

**Shape and space:**

- Prove and use circle theorems
- The angle subtended by an arc at the centre of a circle is twice the angle subtended at any point on the circumference
- The angle subtended at the circumference by a semi-circle is a right angle
- Angles in the same segment are equal
- Opposite angles of a cyclic quadrilateral add up to 180 degrees
- Explain why the perpendicular from the centre of a chord bisects the chord
- Prove and use the alternate segment theorem
- Constructing triangles
- Constructing a perpendicular bisector and finding the mid-point of a line segment
- Construct perpendiculars to a line
- Bisecting an angle
- Finding Loci
- Constructing graphs of simple loci

***National Curriculum levels at which you will work***

The Higher tier exam enables pupils to achieve a grade C up to an A\* grade

***Assessment: how you will be tested this term***

In addition to classwork and homework assignments (2 per week), you will have an end of half term test on all the topics taught this term. You will sit GCSE Maths in June 2010. You will also do a Functional Skills test which you must pass before you can achieve a pass grade in the GCSE Maths exam.

***Equipment you will need for this term's work:***

Pen, pencil, ruler, compass, protractor, exercise book and calculator.