

Dawood Public School
Course Outline 2017-18
Mathematics
Class VI

Books:

Sang, T. et al, 2008, New Syllabus Mathematics 1(6th Edition), Singapore; Oxford University

Introduction

This syllabus provides a comprehensive set of progressive learning objectives for mathematics. The objectives detail what the learner should know or what they should be able to do in each year of education. The learning objectives provide a structure for teaching and learning and a reference against which learners' ability and understanding can be checked.

This syllabus designed to promote continuity, coherence and progression within the study of Mathematics. The syllabus builds on the knowledge, understanding and skills developed within the Key Stage of Study for Mathematics.

This syllabus has been designed to meet the requirements of the GCSE regulations.

In studying a course based on this specification, students should be encouraged to make appropriate use of Information and Communications Technology (ICT), for example, spreadsheets and databases.

It has been designed to be as free as possible from ethnic, gender, religious, political or other forms of bias.

Syllabus Aims and Assessment:

The syllabus demands understanding of basic mathematical concepts and their applications, together with an ability to show this by clear expression and careful reasoning.

In the examination, importance will be attached to skills in algebraic manipulation and to numerical accuracy in calculations.

Aims

The course should enable students to:

Applying and Problem-Solving

Using Techniques and Skills in Solving Mathematical Problems

- Use the laws of arithmetic and inverse operations to simplify calculations with whole numbers and decimals.
- Understand everyday systems of measurement and use them to estimate measure and calculate.
- Recognise and use spatial relationships in two and three dimensions.
- Estimate, approximate and check their working.
- Solve word problems involving whole numbers, percentages, decimals, money or measures: choose operations and mental or written methods appropriate to the numbers and context, including problems with more than one step.

Using Understanding and Strategies in Solving Problems

- Identify and represent information or unknown numbers in problems, making correct use of numbers, symbols, words, diagrams, tables and graphs.
- Recognise mathematical properties, patterns and relationships, generalizing in simple cases.

- Record and explain methods, results and conclusions.
- Discuss and communicate findings effectively, orally and in writing.

Communicating and Expressing

- listen to and discuss other children's mathematical descriptions and explanations
- discuss and record the processes and results of work using a variety of methods
- discuss problems and carry out analyses

Integrating and Connecting

- understand the connections between mathematical procedures and the concepts she uses
- recognize and apply mathematical ideas and processes in other areas of the curriculum

Reasoning

- search for and investigate mathematical patterns and relationships
- reason systematically in a mathematical context
- justify processes and results of mathematical activities, problems and projects

Implementing

- devise and use mental strategies and procedures for carrying out mathematical tasks
- use appropriate manipulative to carry out mathematical procedures

Understanding and Recalling

- understand and recall facts, definitions and formulae.

Assessment

Assessment: An Integral Part of Teaching and Learning

Assessment is a continuous, dynamic and often informal process. It is a continuum, ranging from classroom observation to standardized tests. Equally important are questioning and dialogue, homework, and structured tests developed by teachers. Assessment provides information that can be used in decision-making about how the teacher can realistically answer the needs of the child. It must be an integral part of the educational process and should not become an end in itself. A balance must be struck between time spent on assessment and the time spent on teaching and learning.

ASSESSMENT OBJECTIVES

Within the assessment components, candidates will be required to:

- recall, apply and interpret mathematical knowledge in the context of everyday situations;
- set out mathematical work, including the solution of problems, in a logical and clear form using appropriate symbols and terminology;
- organise, interpret and present information accurately in written, tabular, graphical and diagrammatic forms;
- perform calculations by suitable methods;
- use an electronic calculator;
- understand systems of measurement in everyday use and make use of them in the solution of problems;
- estimate, approximate and work to degrees of accuracy appropriate to the context;
- use mathematical and other instruments to measure and to draw to an acceptable degree of accuracy;

- recognise patterns and structures in a variety of situations and form generalisations;
- interpret, transform and make appropriate use of mathematical statements expressed in

Words or Symbols:

- recognise and use spatial relationships in two and three dimensions, particularly in solving problems;
- analyse a problem, select a suitable strategy and apply an appropriate technique to obtain its solution;
- apply combinations of mathematical skills and techniques in problem solving;
- make logical deductions from given mathematical data;
- respond to a problem relating to a relatively unstructured situation by translating it into an appropriately structured form.

Units:

- SI units will be used in questions involving mass and measures: the use of the centimetre will continue.

Monthly Syllabus for the Year 2017 – 18

MONTH	TOPIC	DURATION
AUGUST	Factors and Multiples	3 WEEKS
	Integers	1 WEEK
	Activity Calendar	
SEPTEMBER	Integers	1 WEEK
	Rational Number	3 WEEKS
	Activity Calendar	
OCTOBER	Fundamental Algebra	3 WEEKS
	Basic Geometrical Shapes and Properties	1 WEEK
	Activity Calendar	
NOVEMBER	Revision for midterm exams	
	Activity Calendar	
DECEMBER	Mid Term Exams	
JANUARY	Algebraic Equation and Simple Inequalities(7a–7c)	2 WEEKS
	Functions and Graph	1 WEEK
	Estimation and Approximation	1 WEEK
	Activity Calendar	
FEBRUARY	Estimation and Approximation	1 WEEK
	Perimeter and Area of Simple Geometrical Figures	3 WEEKS
MARCH	Ratio, Rate and Speed (10a- 10d)	1.5 WEEKS
	Geometrical Construction	1.5 WEEK
	Activity Calendar	
APRIL	Revision for Final Term	
	Activity Calendar	
MAY	Final Exams	

AUGUST		
TOPIC	FACTORS AND MULTIPLES	
SUB TOPIC	SPECIFIC OBJECTIVES	ADDITIONAL RESOURCES
<ul style="list-style-type: none"> • Prime and composite numbers. • Test of divisibility • Prime factorization • Index notation. • L.C.M and H.C.F • Square and square root • Cube and cube root • Mental estimation 	<p>By the end of the topic, students would be able to :</p> <ul style="list-style-type: none"> • Recognize prime and composite numbers. • Apply divisibility rules up till 13. • Do prime factorization and express prime factors in index notation. • Find L.C.M and H.C.F of multiple values and solve problem sums including them. • Find square and square root, cube and cube root and their application in real life. • Estimate mentally. 	<ul style="list-style-type: none"> • www.fun4thebrain.com/beyondfacts • www.sheppardsoftware.com/mathgames/fractions/LeastCommonMultiple • www.onlinemathlearning.com/hcf-lcm • https://www.studyladder.com/games/activity/challenge-puzzle-index-notation • https://www.mangahigh.com/math_games/.../square_and_cube_roots • https://quizlet.com/.../8th-grade-square-roots-and-cube-roots

ATTAINABLE TARGETS:

- Apply and explain the use of prime factorizations, common factors, and common multiples in problem situations.
- Find and use the prime factorization of composite numbers. For example:
 - 1 - Use the prime factorization to recognize the greatest common factor (GCF).
 - 2 - Use the prime factorization to recognize the least common multiple (LCM).
 - 3 - Apply the prime factorization to solve problems and explain solutions.

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AUGUST / SEPTEMBER		
TOPIC	INTEGERS	
SUB TOPIC	OBJECTIVES	ADDITIONAL RESOURCES
<ul style="list-style-type: none"> • Number line • Absolute value of integer. • Addition and subtraction of integers. • Multiplication and division of integers. • Laws 	<p>By the end of the topic, students would be able to :</p> <ul style="list-style-type: none"> • Understand absolute value of integer. • Solve long expressions including integers. • Solve various integers with different kind of brackets. • State and apply commutative, associative and distributive laws. 	<ul style="list-style-type: none"> • www.mathplayground.com/ASB_OrbitIntegers • www.mathgoodies.com/games/integer_game • www.hoodamath.com/games/integer • www.math-play.com/Integers-Jeopardy/Integers

ATTAINABLE TARGETS:

- Define negative, origin, opposite numbers and integers.
- Construct a vertical and horizontal number line.
- Explain the difference between positive and negative number.
- Assign an integer to a specific situation.
- Recognize and order integers.

Add, subtract, multiply and divide integers.

SEPTEMBER		
TOPIC	RATIONAL NUMBERS	
SUB TOPIC	SPECIFIC OBJECTIVES	ADDITIONAL RESOURCES
<ul style="list-style-type: none"> • Ordering of rational numbers • Addition and subtraction • Multiplication and division • Problem sums. • Recurring, non recurring decimals • Rational and irrational numbers 	<p>By the end of the topic, students would be able to :</p> <ul style="list-style-type: none"> • Arrange rational numbers in ascending and descending order. • Add and subtract rational numbers with brackets. • Multiply and divide rational numbers. • Solve word problems related to rational numbers. • Differentiate and recognize rational and irrational. numbers and work out recurring or non recurring decimals. 	<ul style="list-style-type: none"> • www.softschools.com • https://www.quia.com • https://www.brainpop.com/games/numbers/ne • www.mathwarehouse.com/numbers/rational-irrational-numbers/rational-irrational • www.mathplayground.com/ASB_SpiderMatchIntegers

ATTAINABLE TARGETS:

- Determine if a number is rational or irrational.
- Order rational and irrational numbers
- Conversion of rational numbers to decimals and vice-versa.
- Represent recurring and terminating decimals.

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OCTOBER		
TOPIC	FUNDAMENTAL ALGEBRA	
SUB TOPIC	SPECIFIC OBJECTIVES	ADDITIONAL RESOURCES
<ul style="list-style-type: none"> • Formation of algebraic expressions . • Evaluation of algebraic expression. • Simplification. • Addition and subtraction • Factorization 	<p>By the end of the topic, students would be able to :</p> <ul style="list-style-type: none"> • Form algebraic expressions. • Evaluate algebraic expressions. • Simplify algebraic expressions including four operations. • Add and subtract algebraic expressions. • Factorize algebraic expressions 	<ul style="list-style-type: none"> • www.math4children.com/Grade6/games • www.math-play.com/Algebra-Math-Games. • www.mathplayground.com/grade_6_games • www.algebra4children.com/games • www.free-training-tutorial.com/algebra-games.

ATTAINABLE TARGETS:

- Write down algebraic expressions from the given mathematical statements.
- Evaluate algebraic expressions by substitution.
- Simplify algebraic expressions involving +, -, x, ÷ and power of an algebraic term.
- Simplify algebraic expressions involving brackets.
- Simplify simple algebraic fractions.
- Factorization of simple algebraic expressions by grouping.

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OCTOBER		
TOPIC	BASIC GEOMETRICAL CONCEPTS AND PROPERTIES	
SUB TOPIC	OBJECTIVES	ADDITIONAL RESOURCES
<ul style="list-style-type: none"> • Adjacent angles • Vertically opposite angles • Transversal • Alternate angles • Consecutive interior angles. • Corresponding angles. 	<p>By the end of the topic, students would be able to :</p> <ul style="list-style-type: none"> • Find unknown angles when given in form of adjacent or vertically opposite angles. • Find unknown angles forming, in case of transversal cutting parallel lines. <p>Recognize alternate, corresponding and interior angles.</p>	<ul style="list-style-type: none"> • www.mathplayground.com/alienangles • www.pbslearningmedia.org/resource/muen-math-g-angles/angles • www.helpingwithmath.com • www.commoncoresheets.com/Angles

ATTAINABLE TARGETS:

- Measure a given angle with a protractor.
- Identify (a) acute, (b) obtuse, and (c) reflex angles.
- Find the complement and supplement of a given angle.
- Construct a given angle with a ruler and a protractor.
- Find unknown angles using the properties of:
 - (a) Angles at a point,
 - (b) Vertically opposite angles, (c) Adjacent angles on a straight line.
- Find unknown angles using the properties of:
 - (a) Corresponding, (b) alternate, (c) interior angles for two parallel lines cut by a transversal.
- Use and interpret the geometrical terms: point, line, plane, parallel, perpendicular, right angle, acute, obtuse and reflex angles, interior and exterior angles.

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NOVEMBER: REVISION FOR MIDTERM

DECEMBER: MIDTERM

JANUARY		
TOPIC	ALGEBRAIC EQUATIONS AND SIMPLE INEQUALITIES	
SUB TOPIC	OBJECTIVES	ADDITIONAL RESOURCES
<ul style="list-style-type: none"> • Open sentences • Simple equations • Solving simple equations 	By the end of the topic, students would be able to : <ul style="list-style-type: none"> • Find the solution of given equations. Solve different kinds of equations including rational numbers 	<ul style="list-style-type: none"> • https://www.mangahigh.com/games/algebra-meltdown • www.math-play.com/equation-games • www.shodor.org • https://www.sheppardsoftware.com/math-games/menus/algebra • www.coolmath.com/algebra

ATTAINABLE TARGETS:

- Solve simple linear equations with one unknown;
- Solve fractional equations with numerical and linear algebraic denominators;
- Solve simple algebraic equations by inspection.
- State the rules for solving algebraic equations:
 - (a) equal numbers may be added to or subtracted from each side,
 - (b) each side may be multiplied or divided by equal numbers except zero.
- Use the above rules to solve simple algebraic equations.
- Use the rules to solve algebraic equations involving fractions and decimals.

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JANUARY		
TOPIC	FUNCTIONS AND GRAPH	
SUB TOPIC	OBJECTIVES	ADDITIONAL RESOURCES
<ul style="list-style-type: none"> Rectangular coordinates in two dimensions. Idea of functions Ordered pairs satisfying a function. Gradient of a straight line 	<p>By the end of the topic, students would be able to :</p> <ul style="list-style-type: none"> Able to write down the coordinates of given points. Plot different given points on graph paper. Obtain a shape by plotting given points. Find unknown value of y with the given function and value of x. Find gradient of a straight line 	<ul style="list-style-type: none"> www.mathplayground.com/functionmachine www.mathplayground.com/SaveTheZogs/SaveTheZogs www.onlinemathlearning.com/linear-function-games https://sites.google.com/a/lsr7.net/middle-school-math/graphing www.mathgames.com/skill/8.107-graph-a-line-from-a-function-table

ATTAINABLE TARGETS:

- Generate coordinate pairs that satisfy a simple linear rule;
- Plot the graphs of simple linear functions, where y is given explicitly in terms of x, on paper;
- Recognize straight-line graphs parallel to the x-axis or y-axis.

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JANUARY / FEBRUARY		
TOPIC	ESTIMATION AND APPROXIMATION	
SUB TOPIC	OBJECTIVES	ADDITIONAL RESOURCES
<ul style="list-style-type: none"> • Estimation and rounding • Rounding off number to given number of decimal places. • Rounding a number to a given number of significant figures. 	By the end of the topic, students would be able to : <ul style="list-style-type: none"> • Estimate and round off different values. • Round off to specific decimal places. • Round off to given significant numbers 	<ul style="list-style-type: none"> • www.math-aids.com/Estimation • www.mrnussbaum.com/sixth-grade-learning-games • www.jumpstart.com • www.mathfox.com

ATTAINABLE TARGETS:

- Make an estimate of the value of a given problem involving sum, difference, product, quotient, square and square root, cube and cube root of numbers.
- Round off a number to the required degree of accuracy.
- State the rules for writing significant figures.
- Make estimates of numbers, quantities and lengths, give approximations to specified numbers of significant figures and decimal places and round off answers to reasonable accuracy in the context of a given problem.

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Pg #73 – 86

FEBRUARY		
TOPIC	AREA AND PERIMETER OF SIMPLE GEOMETRICAL FIGURES	
SUB TOPIC	OBJECTIVES	ADDITIONAL RESOURCES
<ul style="list-style-type: none"> • Units of area. • Area of parallelogram • Area of a trapezium. Area and perimeter of a composite and complex figure	By the end of the topic, students would be able to : <ul style="list-style-type: none"> • Convert area from one unit to another. • Find area of parallelogram using formula. • Find area of trapezium using formula. • Find area and perimeter of circle, semi circle using formula. Find area and perimeter of composite and complex figure	<ul style="list-style-type: none"> • https://www.tes.com/.../area-of-compound-shapes-triangles-parallelograms • www.mathgoodies.com/lessons/toc • www.xpmath.com/forums/arcade.php?do=play&game

ATTAINABLE TARGETS:

- Solve problems involving the perimeter and area of a rectangle and triangle, the circumference and area of a circle,
- Find the area of a parallelogram and a trapezium,
- Calculate the area of complex figures involving triangles, rectangles, parallelograms, trapeziums, circles etc.

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MARCH		
TOPIC	RATIO, RATE, SPEED	
SUB TOPIC	OBJECTIVES	ADDITIONAL RESOURCES
<ul style="list-style-type: none"> Ratio. Equivalent ratios Increase and decrease in ratio. Rate 	<p>By the end of the topic, students would be able to :</p> <ul style="list-style-type: none"> Express ratios in their simplest form. Find unknown values using equivalent ratios. Find increasing and decreasing quantities in given ratios. Find rate and average rate in given conditions 	<ul style="list-style-type: none"> www.mathplayground.com/ASB_RatioBlaster www.sheppardsoftware.com/mathgames/ratios/MatchingRates https://www.brainpop.com/games/ratiormble https://www.brainpop.com/games/ratiormble www.arcademics.com/games/ratio-stadium/ratio-stadium

ATTAINABLE TARGETS:

- Demonstrate their understanding of the concept of a ratio by using ratio language to describe relationships between quantities.
- Calculate times in terms of the 12-hour and 24-hour clock;
- Read clocks, dials and timetables.
- Apply the results:
 - (a) Average speed = Distance travelled/Time taken,
 - (b) Distance travelled = Average speed x Time taken,
 - (c) Time taken = Distance travelled/Average speed, to calculate average speed, distance travelled and time taken respectively.
- Convert speed in km/h to m/s and vice versa.

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MARCH		
TOPIC	GEOMETRICAL CONSTRUCTION	
SUB TOPIC	OBJECTIVES	ADDITIONAL RESOURCES
<ul style="list-style-type: none"> • Perpendicular bisector • Angle bisection • Construction of triangle • Construction of rectangle, rhombus, trapezium and other quadrilaterals 	<p>By the end of the topic, students would be able to :</p> <ul style="list-style-type: none"> • Construct perpendicular bisector. • Construct angle bisector. • Construct triangles, trapeziums, rhombus, rectangles and other quadrilaterals using compass and protractor and given measurements. 	<ul style="list-style-type: none"> • https://www.mathsisfun.com/geometry/constructions. • www.euclidthegame.com • www.coolmath-games.com/0-construction-fall • www.io9.gizmodo.com/try-your-hand-at-this-ridiculously-addictive-geometry- • www.cut-the-knot.org/.../compass

ATTAINABLE TARGETS:

- Measure lines and angles.
- Construct simple geometrical figures from given data, angle bisectors and perpendicular bisectors using protractors.
- Read and make scale drawings. (Where it is necessary to construct a triangle given the three sides, ruler and compasses only must be used.)
- Construct a triangle from the given data using a pair of compasses, a ruler and/or a protractor.
- Construct a quadrilateral from given data using a pair of compasses, a ruler and/or a protractor.

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APRIL: REVISION FOR FINAL EXAM

MAY: FINAL EXAM