

# Bridging Documents for Mathematics

## 5<sup>th</sup>/6<sup>th</sup> Class, Primary – Junior Cycle, Post-Primary

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<b><u>Strand(s):</u></b>	<b>Number, Measure</b>	⇒	<b>Number (Strand 3)</b>	<b>2-5</b>
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These bridging documents are designed to give an overview of the content objectives in each strand and strand unit for Mathematics in 5<sup>th</sup> and 6<sup>th</sup> classes in primary schools and to illustrate how the strands and strand units are continued at Junior Cycle in post-primary schools. They are not intended to replace the *Primary School Curriculum* (1999) documents or the Mathematics syllabus at Junior Cycle. It is still important that teachers would consult the curriculum when planning.

Place value	Fifth Class, Primary	Sixth Class, Primary	Junior Cycle, Post-Primary
		The child should be enabled to	
	<ul style="list-style-type: none"> <li>Read, write and order whole numbers and decimals</li> </ul>	<ul style="list-style-type: none"> <li>Round whole numbers and round decimals</li> <li>Round decimals</li> </ul>	<ul style="list-style-type: none"> <li><i>Justify approximations and estimates of calculations*</i></li> </ul>
	<ul style="list-style-type: none"> <li>Identify place value in whole numbers and decimals</li> </ul>		
Operations	Fifth Class, Primary	Sixth Class, Primary	Junior Cycle, Post-Primary
	The child should be enabled to		The learner should be able to
	<ul style="list-style-type: none"> <li>Estimate sums, differences, products and quotients of whole numbers</li> </ul>	<ul style="list-style-type: none"> <li>of decimals</li> </ul>	<ul style="list-style-type: none"> <li><i>Revisit models such as decomposition, skip counting, arranging items in arrays and accumulating groups of equal size to make sense of the operations of addition, subtraction, multiplication, and division in N where the answer is in N*</i></li> </ul>
	<ul style="list-style-type: none"> <li>Add and subtract whole numbers and decimals (to three decimal places) without and with a calculator</li> </ul>		
	<ul style="list-style-type: none"> <li>Multiply a decimal (up to three places) by a whole number, without and with a calculator</li> </ul>	<ul style="list-style-type: none"> <li>Multiply a decimal by a decimal, without and with a calculator</li> </ul>	<ul style="list-style-type: none"> <li><i>Generalise observations of arithmetic operations*</i></li> </ul>
	<ul style="list-style-type: none"> <li>Divide a three-digit number by a two-digit number, without and with a calculator</li> </ul>	<ul style="list-style-type: none"> <li>Divide a four-digit number by a two-digit number, without and with a calculator</li> </ul>	
	<ul style="list-style-type: none"> <li>Divide a decimal number by a whole number, without and with a calculator</li> </ul>	<ul style="list-style-type: none"> <li>by a decimal, without and with a calculator</li> </ul>	
Fractions	Fifth Class, Primary	Sixth Class, Primary	Junior Cycle, Post-Primary
	The child should be enabled to		The learner should be able to
	<ul style="list-style-type: none"> <li>Compare and order fractions and identify equivalent forms of fractions with denominators 2 - 12</li> </ul>	<ul style="list-style-type: none"> <li>and identify equivalent forms of fractions</li> </ul>	<ul style="list-style-type: none"> <li><i>Investigate models to help think about the operations of addition, subtraction, multiplication and division of rational numbers in Z*</i></li> </ul>
	<ul style="list-style-type: none"> <li>Express improper fractions as mixed numbers and vice versa and position them on the number line</li> </ul>		
	<ul style="list-style-type: none"> <li>Add and subtract simple fractions and simple mixed numbers</li> </ul>		
	<ul style="list-style-type: none"> <li>Multiply a fraction by a whole number</li> </ul>	<ul style="list-style-type: none"> <li>by a fraction</li> </ul>	
	<ul style="list-style-type: none"> <li>Express tenths, hundredths and thousandths in both fraction and decimal form</li> </ul>		<ul style="list-style-type: none"> <li><i>Use the equivalence of fractions, decimals and percentages to compare proportions*</i></li> </ul>
	<ul style="list-style-type: none"> <li>Divide a whole number by a unit fraction</li> <li>Understand and use simple ratios</li> </ul>	<ul style="list-style-type: none"> <li><i>Consolidate their understanding of the relationship between ratio and proportion*</i></li> </ul>	

\*The learning outcomes shown in italics are on the Common Introductory course for First Year

	Fifth Class, Primary	Sixth Class, Primary	Junior Cycle, Post-Primary
	<b>Decimals and percentages</b>	The child should be enabled to	
<ul style="list-style-type: none"> <li>Develop an understanding of simple percentages</li> </ul>		<ul style="list-style-type: none"> <li>Use percentages</li> </ul>	<ul style="list-style-type: none"> <li><i>Calculate percentages*</i></li> <li><i>Use the equivalence of fractions, decimals and percentages to compare proportions*</i></li> </ul>
<ul style="list-style-type: none"> <li>and relate them to fractions and decimals</li> </ul>		<ul style="list-style-type: none"> <li>Compare and order fractions and decimals</li> <li>percentages of numbers</li> </ul>	
<ul style="list-style-type: none"> <li>Solve problems involving operations with whole numbers, fractions, decimals and simple percentages</li> </ul>		<ul style="list-style-type: none"> <li>relating to profit and loss, discount, VAT, interest, increases, decreases</li> </ul>	<ul style="list-style-type: none"> <li>Solve problems that involve finding profit or loss, % profit or loss (on the cost price), discount, % discount, selling price, compound interest for not more than 3 years, income tax (standard rate only), net pay (including other deductions of specified amounts)</li> </ul>
<b>Number theory</b>	Fifth Class, Primary	Sixth Class, Primary	Junior Cycle, Post-Primary
	The child should be enabled to		The learner should be able to
	<ul style="list-style-type: none"> <li>Identify simple prime and composite numbers</li> </ul>		<ul style="list-style-type: none"> <li><i>Consolidate their understanding of prime numbers in <math>N^*</math></i></li> </ul>
	<ul style="list-style-type: none"> <li>Identify square and rectangular numbers</li> </ul>	<ul style="list-style-type: none"> <li>Identify and explore square numbers</li> <li>Explore and identify simple square roots</li> </ul>	<ul style="list-style-type: none"> <li>Use the notation <math>a^n</math> for <math>a, n \in N</math>.</li> <li>Use the notation <math>a^{\frac{1}{2}}</math>, <math>a \in N</math></li> </ul>
	<ul style="list-style-type: none"> <li>Identify factors and multiples</li> </ul>	<ul style="list-style-type: none"> <li>Identify common factors and multiples</li> </ul>	<ul style="list-style-type: none"> <li><i>Consolidate their understanding of factors, multiples, in <math>N^*</math></i></li> </ul>
	<ul style="list-style-type: none"> <li>Write whole numbers in exponential form</li> </ul>	<ul style="list-style-type: none"> <li>Apply the rules for indices (where <math>a \in \mathbb{Z}</math>, <math>p, q \in \mathbb{N}</math>): <ul style="list-style-type: none"> <li><math>a^p a^q = a^{p+q}</math></li> <li><math>\frac{a^p}{a^q} = a^{p-q}</math> <math>p &gt; q</math></li> <li><math>(a^p)^q = a^{pq}</math></li> </ul> </li> </ul>	

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	Fifth Class, Primary	Sixth Class, Primary	Junior Cycle, Post-Primary	
<b>Length</b>	The child should be enabled to		The learner should be able to	
	<ul style="list-style-type: none"> <li>Estimate and measure length using appropriate metric units</li> </ul>			
	<ul style="list-style-type: none"> <li>Select and use appropriate instruments of measurement</li> </ul>	<ul style="list-style-type: none"> <li>Rename measures of length</li> </ul>		
	<ul style="list-style-type: none"> <li>Estimate and measure the perimeter of regular and irregular shapes</li> </ul>			
		<ul style="list-style-type: none"> <li>Use and interpret scales on maps and plans</li> </ul>	<ul style="list-style-type: none"> <li>Draw and interpret scaled diagrams</li> </ul>	
<b>Area</b>	Fifth Class, Primary		Junior Cycle, Post-Primary	
	The child should be enabled to		The learner should be able to	
	<ul style="list-style-type: none"> <li>Discover that the area of a rectangle is length by breadth</li> </ul>	<ul style="list-style-type: none"> <li>Recognise that the length of the perimeter of a rectangular shape does not determine the area of the shape</li> </ul>	<ul style="list-style-type: none"> <li>Investigate nets of rectangular solids</li> </ul>	
	<ul style="list-style-type: none"> <li>Estimate and measure</li> </ul>	<ul style="list-style-type: none"> <li>Calculate</li> </ul>	<ul style="list-style-type: none"> <li>Find (OL)</li> </ul>	<ul style="list-style-type: none"> <li>Perform calculations involving (HL)</li> </ul>
		the area of regular and irregular 2-D shapes	surface area of rectangular solids	
		<ul style="list-style-type: none"> <li>Measure the surface area of specified 3-D shapes</li> </ul>		
		<ul style="list-style-type: none"> <li>Calculate area using</li> </ul>		
	<ul style="list-style-type: none"> <li>square centimetres and square metres</li> </ul>	<ul style="list-style-type: none"> <li>ares and hectares</li> </ul>		
	<ul style="list-style-type: none"> <li>Compare visually</li> </ul>	<ul style="list-style-type: none"> <li>Identify the relationship between</li> </ul>		
		<ul style="list-style-type: none"> <li>square metres and square centimetres</li> </ul>		
<b>Weight</b>		<ul style="list-style-type: none"> <li>Find the area of a room from a scale plan</li> </ul>		
	Fifth Class, Primary		Junior Cycle, Post-Primary	
	The child should be enabled to		The learner should be able to	
	<ul style="list-style-type: none"> <li>Estimate and measure weight using appropriate metric units</li> </ul>		<ul style="list-style-type: none"> <li>Calculate interpret and apply units of measure and time</li> </ul>	
	<ul style="list-style-type: none"> <li>Select and use appropriate instruments of measurement</li> </ul>	<ul style="list-style-type: none"> <li>Rename measures of weight</li> </ul>		

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<b>Capacity</b>	Fifth Class, Primary	Sixth Class, Primary	Junior Cycle, Post-Primary		
	The child should be enabled to		The learner should be able to		
	<ul style="list-style-type: none"> <li>▪ Estimate and measure capacity using appropriate metric units</li> </ul>				
		<ul style="list-style-type: none"> <li>▪ Select and use appropriate instruments of measurement</li> </ul>			
		<ul style="list-style-type: none"> <li>▪ Rename measures of capacity</li> </ul>	<ul style="list-style-type: none"> <li>▪ Find (OL)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Perform calculations involving (HL)</li> </ul>	
<b>Time</b>	Fifth Class, Primary	Sixth Class, Primary	Junior Cycle, Post-Primary		
	The child should be enabled to		The learner should be able to		
	<ul style="list-style-type: none"> <li>▪ Read and interpret timetables and the 24-hour clock (digital and analogue)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Explore international time zones</li> </ul>			
	<ul style="list-style-type: none"> <li>▪ Interpret and convert between times in 12-hour and 24-hour format</li> </ul>	<ul style="list-style-type: none"> <li>▪ Explore the relationship between time, distance and average speed</li> </ul>		<ul style="list-style-type: none"> <li>▪ Solve problems that involve calculating average speed, distance and time</li> </ul>	
		<ul style="list-style-type: none"> <li>▪ Find the volume of a cuboid experimentally</li> </ul>			Volume of rectangular solids and cylinders
<b>Money</b>	Fifth Class, Primary	Sixth Class, Primary	Junior Cycle, Post-Primary		
	The child should be enabled to		The learner should be able to		
	<ul style="list-style-type: none"> <li>▪ Compare 'value for money' using unitary method</li> </ul>	<ul style="list-style-type: none"> <li>▪ Explore value for money</li> </ul>		<ul style="list-style-type: none"> <li>▪ Make value for money calculations and judgements</li> </ul>	
		<ul style="list-style-type: none"> <li>▪ Convert other currencies to euro and vice versa</li> </ul>		<ul style="list-style-type: none"> <li>▪ <i>Use the equivalence of fractions, decimals and percentages to compare proportions*</i></li> <li>▪ <i>Consolidate their understanding of the relationship between ratio and proportion*</i></li> </ul>	

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3-D shapes	Fifth Class, Primary	Sixth Class, Primary	Junior Cycle, Post-Primary	
	The child should be enabled to	<ul style="list-style-type: none"> <li>Identify and examine 3-D shapes and explore relationships, including tetrahedron   octahedron (faces, edges and vertices)</li> <li>Draw the nets of simple 3-D shapes and construct the shapes</li> </ul>		The learner should be able to
			<ul style="list-style-type: none"> <li>Investigate the nets of rectangular solids</li> <li>Find the volume of rectangular solids</li> </ul>	
2-D shapes	Fifth Class, Primary	Sixth Class, Primary	Junior Cycle, Post-Primary	
	The child should be enabled to	<ul style="list-style-type: none"> <li>Make informal deductions about 2-D shapes and their properties</li> </ul>		The learner should be able to
		<ul style="list-style-type: none"> <li>Use angle and line properties to classify and describe triangles and quadrilaterals</li> </ul>		<ul style="list-style-type: none"> <li>Prove in a parallelogram opposite sides and opposite angles are equal and the diagonals bisect each other</li> </ul>
		<ul style="list-style-type: none"> <li>Construct triangles from given sides or angles</li> </ul>	<ul style="list-style-type: none"> <li>Construct triangles given length of 3 sides, SAS and ASA data</li> </ul>	
		<ul style="list-style-type: none"> <li>Identify the properties of the circle</li> </ul>		<ul style="list-style-type: none"> <li>Develop an understanding of the relationship between diameter, circumference and <math>\pi</math></li> </ul>
		<ul style="list-style-type: none"> <li>Construct a circle of given radius or diameter</li> </ul>		
		<ul style="list-style-type: none"> <li>Use 2-D shapes and properties to solve problems</li> </ul>		
		<ul style="list-style-type: none"> <li>Classify 2-D shapes according to their lines of symmetry</li> </ul>		<ul style="list-style-type: none"> <li><i>Use drawings to show central symmetry and axial symmetry*</i></li> <li>Locate axes of symmetry in simple shapes</li> </ul>
	<ul style="list-style-type: none"> <li>Tessellate combinations of 2-D shapes</li> </ul>			
Lines and angles	Fifth Class, Primary	Sixth Class, Primary	Junior Cycle, Post-Primary	
	The child should be enabled to	<ul style="list-style-type: none"> <li>Recognise, classify and describe angles and relate angles to shape and the environment</li> <li>Recognise angles in terms of rotation</li> <li>Estimate, measure and construct angles in degrees</li> <li>Explore the sum of the angles in a triangle   in a quadrilateral</li> </ul>		The learner should be able to
				<ul style="list-style-type: none"> <li><i>Bisect an angle with a compass and straight edge*</i></li> <li>Prove the angles in a triangle add to <math>180^\circ</math></li> </ul>

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**Mathematics>>Data→Statistics and Probability**

	Fifth Class, Primary	Sixth Class, Primary	Junior Cycle, Post-Primary
	<b>Representing and interpreting data</b>	The child should be enabled to	
<ul style="list-style-type: none"> <li>Collect, organise and represent data using pictograms, single and multiple bar charts and simple pie charts</li> </ul>		<ul style="list-style-type: none"> <li>pie charts and trend graphs</li> </ul>	<ul style="list-style-type: none"> <li><i>Select appropriate graphical or numerical* methods to describe the sample (univariate data only)*</i></li> <li><i>Use pie charts, barcharts, line plots, histograms(equal intervals) and stem and leaf plots to display data*</i></li> </ul>
<ul style="list-style-type: none"> <li>Read and interpret pictograms, single and multiple bar charts, and pie charts</li> </ul>		<ul style="list-style-type: none"> <li>trend graphs and pie charts</li> </ul>	<ul style="list-style-type: none"> <li>Interpret graphical summaries of data</li> </ul>
<ul style="list-style-type: none"> <li>Compile and use simple data sets</li> </ul>			
<ul style="list-style-type: none"> <li>Explore and calculate averages of simple data sets</li> </ul>		<ul style="list-style-type: none"> <li>Use a variety of summary statistics to analyse the data: central tendency- mean, mode and median, variability - range</li> </ul>	
<ul style="list-style-type: none"> <li>Use data sets to solve problems</li> </ul>			<ul style="list-style-type: none"> <li><i>Plan an experiment*</i></li> <li><i>Select a sample and appreciate the importance of representativeness so as to avoid biased samples*</i></li> <li><i>Design a plan to collect data on the basis of above knowledge*</i></li> <li><i>Employ the plan to collect the data*</i></li> </ul>
<b>Chance</b>	Fifth Class, Primary	Sixth Class, Primary	Junior Cycle, Post-Primary
	The child should be enabled to		The learner should be able to
	<ul style="list-style-type: none"> <li>Identify and list all possible outcomes of simple random processes</li> </ul>		<ul style="list-style-type: none"> <li>Apply the principle that in the case of equally likely outcomes the probability is given by the number of outcomes of interest divided by the total number of outcomes</li> </ul>
	<ul style="list-style-type: none"> <li>Estimate the likelihood of occurrence of events</li> </ul>		<ul style="list-style-type: none"> <li><i>Decide whether an everyday event is likely or unlikely to occur*</i></li> <li><i>Appreciate that probability is a quantity that gives a measure on a scale of 0- 1 of how likely an event is to occur*</i></li> <li><i>Apply the fundamental principle of counting*</i></li> </ul>
<ul style="list-style-type: none"> <li>Construct and use frequency charts and tables</li> </ul>			

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**Mathematics >> Algebra → Functions**

	Fifth Class, Primary	Sixth Class, Primary	Junior Cycle, Post-Primary
Directed numbers	The child should be enabled to		The learner should be able to
	<ul style="list-style-type: none"> <li>Identify positive and negative numbers in context</li> </ul>	<ul style="list-style-type: none"> <li>on the number line</li> <li>Add simple positive and negative numbers on the number line</li> </ul>	<ul style="list-style-type: none"> <li><i>Investigate models such as the number line to illustrate the operations of addition, subtraction, multiplication and division in <math>\mathbb{Z}^*</math></i></li> </ul>
Rules and Properties	<ul style="list-style-type: none"> <li>Explore and discuss simple properties and rules about brackets and priority of operation</li> </ul>	<ul style="list-style-type: none"> <li>Know</li> </ul>	<ul style="list-style-type: none"> <li><i>Perform the operations in their order including brackets*</i></li> <li><i>Generalise observations of arithmetic operations</i> <ul style="list-style-type: none"> <li><i>use tables to represent a repeating-pattern situation</i></li> <li><i>generalise and explain patterns and relationships in words and numbers</i></li> <li><i>write arithmetic expressions for particular terms in a sequence</i></li> <li><i>use simple graphs as a tool for analysing relations*</i></li> </ul> </li> </ul>
	<ul style="list-style-type: none"> <li>Identify relationships and record verbal and simple symbolic rules for number patterns</li> </ul>	<ul style="list-style-type: none"> <li>symbolic rules for number patterns</li> </ul>	
Equations	<ul style="list-style-type: none"> <li>Translate number sentences with a frame into word problems and vice versa</li> </ul>	<ul style="list-style-type: none"> <li>word problems with a variable into number sentences</li> </ul>	<ul style="list-style-type: none"> <li>Interpret equations of the form <math>f(x) = g(x)</math> as a comparison of functions of the form <ul style="list-style-type: none"> <li><math>ax</math> where <math>a \in \mathbb{Z}, x \in \mathbb{R}</math></li> <li><math>ax+b</math> where <math>a,b \in \mathbb{Z}, x \in \mathbb{R}</math></li> <li><math>ax^2+bx+c</math> where <math>a,b,c \in \mathbb{Z}, x \in \mathbb{R}</math></li> <li><math>a2^x</math> where <math>a \in \mathbb{N}, x \in \mathbb{R}</math></li> <li><math>a3^x</math> where <math>a \in \mathbb{N}, x \in \mathbb{R}</math></li> </ul> </li> <li>use graphical methods to find approximate solutions to <math>f(x) = g(x)</math></li> </ul>
	<ul style="list-style-type: none"> <li>Solve one-step number sentences and equations</li> </ul>		
Variables		<ul style="list-style-type: none"> <li>Explore the concept of a variable in the context of simple patterns, tables and simple formulae and substitute values for variables</li> </ul>	<ul style="list-style-type: none"> <li>Use tables diagrams and graphs as tools for representing and analysing linear, quadratic and exponential patterns and relations (exponential relations limited to doubling and tripling)</li> </ul>

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