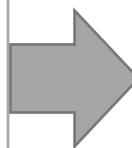


# Why is the Mathematics curriculum at MRC important?

## Our curriculum aims to:

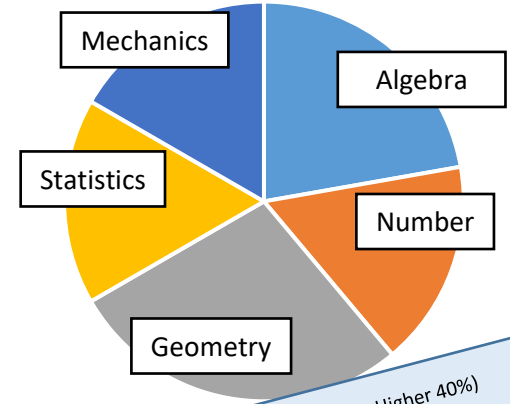
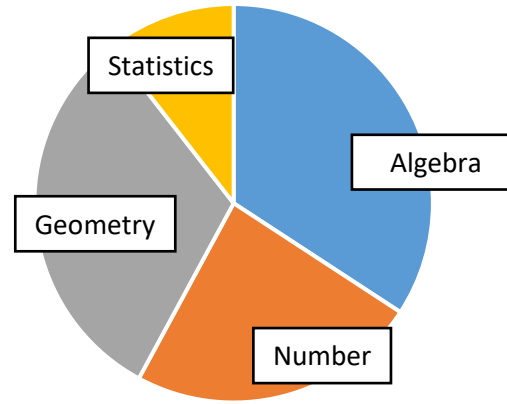
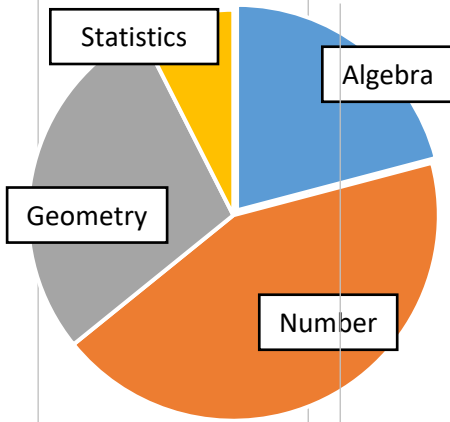
- Develop the breadth of knowledge and skills needed to succeed in their studies through effective design and integration of mathematical fluency
- promote the value and enjoyment of the study of maths to students, parents and colleagues.
- be accessible and challenging to all
- maximise the development of every child's ability and academic achievement.
- inspire students to follow careers involving further Mathematics study at University
- be designed such that long term memory is developed and knowledge is embedded through routine practice and interleaving topics based on prior learning and key concepts



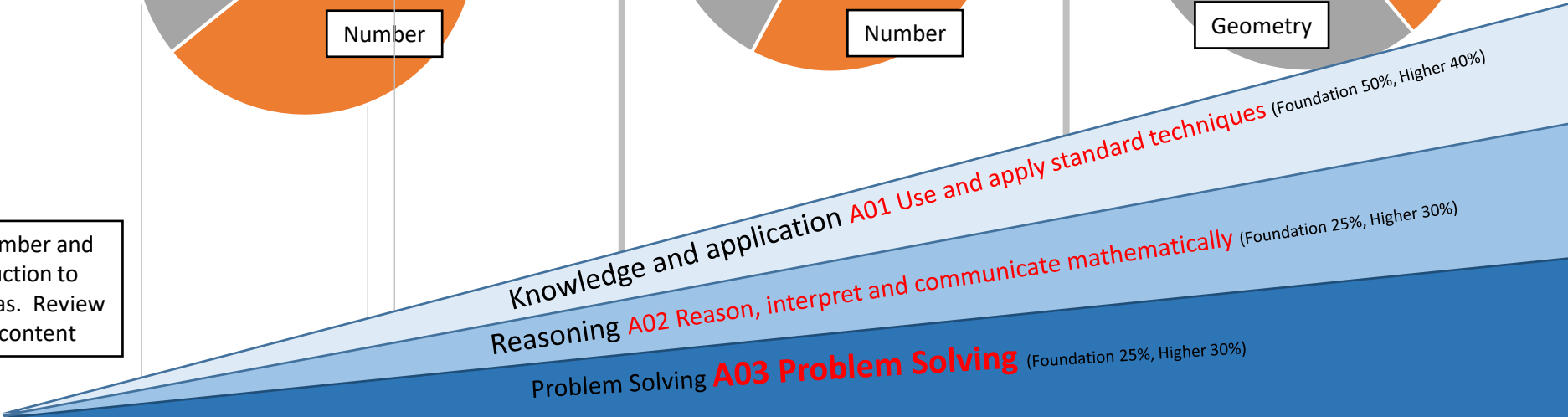
## The overall outcomes:

- our students will have the ability to reason mathematically, have an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.
- students are able to apply their Mathematical knowledge and wider problem solving skills across a range of subjects such as Science and Computer Science, Design and Technology and Business studies whilst appreciating the rich cultural diversity of Mathematics and its history
- students to make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.
- students will know that Mathematics is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. Career links will be explicit and implicit in the curriculum roadmap shared with students.

# Mathematics



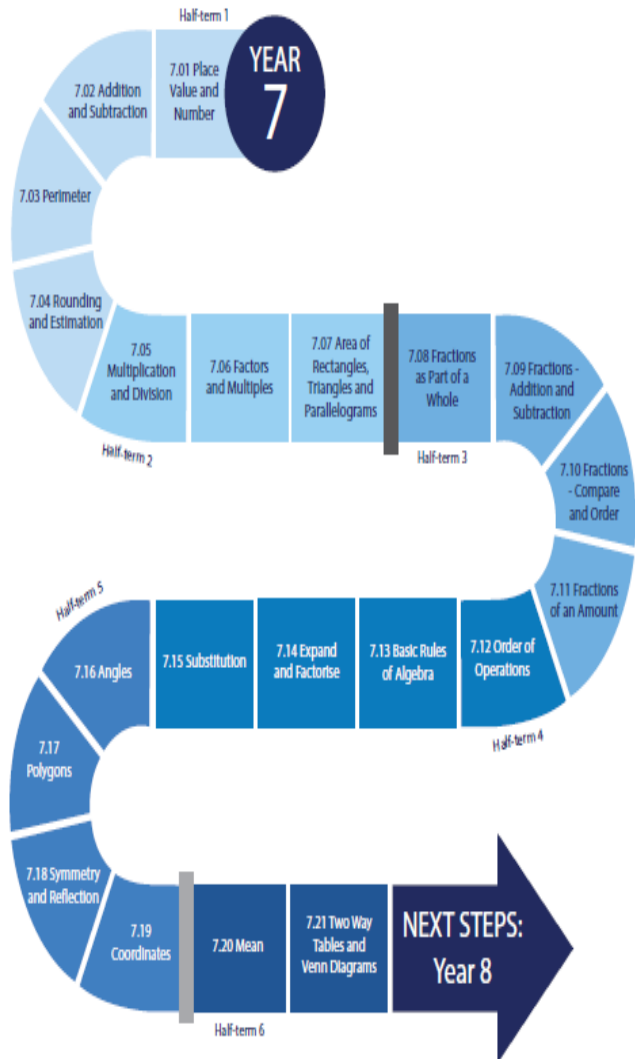
Basic Number and introduction to other areas. Review of KS2 content



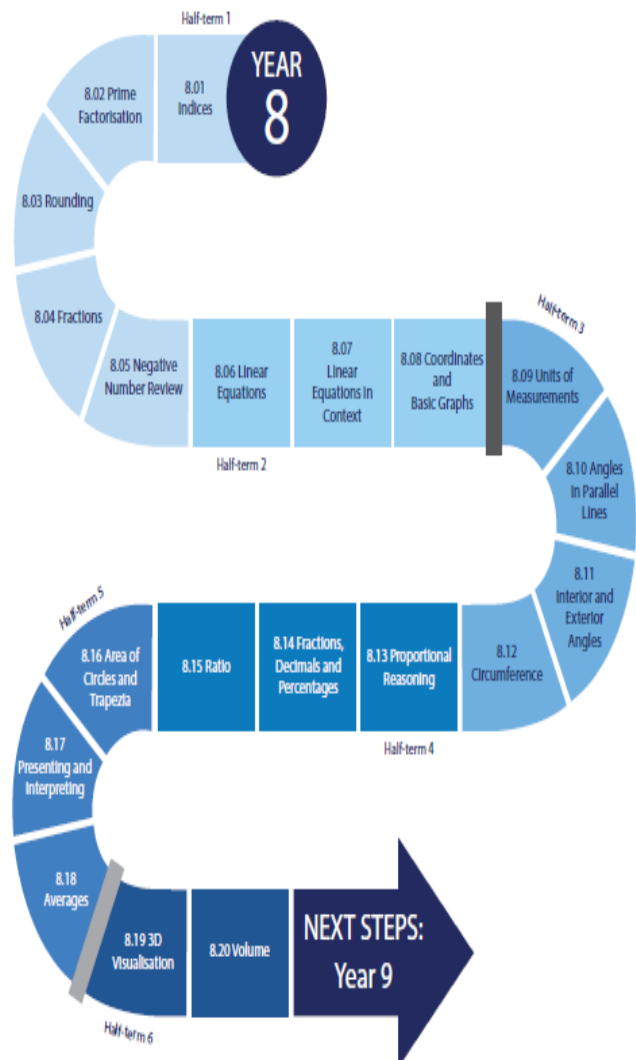
<ul style="list-style-type: none"> <li>Algebra introduction</li> <li>Place Value</li> <li>4 operations</li> <li>Fractions</li> <li>Shape &amp; Angles</li> <li>Averages and presenting data</li> </ul>	<ul style="list-style-type: none"> <li>Linear Equations</li> <li>Coordinates</li> <li>Indices</li> <li>Percentages</li> <li>Proportional Reasoning</li> <li>3D visualisation</li> <li>2 way tables</li> </ul>	<ul style="list-style-type: none"> <li>Expanding and factorising</li> <li>Rearranging equations</li> <li>Sequences</li> <li>Index Laws</li> <li>Linear Inequalities</li> <li>Basic Vectors</li> <li>Pythagoras</li> </ul>	<ul style="list-style-type: none"> <li>Linear graphs</li> <li>Further Proportion</li> <li>Standard Form</li> <li>Bounds</li> <li>Surds</li> <li>Plans and Elevations</li> <li>Loci</li> <li>Trigonometry</li> <li>Probability</li> </ul>	<ul style="list-style-type: none"> <li>Algebraic Proof</li> <li>Solving Quadratics</li> <li>Functions</li> <li>Simultaneous Equations</li> <li>Further Trigonometry</li> <li>Circle Theorem</li> <li>Bearings</li> <li>Transformations</li> <li>Congruence</li> </ul>	<ul style="list-style-type: none"> <li>Proof</li> <li>Algebra and functions</li> <li>Calculus</li> <li>Differential equations</li> <li>Vectors</li> <li>Polar coordinates</li> <li>Hyperbolic functions</li> <li>Coordinate Geometry</li> <li>Statistics</li> <li>Introduction to Mechanics</li> </ul>	<ul style="list-style-type: none"> <li>Coordinate Geometry</li> <li>Further Trigonometry</li> <li>Complex Numbers</li> <li>Matrices</li> <li>Numerical methods</li> <li>Statistics</li> <li>Further mechanics</li> </ul>
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Yr7	Yr8	Yr9	Yr10	Yr11	Yr12	Yr13
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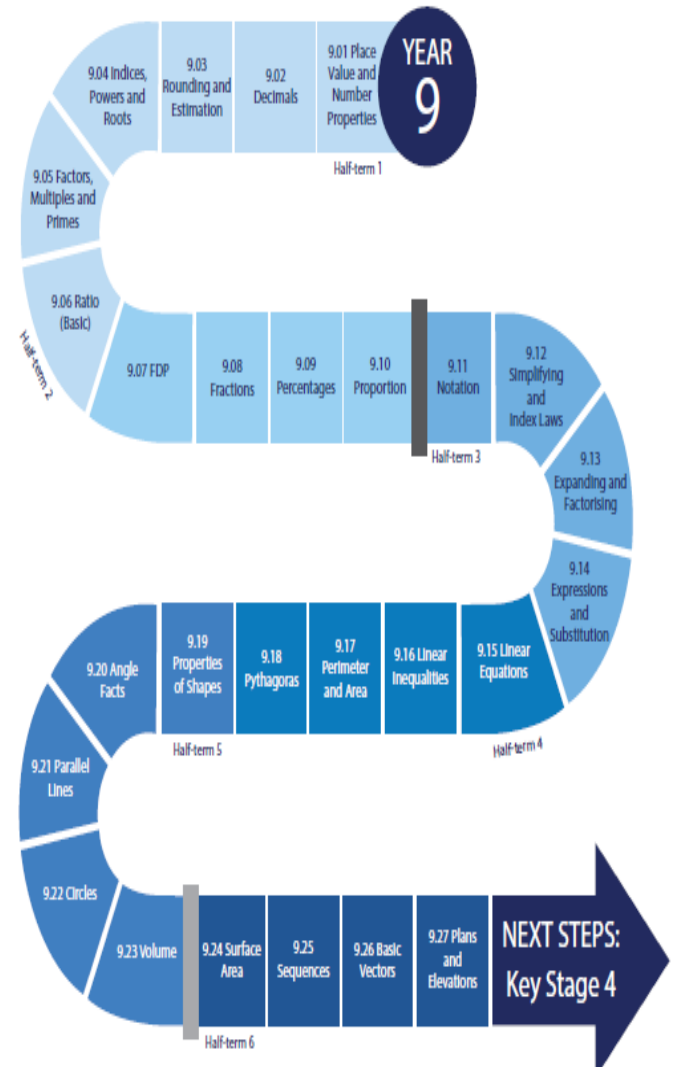
KEY:  
 Mid-Year Assessment  
 End of Year Assessment



KEY:  
 Mid-Year Assessment  
 End of Year Assessment

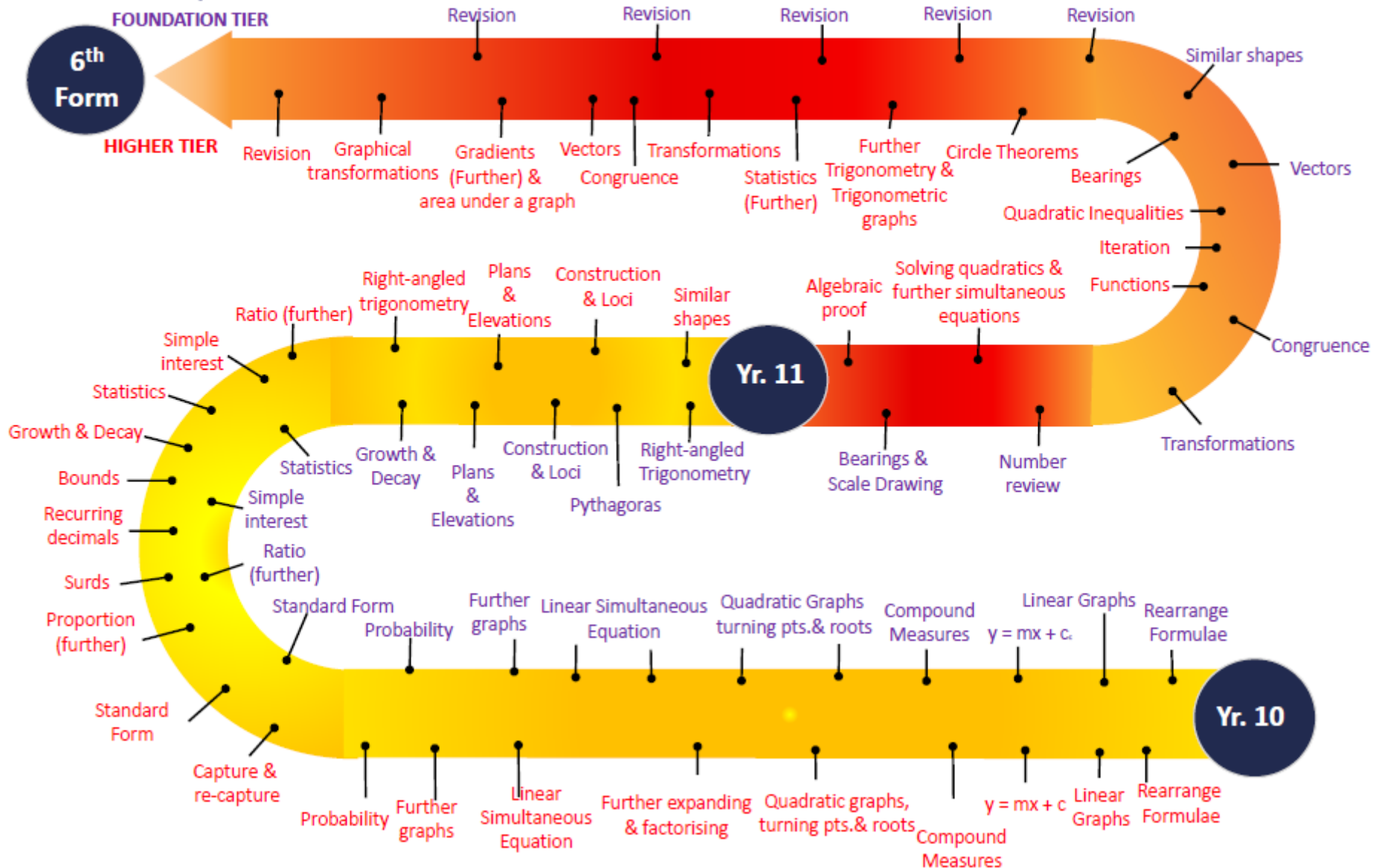


KEY:  
 Mid-Year Assessment  
 End of Year Assessment





# Key Stage 4 Mathematics Learning Journey



# Developing Problem Solving at MRC

- Embedding investigational maths and problem solving throughout the curriculum
- Ensuring students can record their 'random' findings in a way to help spot patterns and similarities
- Training students to 'look' for patterns and sequences as they work through a problem
- What can I change and what changes will that make?

## Year 7 Curriculum – NRICH Open Problems

New KPI	New Ordering and KPI Title	Old KPI
<b>Half Term 1</b>		
7.01	Place value and Number sense: New Title: Numerical Skills <a href="#">Add to 200 (maths.org)</a> <a href="#">Forwards Add Backwards (maths.org)</a> <a href="#">Consecutive Seven (maths.org)</a>	7.01
7.02	Order of operations <a href="#">Consecutive Numbers (maths.org)</a> <a href="#">Can You Make 100? (maths.org)</a>	7.12
7.03	Basic rules of algebra <a href="#">How Much Can We Spend? (maths.org)</a>	7.13
7.04	Factors and Multiples <a href="#">Gabriel's Problem (maths.org)</a> <a href="#">Multiple Surprises (maths.org)</a>	7.06
7.05	Expand and factorise	7.14
	Rounding & Estimation (in real life situations)	<del>7.04</del>
<b>Half Term 2</b>		
7.06	Addition and Subtraction (Short Problems?)	7.02
7.07	Perimeter <a href="#">Fence It (maths.org)</a>	7.03

# Gabriel's Problem

Age 11 to 14

Challenge Level ★

Gabriel wrote the numbers 1-9 in a 3x3 grid.

He then multiplied together all the numbers in each row and wrote the resulting product next to that row.

He also multiplied the numbers in each column together, and wrote the product under that column.

He then rubbed out the numbers 1-9.

			24
			40
			378
60	21	288	

**Can you work out where Gabriel placed the numbers 1-9?**

# Y8 Example

Investigation which produces square and cube numbers to begin with, then can be developed to generalise with any base and index number.

## 8.01: Indices - Download All

12 Resource items.

### Scheme of Work: KPI Overview

### Lessons

8.01: Lesson 1 - Index Form.pptx

8.01: Lesson 2 - Square & Cube Numbers.pptx


8.01: Lesson 3 - Further Powers.pptx


8.01: Lesson 4 - Square & Cube Roots.pptx

Two scoops of ice cream in each cone, no half scoops allowed.

How many **DIFFERENT** ice creams can you have if there are two flavours to choose from?



 Strawberry

 Mint



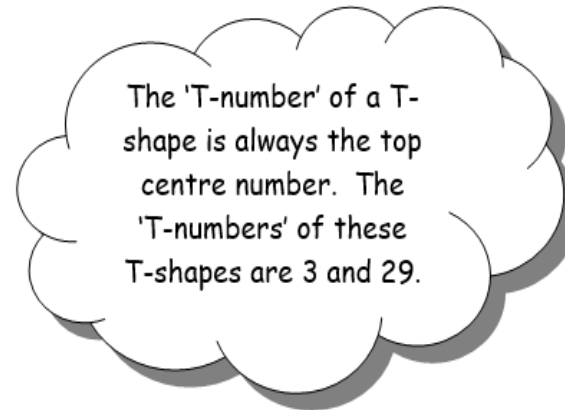
# Y9 Investigation

## T-SHAPES

Take a 10 by 10 grid, and "take out" a T-shape.

A 'T-shape' has three numbers across the top and three numbers down the middle of the T-shape.  
For example:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



The T-total of the T3-shape is  $2+3+4+13+23 = 45$

The T-total of the T29-shape  $28+29+30+39+49 = 175$

Explore different T-shapes, and investigate any relationship between the T-number and T-total.

## 9.26: Sequences

Prior Knowledge Check

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Lessons

[9.26 Lesson\\_1 Unique Sequences.pptx](#)

[9.26 Lesson\\_2 Term to Term Rule.pptx](#)

[9.26 Lesson\\_3 Nth Term.pptx](#)

[9.26 Lesson\\_4 Finding terms.pptx](#)

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Supporting Resources

KPI tests linked to Sparx