



# YEAR 9 2023-2024 Autumn TERM 1

'An ambitious curriculum that meets the needs of all'

## Medium Term Planning

1. Forming and solving equations. 2. Straight line graphs. 3. Number sense and conjecture.

### Curriculum Intent

**UNIT: Forming and solving equations, (9/10 lessons)**

**PUPILS SHOULD NOT BE USING A CALCULATOR WITH THIS UNIT**

***Previously met:***

- Form and solve one-step equations (Year 7, Aut 2)
- Form and solve two-step equations (Year 7, Spr 2)
- Solve inequalities (Year 8, Aut 2)
- Form and solve equations with brackets (Year 8, Aut 2)
- Form and solve inequalities with unknowns on both sides (Year 8, Aut 2)

To be able to:

- One and two-step equations and inequalities (R)
- Equations and inequalities with brackets (R)
- Inequalities with negative numbers.
- Solve equations with unknowns on both sides.
- Solve inequalities with unknowns on both sides.
- Equations and inequalities in other mathematical contexts.
- Formulae and equations.
- Rearrange formulae (one-step).
- Rearrange formulae (two-step).
- Rearrange complex formulae.

**REMDINER – Strategies for teaching.**

- Balancing method when solving equations and inequalities.
- Balancing method with rearranging.

**Links and interleaving**

- Review use of brackets.
- Revisit key topics when solving equations (fractions and decimals, numeracy work, collecting like terms).
- Modelling real life contexts. This fits into all parts of mathematics, any context which requires unknowns. This certainly fits well with area.

***Straight line graphs (6/7 lessons)***

***Previously met:***

- Conversion graphs (Year 8, Aut 1)
- Direct proportion graphs (higher content) (Year 8, Aut 1)
- Using coordinates (Year 8, Aut 2)
- Plotting graphs (including  $y = k$ ,  $x = k$ ,  $y = kx$ ,  $y = x + a$ ,  $y = mx + c$ ) (Year 8, Aut 2)
- Exploring gradient (higher content) (Year 8, Aut 2)
- Explore non-linear graphs (higher content) (Year 8, Aut 2)

### Skills/Assessment Objective Links

To be able to:

- Lines parallel to the axis,  $y = x$  and  $y = -x$ .
- Using tables of values.
- Compare gradients.
- Compare intercepts.
- Understand and use  $y = mx + c$ .
- Write an equation in the form  $y = mx + c$ .
- Find the equation of a line from a graph.
- Interpret gradients and intercepts of real-life graphs.
- Model real-life graphs involving inverse proportion.
- Explore perpendicular lines.

### **Links and interleaving**

- Compare linear sequences and finding the rule for the n-th term.
- Link equations of graphs to solving equations.
- Modelling real life contexts. This fits into all parts of mathematics, any context which requires unknowns.

### ***Number sense/conjecture (3/4 lessons).***

### ***Previously met: See notes from KS2 National Curriculum***

- Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams **(Year 5)**.
- Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example,  $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ ] **(Year 6)**.
- Divide proper fractions by whole numbers [for example,  $\frac{1}{3} \div 2 = \frac{1}{6}$ ] **(Year 6)**.

To be able to:

- Factors, multiples and primes.
- True or false.
- Always, sometimes, never true.
- Show that.
- Conjectures about number.
- Expand a pair of binomials.
- Conjectures with algebra.
- Explore the 100 grid.
- **Expand three binomials.**

### **Links and interleaving**

- This unit can encompass all topics. A suggestion would be to include some fractions when expanding a pair of binomials.

**Spiritual, moral,  
social, and  
cultural  
development**

**SMSC:** Making choices, looking for patterns which may reflect the natural world, supporting and collaborating with each other, realisation that mathematics is an international language and making cultural links as we explore the history of mathematics.  
**PSHE/British Values:** Working collaboratively, being respectful during discussion and valuing contributions made by others  
**Skills Builder: Key skills in numeracy used in all topic areas.**

**Numeracy**

**Focus on key skills.**

Literacy	<p><b>Vocabulary Tier 2:</b> Command words displayed in the classroom and italicized/bold font used in shared resources/presentations. These are a constant focus in discussion and questioning,</p> <p><b>Vocabulary Tier 3:</b> Title slide in all shared resource presentations show the key vocabulary for each topic.</p> <p><b>Reading:</b> Underlining command words,</p> <p><b>Writing:</b> Modelling solutions</p> <p><b>Oracy:</b> Think, pair, share, discussion, verbal feedback (peer to peer), questioning, student modelling</p>
Becoming future ready	<p><b>Personal Skills:</b> As a Mathematics student you will learn many skills: you will gain opportunities to listen to others supportively and to use questioning to develop your own understanding, you will learn how to cope with challenging questions and how to build up your resilience, you will get the chance to work on your own and with others. You will develop problem solving skills and you will learn how to break a problem down into smaller more manageable steps. You will learn how to collaborate with others when solving problems and you will learn how to articulate your solution to a problem.</p> <p><b>Employability:</b> Mathematical skills are invaluable in the workplace. There are many transferable skills which are much valued by employers. Specific career paths for each topic are discussed at the beginning of each unit of work.</p>
Adaptation	<ul style="list-style-type: none"> <li>• By progressive questioning: exploring pupils' understanding through interactive dialogue.</li> <li>• By outcome: different learners will produce different outcomes.</li> <li>• By resource: worksheets are clearly presented and accessible.</li> <li>• By intervention: by providing different levels of supervision and support.</li> <li>• By grouping/setting: according to prior attainment, gender, social preference, preferred learning style.</li> <li>• By offering optional activities: In class or as homework, to extend learning.</li> </ul>
QFT/SEND Provision	
Implementation Curriculum Delivery	<p><b>Support (S), Core (C), Extension (E).</b></p> <p><b>Forming and solving equations – small steps</b></p> <ul style="list-style-type: none"> <li>• One and two-step equations and inequalities (S)</li> <li>• Equations and inequalities with brackets (S)</li> <li>• Inequalities with negative numbers. (S)</li> <li>• Solve equations with unknowns on both sides. (C)</li> <li>• Solve inequalities with unknowns on both sides. (C)</li> <li>• Equations and inequalities in other mathematical contexts. (C)</li> <li>• Formulae and equations. (C)</li> <li>• Rearrange formulae (one-step). (C)</li> <li>• Rearrange formulae (two-step). (C)</li> <li>• Rearrange complex formulae. (E)</li> </ul> <p><u>Extension tasks – These could be interleaved within the core knowledge.</u></p> <ul style="list-style-type: none"> <li>• Factorising and solving quadratics with the coefficient of <math>x^2</math> being 1.</li> </ul> <p><b>Straight line graphs – small steps</b></p> <ul style="list-style-type: none"> <li>• Plotting coordinates. (S)</li> <li>• Lines parallel to the axis, <math>y = x</math> and <math>y = -x</math>. (S)</li> <li>• Using tables of values. (C)</li> <li>• Compare gradients. (C)</li> <li>• Compare intercepts. (C)</li> <li>• Understand and use <math>y = mx + c</math>. (C)</li> <li>• Write an equation in the form <math>y = mx + c</math>. (C)</li> <li>• Find the equation of a line from a graph. (C)</li> <li>• Interpret gradients and intercepts of real-life graphs. (C)</li> <li>• Model real-life graphs involving inverse proportion. (H)</li> <li>• Explore perpendicular lines. (H)</li> </ul> <p><u>Extension tasks</u></p> <ul style="list-style-type: none"> <li>• Finding the equation of a line from the gradient and a point.</li> <li>• Finding the equation of a line from two points.</li> <li>• Finding the equation of a perpendicular bisector.</li> </ul>
Learning Outcomes (Most Powerful Knowledge)	

	<p><b>Number sense/conjecture - small steps</b></p> <ul style="list-style-type: none"> <li>• Factors, multiples and primes. (S)</li> <li>• True or false. (S)</li> <li>• Always, sometimes, never true. (S)</li> <li>• Show that. (C)</li> <li>• Conjectures about number. (C)</li> <li>• Expand a pair of binomials. (C)</li> <li>• Conjectures with algebra. (C)</li> <li>• Explore the 100 grid. (C)</li> <li>• <b>Expand three binomials. (E)</b></li> </ul> <p><u>Extension</u></p> <ul style="list-style-type: none"> <li>• Explore the shapes of graphs.</li> </ul>
<p><b>Current learning to be developed in the future within:</b></p>	<p><u>Form and solve equations.</u></p> <ul style="list-style-type: none"> <li>• Representing inequalities <b>(Year 9, Sum 2)</b></li> <li>• Represent solutions to inequalities on number lines <b>(Year 10, Aut 1)</b></li> <li>• Form and solve linear simultaneous equations. <b>(Year 10, Aut 1)</b></li> <li>• Solve quadratic equations and inequalities by factorising <b>(Year 10, Aut 1)</b></li> <li>• Solve simultaneous equations, one linear and one quadratic <b>(Year 10, Aut 1)</b></li> <li>• Form and solve quadratic equations by factorising <b>(Year 11, Aut 1)</b></li> <li>• Solve quadratic equations using the formula and completing the square <b>(Year 11, Aut 1)</b></li> </ul> <p><u>Straight line graphs</u></p> <ul style="list-style-type: none"> <li>• Solve linear simultaneous equations graphically <b>(Year 10, Aut 1)</b></li> <li>• Perpendicular lines <b>(Year 11, Aut 1)</b></li> <li>• Equation of the tangent to a circle <b>(Year 11, Aut 1)</b></li> </ul> <p><u>Number sense/conjecture</u></p> <ul style="list-style-type: none"> <li>• This topic will not be revisited to revised through past exam paper questions throughout Year 10 and 11.</li> </ul>
<b>Assessment</b>	Refer to assessment maps for formative and summative assessment opportunities.
<b>Impact</b>	Attainment and Progress – Refer to assessment results / data review documentation.