



# YEAR 8 2023-2024 Autumn TERM 2

'An ambitious curriculum that meets the needs of all'

## Medium Term Planning

1. The Cartesian plane. 2. Collecting and presenting data. 3. Tables and probability. 4. Brackets, equations, and inequalities (2 week before Christmas and 2 weeks after)

### Curriculum Intent

**UNIT: The Cartesian plane, (9/10 lessons)**

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

***Previously met within Year 7 and KS2 National Curriculum:***

- Describe positions on a 2-D grid as coordinates in the first quadrant (Year 4)
- Describe positions on the full coordinate grid (all four quadrants) (Year 6)
- Represent functions graphically (Year 7, Aut 1)

To be able to:

- Work with coordinates in all four quadrants.
- Identify and draw lines that are parallel to the axes.
- Recognise and use the line  $y = x$ .
- Recognise and use lines of the form  $y = kx$ .
- Link  $y = kx$  to direct proportion problems.
- **Explore the gradient of the line  $y = kx$ .**
- Recognise and use lines of the form  $y = x + a$ .
- Explore graphs with negative gradient ( $y = -kx, y = a - x, x + y = a$ )
- Link graphs to linear sequences.
- Plot graphs of the form  $y = mx + c$ .
- **Explore non-linear graphs.**
- **Find the midpoint of a line segment.**

REMDINER – Strategies for teaching.

- For lower attaining pupils, table of values may suffice for many of the plotting graphs.

### Skills/Assessment Objective Links

#### Links and interleaving

- Revisit calculation with negative numbers.
- Link to solving one and two-step equations.
- Links to representing data and using graphs in other areas of the curriculum.

***Collecting and representing data (3/4 lessons)***

***Previously met:***

- Pupils may have seen scatter graphs within science lessons but this will be a new topic for a lot of students.

To be able to:

- Draw and interpret scatter graphs.
- Understand and describe linear correlation.
- Draw and use line of best fit.
- Identify non-linear relationships.

### Links and interleaving

- Modelling real life contexts. This fits into all parts of mathematics, any context which requires unknowns.
- Link the line of best fit to straight line graphs.

### ***Tables and probability (6/7 lessons).***

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

- Use the language of probability (Year 7, Sum 2).
- Calculate simple probabilities (Year 7, Sum 2).
- Use the probability scale (Year 7, Sum 2).
- Sample spaces (Year 7, Sum 2).
- Understand and use set notation, including Venn diagrams (Year 7, Sum 2).
- Know the sum of probabilities is 1 (Year 7, Sum 2).

To be able to:

- Construct sample spaces for one or more events.
- Find probabilities from a sample space.
- Find probabilities from two-way tables.
- Find probabilities from Venn diagrams.
- Use the product rule for finding the total number of possible outcomes.

### Links and interleaving

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

### **Brackets, equations, and inequalities (2 week before Christmas and 2 weeks after) - 13/14 lessons**

#### ***Previously met:***

- Express missing number problems algebraically (Year 6).
- Find pairs of numbers that satisfy an equation with two unknowns (Year 6).
- Understand the difference between equality and equivalence (Year 7, Aut 2).
- Collecting like terms (Year 7, Aut 2).
- Form and solve one-step equations (Year 7, Aut 2).
- Form and solve two-step equations (Year 7, Spr 2).

To be able to:

- Form algebraic expressions.
- Use directed number with algebra.
- Multiply out a single bracket.
- Factorise into a single bracket.
- Expand multiple single brackets and simplify.
- **Expand a pair of binomials.**

	<ul style="list-style-type: none"> <li>Solve equations, including with brackets.</li> <li>Form and solve equations with brackets.</li> <li>Understand and solve simple inequalities.</li> <li>Form and solve inequalities.</li> <li><b>Solve equations and inequalities with unknowns on both sides.</b></li> <li><b>Form and solve equations and inequalities with unknowns on both sides.</b></li> <li>Identify and use formulae, expressions, identities and equations.</li> </ul> <p><b>Links and interleaving</b></p> <ul style="list-style-type: none"> <li>Use of negative numbers and fractions throughout.</li> <li>Solve equations set in the context of earlier context – shapes, angles, probability, ratio etc.</li> <li>This unit can encompass all topics. A suggestion would be to include some fractions when expanding a pair of binomials.</li> </ul>
<b>Spiritual, moral, social, and cultural development</b>	<p><b>SMSC:</b> 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.</p> <p><b>PSHE/British Values:</b> Working collaboratively, being respectful during discussion and valuing contributions made by others</p> <p><b>Skills Builder: Key skills in numeracy used in all topic areas.</b></p>
<b>Numeracy</b>	<b>Focus on key skills.</b>
<b>Literacy</b>	<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>
<b>Becoming future ready</b>	<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>
<b>Adaptation</b>	<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>
<b>QFT/SEND Provision</b>	
<b>Implementation Curriculum Delivery</b>	<p><b>Support (S), Core (C), Extension (E).</b></p> <p><b>The cartesian plane – small steps</b></p> <ul style="list-style-type: none"> <li>Work with coordinates in all four quadrants. (S)</li> <li>Identify and draw lines that are parallel to the axes. (S)</li> <li>Recognise and use the line <math>y = x</math>. (S/C)</li> <li>Recognise and use lines of the form <math>y = kx</math>. (S/C)</li> <li>Link <math>y = kx</math> to direct proportion problems. (E)</li> <li><b>Explore the gradient of the line <math>y = kx</math>. (E)</b></li> <li>Recognise and use lines of the form <math>y = x + a</math>. (S/C)</li> <li>Explore graphs with negative gradient (<math>y = -kx, y = a - x, x + y = a</math>) (C)</li> <li>Link graphs to linear sequences.</li> </ul>
<b>Learning Outcomes (Most Powerful Knowledge)</b>	

- Plot graphs of the form  $y = mx + c$ . (C)
- **Explore non-linear graphs. (E)**
- **Find the midpoint of a line segment. (E)**

Extension tasks – These could be interleaved within the core knowledge.

- Plot graphs without the using a table of values.
- Plot quadratics using a table of values.
- Rearrange equations into the form  $y = mx + c$ .

#### **Collecting and representing data – small steps**

- Draw and interpret scatter graphs. (S/C)
- Understand and describe linear correlation. (C)
- Draw and use line of best fit. (C)
- Identify non-linear relationships. (C/E)

Extension tasks

- Discuss interpolation/extrapolation.

#### **Tables and probability - small steps**

- Construct sample spaces for one or more events (S).
- Find probabilities from a sample space (C).
- Find probabilities from two-way tables (S).
- Find probabilities from Venn diagrams (C)
- Use the product rule for finding the total number of possible outcomes. (C)

Extension

- Investigate independent events and tree diagrams.

#### **Brackets equations and inequalities - small steps**

- Form algebraic expressions. (S)
- Use directed number with algebra. (S) – Some classes will need a full recap on directed number.
- Multiply out a single bracket. (C)
- Factorise into a single bracket. (C)
- Expand multiple single brackets and simplify. (C)
- **Expand a pair of binomials. (E)**
- Solve equations, including with brackets. (C)
- Form and solve equations with brackets. (C)
- Understand and solve simple inequalities. (C)
- Form and solve inequalities. (C)
- **Solve equations and inequalities with unknowns on both sides. (E)**
- **Form and solve equations and inequalities with unknowns on both sides. (E)**
- Identify and use formulae, expressions, identities and equations. (C)

Extension

- Expand three brackets.
- Factorise quadratics.

**Current learning  
to be developed  
in the future  
within:**

The cartesian plane

- Simplify, use and interpret  $y = mx + c$ . **(Year 9, Aut 1)**
- Parallel lines. **(Year 9, Aut 1)**
- Solve simultaneous equations graphically. **(Year 9, Aut 1)**
- Explore perpendicular lines. **(Year 9, Aut 1)**
- Solve linear simultaneous equations graphically. **(Year 10, Aut 1)**
- Perpendicular lines. **(Year 11, Aut 1)**
- Equation of the tangent to a circle. **(Year 11, Aut 2)**

Collecting and representing data

- Understand the risks of extrapolation. **(Year 10, Sum 1)**

	<p><u>Tables and probability</u></p> <ul style="list-style-type: none"> <li>• Compare experimental and theoretical probability. <b>(Year 9, Sum 2)</b></li> <li>• Use frequency trees to find probabilities. <b>(Year 9, Sum 2)</b></li> <li>• Simple tree diagrams. <b>(Year 9, Sum 2)</b></li> <li>• Effect of sample size on estimated probabilities. <b>(Year 10, Spr 2)</b></li> <li>• Use tree diagrams. <b>(Year 10, Spr 2)</b></li> <li>• Mutually exclusive and independent events. <b>(Year 10, Spr 2)</b></li> <li>• Conditional probabilities. <b>(Year 10, Spr 2)</b></li> </ul> <p><u>Brackets, equations and inequalities</u></p> <ul style="list-style-type: none"> <li>• Change the subject of a formula. <b>(Year 9, Aut 1)</b></li> <li>• Testing algebraic conjectures. <b>(Year 9, Aut 1)</b></li> <li>• Representing inequalities <b>(Year 9, Sum 2)</b></li> <li>• Factorise quadratics of the form <math>x^2 + bx + c</math> <b>(Year 10, Aut 1)</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>• Maintain equivalence using the rules of indices. <b>(Year 10, Sum 2)</b></li> <li>• Completing the square. <b>(Year 11, Aut 1)</b></li> <li>• Change the subject of a formula where the subject appears more than once. <b>(Year 11, 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>
<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.