



# YEAR 7 Spring TERM 1

'An ambitious curriculum that meets the needs of all'

## Medium Term Planning

1. Problem solving with addition and subtraction. 2. Problem solving with multiplication and division. 3. Fractions and percentages of amount (1 week before half and 1 week after Christmas).

**UNIT: Problem solving with addition and subtraction, (6/7 lessons)**

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

- Show that addition of two numbers is commutative (Year 2)
- Problem simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change. (Year 2)
- Add and subtract mentally (Year 3)
- Add and subtract using formal methods up to 3 digits (Year 3)
- Add and subtract using formal methods up to 4 digits (Year 3)
- Solve addition and subtraction two-step problems in context, deciding which operations and methods to use and why. (Year 4)
- Add and subtract using formal methods with more than 4 digits (Year 5)
- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why. (Year 5/6)
- Complete, read and interpret information in tables, including timetables (Year 5).

To be able to:

- Understand the properties of addition and subtraction.
- Mental strategies for addition and subtraction.
- Use formal methods for addition of integers.
- Use formal methods of addition of decimals.
- Use formal methods for subtraction of integers.
- Use formal methods for subtraction of decimals.
- Choose the most appropriate method: mental strategies, formal written or calculator.
- Solve problems in the context of perimeter.
- Solve financial problems.
- Solve problems involving tables and timetables.
- Solve problems involving frequency trees.
- Solve problems with bar charts and line charts.
- **Add and subtract numbers given in standard form.**

### REMDINER

The national curriculum recommends teaching addition and subtraction by the column method.

Curriculum Intent

Skills/Assessment  
Objective Links

### **Addition and subtraction**

789 + 642 becomes

$$\begin{array}{r} 789 \\ + 642 \\ \hline 1431 \\ \hline \end{array}$$

Answer: 1431

874 - 523 becomes

$$\begin{array}{r} 874 \\ - 523 \\ \hline 351 \\ \hline \end{array}$$

Answer: 351

932 - 457 becomes

$$\begin{array}{r} 8 \quad 12 \quad 1 \\ 932 \\ - 457 \\ \hline 475 \\ \hline \end{array}$$

Answer: 475

932 - 457 becomes

$$\begin{array}{r} 1 \quad 1 \\ 932 \\ - 457 \\ \hline 475 \\ \hline \end{array}$$

Answer: 475

### **Links and interleaving**

- Modelling real life contexts. This fits into all parts of mathematics, any context which requires unknowns.

### ***Problem solving with multiplication and division (10/11 lessons)***

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

### **Methods of multiplication and division**

- By the end of Year 4, pupils **SHOULD** have memorised their multiplication tables up to and including the 12 times tables and show precision and fluency in work. This **SHOULD** allow them to also recall division facts.
- Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two digits. (Year 4)
- Divide numbers up to 4 digits by a one-digit number using the formal written method of short division. (Year 5)
- Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. (Year 6)
- Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context. (Year 6)

### **Factors and multiples**

- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. (Year 5)

### **Order of operations**

- Use their knowledge of the order of operations to carry out calculations involving the four operations. (Year 6)

### **Problem solving with area**

- Calculate and compare the area of rectangles. (Year 5)
- Calculate the area of parallelograms and triangles. (Year 6)

### **Problem solving with the mean**

- Calculate and interpret the mean (Year 6)

**Pupils have done much less problem solving with multiplication and division. Some may not be fluent with all times tables, so please be aware of this. It might be useful to stick times tables grids into the front of their book.**

To be able to:

- Properties of multiplication and division.
- Understand and use factors.
- Understand and use multiples.
- Multiply and divide integers and decimals by powers of 10.
- **Multiply by 0.1 and 0.01.**
- Convert metric units.
- Use formal methods to multiply integers.
- Use formal methods to divide decimals.
- Use formal methods to divide integers.
- Use formal methods to divide decimals.
- Understand and use order of operations.
- Solve problems using the area of rectangles and parallelograms.
- Solve problems using the area of triangles.
- **Solve problems using the area of trapezia.**
- Solve problems using the mean.
- **Explore multiplication and division in algebraic expressions.**

#### Short multiplication

$24 \times 6$  becomes

$$\begin{array}{r} 24 \\ \times 6 \\ \hline 144 \\ 2 \end{array}$$

Answer: 144

$342 \times 7$  becomes

$$\begin{array}{r} 342 \\ \times 7 \\ \hline 2394 \\ 21 \end{array}$$

Answer: 2394

$2741 \times 6$  becomes

$$\begin{array}{r} 2741 \\ \times 6 \\ \hline 16446 \\ 42 \end{array}$$

Answer: 16 446

#### Long multiplication

$24 \times 16$  becomes

$$\begin{array}{r} 24 \\ \times 16 \\ \hline 240 \\ 144 \\ \hline 384 \end{array}$$

Answer: 384

$124 \times 26$  becomes

$$\begin{array}{r} 124 \\ \times 26 \\ \hline 2480 \\ 744 \\ \hline 3224 \\ 11 \end{array}$$

Answer: 3224

$124 \times 26$  becomes

$$\begin{array}{r} 124 \\ \times 26 \\ \hline 744 \\ 2480 \\ \hline 3224 \\ 11 \end{array}$$

Answer: 3224

### Short division

$98 \div 7$  becomes

$$\begin{array}{r} 14 \\ 7 \overline{) 98} \\ \underline{7} \phantom{0} \\ 28 \\ \underline{28} \\ 0 \end{array}$$

Answer: 14

$432 \div 5$  becomes

$$\begin{array}{r} 86 \text{ r } 2 \\ 5 \overline{) 432} \\ \underline{40} \phantom{0} \\ 32 \\ \underline{30} \\ 2 \end{array}$$

Answer: 86 remainder 2

$496 \div 11$  becomes

$$\begin{array}{r} 45 \text{ r } 1 \\ 11 \overline{) 496} \\ \underline{44} \phantom{0} \\ 56 \\ \underline{55} \\ 1 \end{array}$$

Answer:  $45 \frac{1}{11}$

### Long division

$432 \div 15$  becomes

$$\begin{array}{r} 28 \text{ r } 12 \\ 15 \overline{) 432} \\ \underline{30} \phantom{0} \\ 132 \\ \underline{120} \\ 12 \end{array}$$

Answer: 28 remainder 12

$432 \div 15$  becomes

$$\begin{array}{r} 28 \\ 15 \overline{) 432} \\ \underline{30} \phantom{0} \\ 132 \\ \underline{120} \\ 12 \end{array}$$

$$\frac{12}{15} = \frac{4}{5}$$

Answer:  $28 \frac{4}{5}$

$432 \div 15$  becomes

$$\begin{array}{r} 28.8 \\ 15 \overline{) 432.0} \\ \underline{30} \phantom{00} \\ 132 \phantom{0} \\ \underline{120} \phantom{0} \\ 120 \\ \underline{120} \\ 0 \end{array}$$

Answer: 28.8

### Links and interleaving

- Modelling real life contexts. This fits into all parts of mathematics, any context which requires unknowns. This certainly fits well with area.
- Money and units of measure can fit into the multiplying decimals.

***Fractions and percentages of amounts (6/7 lessons). This unit saddles half term.***

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

- Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number. (Year 4)
- Pupils continue to develop their understanding of fractions as numbers, measures and operators by finding fractions of numbers and quantities. (This is non-statutory guidance). (Year 5)
- Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison. (Year 6).

To be able to:

- Find a fraction of a given amount.
- Use a given fraction to find the whole and/or other fractions.
- Find a percentage of a given amount using mental methods.
- Find a percentage of given amounts using a calculator.
- **Solve problems with fractions greater than 1 and percentages greater than 100%.**

	<p><b><u>Links and interleaving</u></b></p> <ul style="list-style-type: none"> <li>• Converting mixed numbers and improper fractions.</li> <li>• Converting between decimals, percentages and fractions.</li> <li>• Multiplying and dividing decimals when finding fractions and percentages of amounts.</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>Problem solving with addition and subtraction – small steps</b></p> <ul style="list-style-type: none"> <li>• Understand the properties of addition and subtraction. (S)</li> <li>• Mental strategies for addition and subtraction. (S)</li> <li>• Use formal methods for addition of integers. (S)</li> <li>• Use formal methods of addition of decimals. (C)</li> <li>• Use formal methods for subtraction of integers. (C)</li> <li>• Use formal methods for subtraction of decimals. (C)</li> <li>• Choose the most appropriate method: mental strategies, formal written or calculator. (C)</li> <li>• Solve problems in the context of perimeter. (C)</li> <li>• Solve financial problems. (S/C)</li> </ul>
<b>Learning Outcomes (Most Powerful Knowledge)</b>	

- Solve problems involving tables and timetables. (C)
- Solve problems involving frequency trees. (S/C)
- Solve problems with bar charts and line charts. (C)
- **Add and subtract numbers given in standard form. (E)**

Extension tasks – These could be interleaved within the core knowledge

- Introduce exact values and types of number.
- Adding and subtracting surds.

**Problem solving with multiplication and division – small steps**

- Properties of multiplication and division. (C)
- Understand and use factors. (S/C)
- Understand and use multiples. (S/C)
- Multiply and divide integers and decimals by powers of 10. (S)
- **Multiply by 0.1 and 0.01. (E)**
- Convert metric units. (C)
- Use formal methods to multiply integers. (S/C)
- Use formal methods to divide decimals. (C)
- Use formal methods to divide integers. (S/C)
- Use formal methods to divide decimals. (C)
- Understand and use order of operations. (S/C)
- Solve problems using the area of rectangles and parallelograms. (C)
- Solve problems using the area of triangles. (C)
- **Solve problems using the area of trapezia. (E)**
- Solve problems using the mean. (C)
- **Explore multiplication and division in algebraic expressions. (E)**

Extension tasks

- Simplifying surds.
- Multiplying surds.

**Fractions and percentages of amounts - small steps**

- Find a unit fraction of an amount (S).
- Use any unit fraction to find the whole (S)
- Find a fraction of a given amount. (S/C).
- Use a given fraction to find the whole and/or other fractions. (C)
- Find 10%, 25% and 50% of an amount (S)
- Find a percentage of a given amount using mental methods. (S/C)
- Find a percentage of given amounts using a calculator. (C)
- **Solve problems with fractions greater than 1 and percentages greater than 100%. (E)**

Extension

- Working backwards to find the original amount after an increase/decrease by a fraction or percentage.
- Work with interest rates (simple/compound).

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

Problem solving with addition and subtraction

- Order of operations (Year 8)
- Calculate with money (Year 8)
- Use estimation (Year 8)
- Revisit and extend work in the context of financial mathematics (Year 9)
- Calculate with standard form (Year 10)
- Revisit and extend number work (Year 11)

Problem solving with multiplication and division.

- Order of operations (Year 8)
- Calculate with money (Year 8)
- Use estimation (Year 8)
- Prime factorisation, HCF and LCM (Year 9)
- Revisit and extend work in the context of financial mathematics (Year 9)
- Calculate with standard form (Year 10)
- Revisit and extend number work (Year 11)

	<p><u>Fractions and percentages of amounts</u></p> <ul style="list-style-type: none"> <li>• Percentage increase/decrease with/without multipliers. (Year 8)</li> <li>• Express one number of a fraction of another. (Year 8)</li> <li>• Explore calculator and non calculator methods. (Year 8)</li> <li>• Reverse percentages and repeated percentage change. (Year 9)</li> <li>• Repeated percentage change (Year 9/10)</li> <li>• Simple and compound interest (Year 10)</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.