Remember

Place value
The ten digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are used to build up numbers.

<table>
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<tr>
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<tr>
<td>1</td>
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</table>

Read as one million.

Multiplying and dividing by 10 and 100
When you multiply numbers by 10 / 100 / 1000 all the digits move 1 / 2 / 3 places to the left.
When you divide numbers by 10 / 100 / 1000 all the digits move 1 / 2 / 3 places to the right.

Comparing numbers
= means is equal to, < means is less than and > means is greater than.

Rounding numbers
When rounding to the nearest 10 look at the units digit, when rounding to the nearest 100 look at the tens digit and when rounding to the nearest 1000 look at the hundreds digit, so 8364 rounds down to 8000.

Positioning numbers on a blank number line
Example:
Draw an arrow to mark the position of 3500 on the blank number line.

Answer:

It is helpful to mark 5000 halfway along the line.
1 Here is a place-value chart.

<table>
<thead>
<tr>
<th></th>
<th>100 000</th>
<th>200 000</th>
<th>300 000</th>
<th>400 000</th>
<th>500 000</th>
<th>600 000</th>
<th>700 000</th>
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</tbody>
</table>

What number is represented on the chart?
Write the number in words and in figures. _________________________________________
___________________________________________________________________________

What does the digit 6 represent in the number 654 321? _____________________________

**Hint:** You will need to write 6 followed by one of: hundred thousand, ten thousand, thousand, hundred, tens, units

2 Here are four numbers.

9009 90009
900009 9000009

Circle the number ninety thousand and nine.

3 Complete each calculation.

$$\boxed{} \times 1000 = 35 000$$  $$\boxed{} \div 1000 = 606$$

$$68 000 \div \boxed{} = 68$$  $$10 100 \div \boxed{} = 101$$

$$\boxed{} \times 100 = 480 000$$  $$\boxed{} \times 100 = 90 100$$

4 Complete this table to show the numbers rounded to the nearest 1000.

<table>
<thead>
<tr>
<th>rounded to the nearest 1000</th>
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</thead>
<tbody>
<tr>
<td>515</td>
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<tr>
<td>5151</td>
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<tr>
<td>51515</td>
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<tr>
<td>515151</td>
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</tbody>
</table>
5 Circle the number that is nearest to 10000.

10060  11 000  9960  9909

**Hint:** The number could be greater or less than 10000.

6 Find your height, in millimetres.

Round to the nearest 10 mm.  ______________________________
Round to the nearest 100 mm.  ______________________________
Round to the nearest 1000 mm.  ______________________________

7 Use the digits 3, 4, 5 and 6 to make the four-digit number that is nearest to 4000.

8 Use one of the signs <, > or = to make these number sentences correct.

\[5 \times 1000 \quad 50000 \div 10\]
\[5005 \quad 50000 \div 10\]
\[500 \times 1000 \quad 1 \text{ million}\]

9 Estimate the number marked by the arrow on the number line.

10 This number line is from zero to one million.

Write the letter of the arrow that points to the number 50000.  _________
More Information
2 Finding factors – a game for two players

Use the 1–10 number cards and target number cards:

<table>
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<tr>
<th>12</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>18</th>
<th>20</th>
<th>21</th>
<th>24</th>
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</thead>
<tbody>
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<td>25</td>
<td>27</td>
<td>30</td>
<td>32</td>
<td>36</td>
<td>40</td>
<td>42</td>
<td></td>
</tr>
</tbody>
</table>

Shuffle the target cards and place them face down in a pile. Shuffle and share out the 1–10 number cards between the players. Turn over the first target card. Each player looks at their number cards to see if they have a card that is a factor of the target number; if so they put it down in front of them. Players can only play one card each turn. Play continues until one player has laid down all their number cards. This player is the winner.

**Hint:** You have drawn factor trees for some of the target numbers in activity 1.
You might find it useful to draw factor trees for the other numbers.
Some of the 1–10 cards are more useful than others.
Which is a useful card to have?

3 Odd and evens – a game for two players

Players are designated A and B. Each player shuffles their 1–10 number cards and places them face down in a pile.

Both players turn over the top card from their pile. If the product is even player A gets a point, if the product is odd player B gets a point. The first player to 10 points wins the game.

Look at the results for some of the calculations.
The even products are shaded.

Complete these general statements about the products of odd and even numbers:

odd × odd = _____
odd × even or even × odd = _____
even × even = _____

**Hint:** Would you rather be player A or player B?
The example shows a way of finding common multiples by writing the first ten multiples for each pair of numbers, then circling the common multiples.

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<td>36</td>
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</table>

Draw similar diagrams for these pairs of numbers.

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<td>3</td>
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**Vocabulary**

prime number, factor

**Remember**

A prime number has exactly two factors.

NOTE: 1 is not a prime number. It has only one factor (1).
Exponents of prime numbers: 2, 3, 5, 7, 11, 13, 17, 19

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</table>

Use the grid. Follow these instructions.

- Cross out the number 1.
- Shade in all the multiples of 2 except 2.
- What do you notice? Can you explain what you see?
- Shade in all the multiples of 3 except 3.
- Some numbers had already been crossed out. Which ones?
- Shade all the multiples of 5 except 5, then 7 except 7. What do you notice?

Now look at your grid. What is special about the numbers that you have not crossed out?

The process you have followed is known as the Sieve of Eratosthenes after the Greek mathematician who first used the idea to find prime numbers up to 100.

**Unit 1A: Number and problem solving**

CPM framework 8Nn19, 6Ps9; Teacher’s Resource 2.3
2 Find two different prime numbers that total 9.
\[ \square + \square = 9 \]
Find two different prime numbers that total 16.
\[ \square + \square = 16 \]

3 Use the clues to find the two prime numbers less than 20.
Prime number 1: This prime number added to 3 is a multiple of 8.
Prime number 2: This prime number is one more than a multiple of 4.

**Hint:** Try listing all the prime numbers less than 20 and cross out the ones that do not satisfy the clue.

4 Shade all the prime numbers in this grid.
What letter is revealed?

<p>| | | | | |</p>
<table>
<thead>
<tr>
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<th></th>
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</thead>
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<tr>
<td>14</td>
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<td>1</td>
<td>11</td>
<td>19</td>
<td>7</td>
<td>6</td>
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<td>9</td>
<td>17</td>
<td>9</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>12</td>
<td>5</td>
<td>16</td>
<td>4</td>
<td>14</td>
</tr>
</tbody>
</table>

5 Draw a path between the two shaded numbers on this grid.
You may pass **only** through prime numbers.
You must not move diagonally.
Remember

**Multiplication strategies**
You should learn and remember some mathematical facts, for example, multiplication facts up to $10 \times 10$.

You can use these facts to work mentally. You can use strategies such as:
- using place value and multiplication facts
- multiplying pairs of multiples of 10
- multiplying near multiples of 10 by multiplying by the multiple and adjusting
- multiplying by halving one number and doubling the other.

Practise these strategies using the examples in this unit.

1. **Using place value and multiplication facts**
   Examples:
   
   $0.8 \times 7 = (8 \div 10) \times 7$
   $= (8 \times 7) \div 10$
   $= 56 \div 10$
   $= 5.6$
   
   $4.8 \div 6 = (48 \div 10) \div 6$
   $= (48 \div 6) \div 10$
   $= 8 \div 10$
   $= 0.8$

   Now try these.
   
   $0.9 \times 8 =$
   $0.6 \times 7 =$
   $6.3 \div 9 =$
   $5.6 \div 8 =$

2. **Multiplying pairs of multiples of 10**
   Examples:
   
   I know that $3 \times 4 = 12$
   so $30 \times 40 = 1200$
   
   I know that $6 \times 4 = 24$
   so $600 \times 40 = 24000$

   Now try these.
   
   $70 \times 80 =$
   $40 \times 90 =$
   $300 \times 70 =$
   $400 \times 60 =$
3  Three in a row – a game for two players

Use counters or cross out the numbers on the grid.

Take turns to choose a calculation to work out.

Say which you are working on and find the answer on the grid.

Put a counter on the answer.

The winner is the first to get three in a row.

**Calculations**

<table>
<thead>
<tr>
<th>30 × 60</th>
<th>30 × 50</th>
<th>50 × 40</th>
<th>40 × 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 × 600</td>
<td>30 × 500</td>
<td>50 × 400</td>
<td>40 × 600</td>
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<tr>
<td>300 × 60</td>
<td>300 × 50</td>
<td>500 × 40</td>
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<td>300 × 600</td>
<td>300 × 500</td>
<td>500 × 400</td>
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<table>
<thead>
<tr>
<th>2000</th>
<th>200000</th>
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<td>24000</td>
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<tr>
<td>240000</td>
<td>180000</td>
<td>150000</td>
<td>20000</td>
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</table>

**Hint:** Some numbers are repeated on the grid, for example 15 000 which is the answer to 30 × 500 and 300 × 50.

4  Multiplying near multiples of 10 by multiplying by the multiple and adjusting

**Examples:**

\[
16 \times 51 = (16 \times 50) + 16 = 800 + 16 = 816
\]

\[
16 \times 49 = (16 \times 50) - 16 = 800 - 16 = 784
\]

Now try these.

17 × 41 = 17 × 39 =

14 × 29 = 14 × 31 =

**Hint:** Show the stages in your working as some test questions require the working in addition to the answer.

Unit 1A: Number and problem solving

CPM framework 6Nc7, 6Nc8, 6Nc14, 6Nc15, 6Nc16, 6Pt1, 6Ps1; Teacher’s Resource 3.2
5  **Multiplying by halving one number and doubling the other**

**Examples**

16 × 5 is equivalent to 8 × 10 = 80
15 × 18 is equivalent to 30 × 9 = 270

7 × 8 = 56
so 14 × 4 = 56
and 28 × 2 = 56

Now try these.

25 × 14 =
45 × 16 =

35 × 24 =
15 × 14 =

Write a set of related facts, starting with 9 × 8 = 72

______________________  __________________________  __________________________

Write a set of related facts, starting with 3 × 16 = 48

______________________  __________________________  __________________________

6  Circle each multiplication that gives the answer 2400.

60 × 400  40 × 60  80 × 300  20 × 120

7  Complete this number sentence.

35 × 8 = □ × 2  11 × 16 = □ × 4

8  Use the fact that 6 × 7 = 42 to complete the diagram.

```
42 ÷ 7 = 6
□ ÷ 70 = 0.6
6 × 7 = 42
0.6 × □ = 42
□ × 6 = □
0.7 × 6 = □
```

**Unit 1A: Number and problem solving**

CPM framework 6Nc7, 6Nc8, 6Nc14, 6Nc15, 6Nc16, 6Pt1, 6Ps1; Teacher's Resource 3.2