# Stage 2 – Multiplication and Division 2

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Teaching and Learning Activities</th>
<th>Notes/ Future Directions/Evaluation</th>
<th>Date</th>
</tr>
</thead>
</table>
| **Stage 2**  
A student:  
› uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM  
› selects and uses appropriate mental or written strategies, or technology, to solve problems MA2-2WM  
› checks the accuracy of a statement and explains the reasoning used MA2-3WM  
› uses mental and informal written strategies for multiplication and division MA2-6NA | Language  
Students should be able to communicate using the following language: multiply, multiplied by, product, multiplication, multiplication facts, tens, ones, double, multiple, factor, shared between, divide, divided by, division, halve, remainder, equals, is the same as, strategy, digit.  
As students become more confident with recalling multiplication facts, they may use less language. For example, 'five rows (or groups) of three' becomes 'five threes' with the 'rows of' or 'groups of' implied. This then leads to 'one three is three', 'two threes are six', 'three threes are nine', and so on.  
The term 'product' has a meaning in mathematics that is different from its everyday usage. In mathematics, 'product' refers to the result of multiplying two or more numbers together. Students need to understand the different uses for the = sign, eg 4 × 3 = 12, where the = sign indicates that the right side of the number sentence contains 'the answer' and should be read to mean 'equals', compared to a statement of equality such as 4 × 3 = 6 × 2, where the = sign should be read to mean 'is the same as'. | | |

## Ignition Activities

**Skip counting**  
Throughout the focus on this sub strand daily counting by 2's, 3's 5's and 10's is required.  
*I'll give you a fact - you give me a fact*  
Students stand up at their desks and teacher states a multiplication or division fact. One by one students give an associated fact - if they get it wrong they sit down. Repeat for next student with another fact. Last left standing wins.  

**Beetle Game**: In pairs, students are given ten 'beetles' (or counters) each, two dice (can make up blank dice with different numbers that multiply up to 100) and a hundreds chart game board to share. They roll the two dice and multiply the upper faces. If possible, they place a counter on that position on the hundreds board and change turns (only one counter per square). The winner is the first student with four beetles in a row, column or diagonal who must shout 'Beetle' when they see it (or they don't win!). Support students with a 'times table' to check.  

**Multo – 4X, 6X, 7X, 8X and 9X**  
- Provide each student with a 4X4 grid  
- Students write products from 1X1 up to 10X10 in each square  
- Roll ten sided dice twice, multiply numbers together  
- Students cross off the answer on grids  
- First with four in a row win – any direction
**Go Maths Stage 2B – Unit 37, Go Maths Stage 2B 37.4**

### Salute!
This game is played with a pack of cards. One player is the “dealer” who deals a single card to each player. When the dealer deals the cards he/she says “Salute” and the two other players hold the card up to their forehead so that the dealer and the other player can see the card. They aren’t allowed to look at the card dealt to themselves. The dealer multiplies the cards mentally and announces the total. The first player to calculate the number on their own card wins both cards. The winner is the one with the most cards by the end of the deck. The dealer plays the winner and the game continues.

### Tables Races
Students make up cards for particular multiplication facts for particular numbers, shuffle them and put them into an envelope eg

<table>
<thead>
<tr>
<th>4</th>
<th>8</th>
<th>12</th>
<th>16</th>
<th>20</th>
</tr>
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<tbody>
<tr>
<td>24</td>
<td>28</td>
<td>32</td>
<td>36</td>
<td>40</td>
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</table>

In groups, students are given an envelope of cards. Students race each other to put the cards into order, skip counting aloud. Students state which number has the multiplication facts their cards represent. **Variation:** Students write numbers in descending order.

### Multiplication Bingo Game

### Tag
Students find a space to stand in the classroom. The teacher asks students in turn to answer questions eg ‘What are the factors of 16?’ If the student is incorrect they sit down. The teacher continues to ask the same question until a correct answer is given. When a student gives a correct answer, they take a step closer to another student and may tip them if within reach. The ‘tipped’ student sits down. The question is then changed. Play continues until one student remains, who then becomes the questioner. This game is designed for quick responses and repeated games.

### Multiplication Memory
Select a multiple to be practised. Prepare 40 cards, 10 multiplication question cards and 10 division question cards for the selected multiple and 20 appropriate answer cards. Have the students shuffle the cards and place them face down on the floor in four or five rows. The students then take turns to flip over two cards. If a student turns over a question card and the correct answer card then he or she keeps the cards. All players must agree that the cards are a “match”. If the cards do not match then the student flips the cards back over. The player with the most cards wins. **Variation** Have the students create their own set of cards for other multiples.
**Explicit Mathematical Teaching**

An inverse operation is an operation that reverses the effect of the original operation. Addition and subtraction are inverse operations; multiplication and division are inverse operations.

Linking multiplication and division is an important understanding for students in Stage 2. They should come to realise that division 'undoes' multiplication and multiplication 'undoes' division.

Students should be encouraged to check the answer to a division question by multiplying their answer by the divisor. To divide, students may recall division facts or transform the division into a multiplication and use multiplication facts, eg 35 divided by 7 is the same as \( \_ \times 7 = 35 \). The use of digital technologies includes the use of calculators.

<table>
<thead>
<tr>
<th>Recall multiplication facts up to 10 × 10 and related division facts (ACMNA075)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• count by fours, sixes, sevens, eights and nines using skip counting</td>
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<tr>
<td>• use the term 'product' to describe the result of multiplying two or more numbers, eg 'The product of 5 and 6 is 30'</td>
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<tr>
<td>• use mental strategies to build multiplication facts to at least 10 × 10, including:</td>
</tr>
<tr>
<td>- using the commutative property of multiplication, eg 7 × 9 = 9 × 7</td>
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<tr>
<td>- using known facts to work out unknown facts, eg 5 × 7 is 35, so 6 × 7 is 7 more, which is 42</td>
</tr>
<tr>
<td>- using doubling and repeated doubling as a strategy to multiply by 2, 4 and 8, eg 7 × 8 is double 7, double again and then double again</td>
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<tr>
<td>- using the relationship between multiplication facts, eg the multiplication facts for 6 are double the multiplication facts for 3</td>
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<tr>
<td>- factorising one number, eg 5 × 8 is the same as 5 × 2 × 4, which becomes 10 × 4</td>
</tr>
<tr>
<td>• recall multiplication facts up to 10 × 10, including zero facts, with automaticity</td>
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<tr>
<td>• find 'multiples' for a given whole number, eg the multiples of 4 are 4, 8, 12, 16, ...</td>
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<tr>
<td>• relate multiplication facts to their inverse division facts, eg 6 × 4 = 24, so 24 ÷ 6 = 4 and 24 ÷ 4 = 6</td>
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<tr>
<td>• determine 'factors' for a given whole number, eg the factors of 12 are 1, 2, 3, 4, 6, 12</td>
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<tr>
<td>• use the equals sign to record equivalent number relationships involving multiplication, and to mean 'is the same as', rather than to mean to perform an operation, eg 4 × 3 = 6 ÷ 2</td>
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<tr>
<td>• connect number relationships involving multiplication to factors of a number, eg 'Since 4 × 3 = 6, then 4, 3, 2 and 6 are factors of 12' (Communicating, Reasoning)</td>
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<tr>
<td>• check number sentences to determine if they are true or false and explain why, eg 'Is 7 × 5 = 8 × 4 true? Why or why not?' (Communicating, Reasoning)</td>
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</table>

Develop efficient mental and written strategies, and use appropriate digital technologies, for multiplication and for division where there is no remainder (ACMNA076)

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<tbody>
<tr>
<td>• multiply three or more single-digit numbers, eg 5 × 3 × 6</td>
</tr>
<tr>
<td>• model and apply the associative property of multiplication to aid mental computation, eg 2 × 3 × 5 = 2 × 5 × 3 = 10 × 3 = 30</td>
</tr>
<tr>
<td>• make generalisations about numbers and number relationships, eg 'It doesn't matter what order you multiply two numbers in because the answer is always the same'</td>
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</tbody>
</table>
Communicating, Reasoning

- use mental and informal written strategies to multiply a two-digit number by a one-digit number, including:
  - using known facts, e.g., $10 \times 9 = 90$, so $13 \times 9 = 90 + 9 + 9 + 9 = 90 + 27 = 117$
  - multiplying the tens and then the units, e.g., $7 \times 19$: $7$ tens + $7$ nines is $70 + 63$, which is $133$
  - using an area model, e.g., $27 \times 8$
  - using doubling and repeated doubling to multiply by 2, 4 and 8, e.g., $23 \times 4$ is double 23 and then double again
  - using the relationship between multiplication facts, e.g., $41 \times 6$ is $41 \times 3$, which is 123, and then double to obtain 246
  - factorising the larger number, e.g., $18 \times 5 = 9 \times 2 \times 5 = 9 \times 10 = 90$

- create a table or simple spreadsheet to record multiplication facts, e.g., a $10 \times 10$ grid showing multiplication facts (Communicating)

- use mental strategies to divide a two-digit number by a one-digit number where there is no remainder, including:
  - using the inverse relationship of multiplication and division, e.g., $63 \div 9 = 7$ because $7 \times 9 = 63$
  - recalling known division facts
  - using halving and repeated halving to divide by 2, 4 and 8, e.g., $36 \div 4$: halve 36 and then halve again
  - using the relationship between division facts, e.g., to divide by 5, first divide by 10 and then multiply by 2

- apply the inverse relationship of multiplication and division to justify answers, e.g., $56 \div 8 = 7$ because $7 \times 8 = 56$ (Problem Solving, Reasoning)

- record mental strategies used for multiplication and division

- select and use a variety of mental and informal written strategies to solve multiplication and division problems

- check the answer to a word problem using digital technologies (Reasoning)

Use mental strategies and informal recording methods for division with remainders

- model division, including where the answer involves a remainder, using concrete materials
- explain why a remainder is obtained in answers to some division problems (Communicating, Reasoning)
- use mental strategies to divide a two-digit number by a one-digit number in problems for which answers include a remainder, e.g., $27 \div 6$: if $4 \times 6 = 24$ and $5 \times 6 = 30$, the answer is 4 remainder 3
- record remainders to division problems in words, e.g., $17 \div 4 = 4$ remainder 1
- interpret the remainder in the context of a word problem, e.g., "If a car can safely hold 5 people, how many cars are needed to carry 41 people?"; the answer of 8 remainder 1 means that 9 cars will be needed

Whole Class Teaching Activities—some suggestions

~ 4 ~
**Models of the Multiplication Facts**

**Part A**
Students construct models of the multiplication facts using interlocking cubes. They build a staircase eg with 2 blocks in the first step, 4 in the second etc, to represent the multiplication facts for 2. Students use a $10 \times 10$ grid to record their answers.

**Part B**
Students model the multiplication facts using rectangular arrays and record the associated inverse relationships eg

\[
\begin{align*}
3 \times 2 &= 6 & 6 \div 3 &= 2 \\
2 \times 3 &= 6 & 6 \div 2 &= 3
\end{align*}
\]

*Variation:* Students are given a number (eg 12) and asked to represent all its factors using arrays.

**Arrays**
On OHP with transparent counters, demonstrate arrays eg showing $3 \times 2$ (3 rows of two counters). Generate the 2x table on the board and ask students if they know what the two times table is about. Ask students to draw a $5 \times 2$ array. Explain that multiplying is a short cut to repeated addition: ie $5 \times 2$ means adding 2 five times so we can always work out multiplication by repeated addition but knowing our times table makes it so much faster. Now show the array for $4 \times 3$. Explain that it means ‘4 lots of 3’, ‘add 3 four times over’. Show each row. Students may recognise that this is also ‘doubling the double’. If so, discuss why this is the case. That is, doubling means multiplying by two, so to double the double means to multiply by $2 \times 2$ (ie $x4$). Show examples such as

\[
4 \times 3 = \text{double (double 3)}
\]
\[
= 2 \times (2 \times 3)
\]
\[
= 2 \times 6 = 12.
\]

Demonstrate with counters.

Students need to be comfortable with the concept of repeated addition before memorising times tables or it will become a rote learnt skill without understanding. Give them opportunity to draw the arrays or ‘groups of’ to become comfortable with the meaning of multiplication.
Ensure that they can write the number sentence to go with the diagram ie
4 groups of two = 4 \times 2
= 8

Build an array using the counters from the groups to show the same information.

Allow students in these early days to use repeated addition to find the answer. Discuss what 4 \times 0 would look like. Ensure that the zero is always included in a times table - do not assume students know this fact.

Ask students if they can describe the array for 8 \times 4.

Display cards showing the 4 \times arrays and the 8 \times arrays. As a class, students sort them into order of the times tables and put them on the board writing the product of each array (remember to explain what ‘product’ means in mathematics).

Can they describe the relationship between the four times and eight times tables? (8 \times is double the four times just as four times is double the two times).

Students are given an array card. On a separate card they write the number fact for the array. On the back of both cards they write the product. Hang the cards together up around the room.

**Multiplication Facts**

Students write the multiplication facts on flash cards from 0 \times 1 up to at least 10 \times 10. In pairs, students test each other to find which facts they can immediately recall and put these into the ‘known’ pile. The others are put into the ‘unknown’ pile. Each day the students concentrate on learning from their ‘unknown’ facts. Students could repeat this activity with division facts.

Variation: Students play ‘Bingo’ using multiplication and division facts.

**Knee to knee**

Students sit opposite with knees touching. Students take it in turn to ask each other facts up to 10 \times 10 including zero facts. Students are expected to answer with automaticity.

Should be played with both division and multiplication.

**Inverse with division**

Students are asked to apply the inverse relationship of multiplication and division.

<table>
<thead>
<tr>
<th>4 \times 6 = 24</th>
<th>6 \times 2 = 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 \times 4 = 28</td>
<td>9 \times 3 = 27</td>
</tr>
<tr>
<td>2 \times 7 = 14</td>
<td>8 \times 6 = 48</td>
</tr>
<tr>
<td>4x9=36</td>
<td>3x7=21</td>
</tr>
<tr>
<td>-------</td>
<td>--------</td>
</tr>
<tr>
<td>6x5=30</td>
<td>9x5=45</td>
</tr>
<tr>
<td>8x4=32</td>
<td>7x9=63</td>
</tr>
<tr>
<td>2x4=8</td>
<td>6x9=54</td>
</tr>
<tr>
<td>5x4=20</td>
<td>8x9=72</td>
</tr>
<tr>
<td>6x3=18</td>
<td>4x8=32</td>
</tr>
<tr>
<td>10x3=30</td>
<td>6x4=24</td>
</tr>
<tr>
<td>3x3=9</td>
<td>10x7=70</td>
</tr>
</tbody>
</table>

**Patterns**

Students investigate patterns in the multiplication grid. Students discuss these patterns and record their observations. For example, students compare the multiplication facts for 3 and the multiplication facts for 6. They then investigate the multiplication facts for 9.

Students colour multiples on a hundreds chart and are encouraged to describe the patterns created.

**Doubles**

Students work in small groups. A student chooses a small whole number and the next student doubles it. They take turns to keep doubling the number. A student checks the results with a calculator. In the next round they start with a different number.

Possible questions include:
- what did you notice?
- did the pattern help you with your calculations?

**Trio Triangles**

Students are to use the triangles in order to make generalisations about numbers and number relationships. E.g. doesn’t matter what order you multiple two numbers in because the answer is always the same.
### Mental Strategies

Students are asked to write a multiplication fact that they have trouble remembering eg $8 \times 7$. They are encouraged to try mental strategies to help them recall that fact by using known facts eg ‘I know $7 \times 7$ is 49 so $8 \times 7$ must be 7 more than 49 which is 56’ or using the inverse relationship of division: ‘I know $56 + 8 = 7$ so $8 \times 7 = 56$’.

Students are asked to write a division fact they have trouble remembering eg $36 \div 4$. They are encouraged to try mental strategies to help them recall the fact eg using known division facts ‘I know $40 \div 4 = 10$ so $36 \div 4 = 9’; using other known facts ‘half of 36 is 18, then if I halve it again I get 9’; using the inverse relationship of multiplication: ‘$4 \times 9 = 36$ so $36 \div 4 = 9’.

### Times Squares

The teacher chooses 4 cards between 1 and 9 and places them in a square eg

<table>
<thead>
<tr>
<th>4</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

The student multiplies each row and column and records the answers. Students rearrange the cards and record the new multiplication squares.

### Square Numbers

Students make arrays using 1, 4, 9, 16, … counters and discuss the shape of each array. Students explain why these numbers are called square numbers and record the multiplication and division facts for each. Students experiment with other numbers and predict further numbers that will have a square array.

*Variation:* Students represent arrays on the computer in a simple table format.
Chocolate Boxes
The teacher poses the problem: ‘Imagine you had the job of designing a chocolate box. There are to be 48 chocolates in the box. The box can be one or two layers high. How many ways could you arrange the chocolates in the box?’
Students draw or make models of their solutions and discuss these in terms of multiplication and division facts.

Calculations Race
Students work in three groups. One group solves a problem using a calculator, one group solves it using a written algorithm and the third group solves the problem using mental calculations. The following are examples of the types of problems to be used:

- $2 \times 4000 = 8000$
- $20 \times 20 = 400$
- $400 \div 5 = 80$
- $39 \div 3 = 13$

- multiply three or more single-digit numbers, eg $5 \times 3 \times 6$
- model and apply the associative property of multiplication to aid mental computation, eg $2 \times 3 \times 5 = 2 \times 5 \times 3 = 10 \times 3 = 30$
- using known facts, eg $10 \times 9 = 90$, so $13 \times 9 = 90 + 9 + 9 + 9 = 90 + 27 = 117$
- multiplying the tens and then the units, eg $7 \times 19$: $7$ tens + $7$ nines is $70 + 63$, which is $133$

Students discuss the efficiency of each method.
Variation: Groups rotate, trying the different methods of solution to a problem. Students discuss the efficiency of each method in relation to different problems.

Factors
Students are asked to find all of the factors of a given number (eg $24$) and use counters to make the appropriate arrays. Using this knowledge, students are asked to use mental strategies to multiply numbers eg $24 \times 25 = 6 \times 4 \times 25 = 6 \times 100 = 600$.
Students could also be challenged to find which of the numbers between 1 and 100 has the most factors and to record their findings.

Mental Calculations
Students are asked to calculate mentally $26 \times 4$. 
Students discuss the various ways they solved the problem using mental calculation.

\[
26 \times 4 = 20 \times 4 + 6 \times 4 = 80 + 24 = 104 \\
26 \times 4 = 25 \times 4 + 1 \times 4 = 100 + 4 = 104 \\
26 \times 4 = \text{double 26 and double 26 again} = 52 + 52 = 104
\]

Students are asked to pose problems to be solved using mental computation.

**Trading Game with Multiplication and Division**

Students play the trading game ‘Race to and from 1000’ with the following variation. Students throw two dice, one numbered 0 to 5 and the other numbered 5 to 10. They multiply the numbers thrown and collect the necessary Base 10 material. The winner is first to 1000.

**Extension:** Students are asked to design their own games involving multiplication and division number facts.

**Ancient Egyptian Long Multiplication**

The teacher explains to the students that the Ancient Egyptians had a different number system and did calculations in a different way. They used doubling to solve long multiplication problems eg for \(11 \times 23\) they would double, and double again,

\[
1 \times 23 = 23 \\
2 \times 23 = 46 \\
4 \times 23 = 92 \\
8 \times 23 = 184 \\
1+2+8 = 11, \text{so they added the answers to } 1 \times 23, 2 \times 23 \text{ and } 8 \times 23 \text{ to find } 11 \times 23.
\]

\[
23 \\
46 \\
184 +
\]

253.

- using doubling and repeated doubling to multiply by 2, 4 and 8, eg \(23 \times 4\) is double 23 and then double again
- using the relationship between multiplication facts, eg \(41 \times 6\) is \(41 \times 3\), which is 123, and then double to obtain 246

**New From Old**

Students are asked to write a multiplication and a division number fact. Each student uses these facts to build new number facts.

\[
\begin{align*}
\text{Starting with } & 12 \div 3 = 4 & \text{Starting with } & 3 \times 2 = 6 \\
24 \div 3 & = 8 & 6 \times 2 & = 12 \\
48 \div 3 & = 16 & 12 \times 2 & = 24 \\
96 \div 3 & = 32 & 24 \times 2 & = 48
\end{align*}
\]

Possible questions include:

~ 10 ~
what strategy did you use?  
what other strategies could you use?  
what strategy did you use?  
did you use the relationship between multiplication and division facts?  

### Remainders

Students explore division problems involving remainders, using counters eg ‘We have to put the class into four even teams but we have 29 students. What can we do?’ Students make an array to model the solution and record their answer to show the connection with multiplication eg $29 = 4 \times 7 + 1$.

Students could interpret the remainder in the context of a word problem eg ‘Each team would have 7 students and one student could umpire.’

Students could record the answer showing the remainder eg $29 \div 4 = 7$ remainder 1. The teacher could model recording the students’ solutions, using both forms of recording division number sentences.

The teacher sets further problems that involve remainders eg ‘A school wins 125 computers. If there are seven classes, how many computers would each class receive?’ Since only whole objects are involved, students discuss possible alternatives for sharing remainders. Students write their own division problems, with answers involving remainders.

### Area model

Students develop their own area model as a strategy using an area model, eg $27 \times 8$

```
8
20 7
160 56

160 + 56 = 216
```

### Teddy target

Draw a large target on the asphalt with chalk. Write the numerals 6, 5, 4 and 3, on the target, so that one numeral is on one segment of the target. Organise the students into teams and provide each team with a set of “teddy bags”. “Teddy bags” are clear plastic bags containing 2, 3, 4, 5 or 6 plastic teddies. Have the students take turns to throw the “teddy bags” onto the target. The team calculates the score by multiplying the number of teddies in the “teddy bag” by the number indicated on the target segment.

Have one of the team members record the score and another member check the calculation on a calculator. After each member has had a throw, the team adds the total. The team with the highest total wins.
Activities to consolidate understanding of multiplication facts:
Dice Tables and Four in a Row, Four in a Square (Counting On teaching activities, pp. 164-176)

Explore patterns for multiples and squares on a hundreds chart.
See pp 160-161 Talking About Patterns and Algebra

Links to Patterning Multiplication and reversibility
(p. 91 Talking about Patterns and Algebra)

Multiplication strategies
(p. 93 Talking about Patterns and Algebra)

Array slides
(p. 95 Talking about Patterns and Algebra)

Related multiplication and division facts
(p. 97 Talking about Patterns and Algebra)

Arrays and multiplication and division facts
(p. 98 Talking about Patterns and Algebra)

Square numbers
(p. 106 Talking about Patterns and Algebra)

Other DENS 2 Activities
Tasks involving arrays (p98)
Remainders Count (p278)
Multiplication memory (p260)
Multiplication game board (p266)
Set the rules (p268)
Una pizza per favora (p256)

Go Maths Investigation
Which 16 different numbers would you want to have on your Multo card? See Appendix 2

Go Maths Investigation 37.4
### Investigation Methods to Find Factors

See Appendix 3

### Guided Group/Independent Activities—some suggestions

#### Halves

Students work in small groups. One student chooses a number. The next student halves it. Students take turns as they keep halving. The teacher asks how far they think they can go. A student checks the results with a calculator. Students try starting at a different number when playing the next round.

#### Multiple relay

Place students in teams and spread cards printed with selected multiples on the floor in front of each team. At a given signal the teams take the cards, distribute one to each member and then order themselves as a sequence of multiples. First team to finish is the winner. Some teachers like to add the rule that teams must compete in silence. (P. 179 Counting On teaching activities)

#### Mental Strategies

Students are asked to write a multiplication fact that they have trouble remembering eg \(8 \times 5\). They are encouraged to try mental strategies to help them recall that fact by using known facts eg ‘I know \(4 \times 5\) is 20 so \(8 \times 5\) must be double that which is 40’ or using the inverse relationship of division: ‘I know \(40 \div 8 = 5\) so \(8 \times 5 = 40\).’

Students are asked to write a division fact they have trouble remembering eg \(18 \div 2\). They are encouraged to try mental strategies to help them recall the fact eg using known division facts ‘I know \(20 \div 2 = 10\) so \(18 \div 2 = 9\’; using other known facts ‘half of 18 is 9’; using the inverse relationship of multiplication: \(9 \times 2 = 18\) so \(18 \div 2 = 9\’.

#### Tables Races

Students make up cards for particular multiplication facts for particular numbers, shuffle them and put them into an envelope eg 2, 4, 6, 8, 10, 12, 14, 16, 18, 20 on them.

In groups, students are given an envelope of cards. Students race each other to put the cards into order, skip counting aloud. Students state which number has the multiplication facts their cards represent. Variation: Students write numbers in descending order.

#### Dominoes

The teacher creates a set of dominoes to be used for practicing multiplication facts. Half of the domino has an answer while the other half has two numbers to be multiplied or divided together (to obtain a different answer. The students try and match the operation with its answer. They play the normal domino rules.

#### Double Dice Multi

Provide the students with a baseboard, two dice, one die displaying numerals 1 to 6, the other displaying numerals 1 to 3 and 12 counters.

Instruct the students to take turns to roll the dice and multiply the two numbers rolled. Model to the
students how skip counting or repeated addition may be used to determine the answer. Once the answer has been determined, the student covers the corresponding numeral on the baseboard. If the number is already covered, the player misses a turn. Continue until all numerals on the baseboard have been covered.

**Variations**
Modify the dice to have both displaying numerals 1–6 or replace one of the dice with a ten-sided die displaying numerals 1–10. If varying the dice, the baseboard will need to be modified. Use three dice. Have the students roll the dice and choose two of the numbers rolled to multiply.

**Hopscotch**
Prepare a Hopscotch baseboard for each pair of students. The students will also need a die or spinner marked 1–10, ten counters of one colour for each player and a calculator. The players take turns to roll or spin up a number and place a counter on the corresponding number on the hopscotch board. The student’s partner then asks a multiplication question up to 10 x 10, using the calculator as verification. If the first student answers correctly, he or she leaves the counter on the grid. If the student answers incorrectly, then he or she must remove the counter. Play continues until one player has a counter on each numbered section of the “hopscotch”.

**Variations**
Students ask division or multiplication questions. Students have one counter each and move one space on the hopscotch board each time a question is correctly answered.

**Factors**
Students are asked to find all of the factors of a given number (eg 24) and use counters to make the appropriate arrays. Students could also be challenged to find which of the numbers between 1 and 100 has the most factors and to record their findings.

Create arrays
- Year 3 - 3X, 6X, 9X, 4X, 8X
- Year 4 – 10X10
- Counting On, p.166 – 174
- Developing Efficient Strategies 2 pg 276-277 + BLM 328

**Saucy Sixes**
Organise the students into pairs and provide them with a copy of the baseboard grid, 18 counters each (use two different colours) and a numeral die marked 1–6. The aim is to be the player with the most numbers covered on the grid. To cover a number, the students take turns to roll the die. The number that is rolled represents a “remainder”. The student then chooses a number on the baseboard that when divided by “6” would leave a remainder corresponding to the number rolled on the die. For example, if a “3” is rolled, then “3” is the “remainder”. The student could place a counter on 9, 15, 21 or 27 on the baseboard as each of these numbers, when divided by “6”, leaves a remainder of “3”. If a “6” is rolled the student misses a turn. Only one counter may be placed on each numeral. Continue until all numbers on the board are covered.

Using Learning Objects To teach Mathematics CD ROM

~ 14 ~
Division Number Sentences
Students are asked to devise their own division number sentences with a two-digit number divided by a single-digit number. Students can do this by rolling a die or by choosing the numbers themselves. Students are asked to model the number sentences with materials and record their number sentences and solutions.
Possible questions include:
- when you were solving a division problem, was there any remainder?
- how did you know?
- how did you record the remainder?
- interpret the remainder in the context of a word problem, eg ‘If a car can safely hold 5 people, how many cars are needed to carry 41 people?’; the answer of 8 remainder 1 means that 9 cars will be needed
- using the relationship between division facts, eg to divide by 5, first divide by 10 and then multiply by 2

Factors Game
The teacher prepares two dice, one with faces numbered 1 to 6 and the other with faces numbered 5 to 10. Each student is given a blank 6 × 6 grid on which to record factors from 1 to 60. Students work in groups and take turns to roll the two dice and multiply the numbers obtained. For example, if a student rolls 5 and 8, they multiply the numbers together to obtain 40 and each student in the group places counters on all of the factors of 40 on their individual grid ie 1 and 40, 2 and 20, 4 and 10, 5 and 8. The winner is the first student to put three counters in a straight line, horizontally or vertically.

Card Remainders
The teacher prepares a pack of 20 cards consisting of two sets of cards numbered 1 to 10 and 5 x 5 grid boards with the numbers 0 to 5 randomly arranged on them. In pairs, students shuffle the cards and place them face down in a pile. Student A decides on a two-digit target number eg 40. Students take turns to turn over the top card and divide the target number by the number on their card to find the remainder. For example, Student A turns over a ‘6’. 40 ÷ 6 = 6 remainder 4: Student A places a counter on a ‘4’ and returns the card to the bottom of the pile. Student B now turns over the next card and finds the remainder; for example, a ‘3’ is turned over, 40 ÷ 3 = 13 remainder 1. Once a number is covered another counter can go on top of it (stackable counters are best for this). In the next round Student B chooses the target number. Play continues until all numbers are covered. The winner is the player who has the most counters on the board when there are no numbers showing.

Triples plus one
Prepare a baseboard for each pair of students and also provide them with a pile of counters and a numeral die. Have the students take turns to roll the die. The student then multiplies the number rolled by three, determines the answer, and then adds one more to the total. The student then covers a corresponding numeral on the baseboard with a counter. The first player to cover four numerals in a row, vertically, horizontally or diagonally wins.

(pp.206-207 Developing Efficient Numeracy Strategies Stage 2 DENS 2)
Remainders Count
Provide each pair of students with three numeral dice and paper to record on. In turns, students roll the dice and using the three numbers shown make a division number sentence. For example if a 6, 4 and 5 were rolled then a student could make $46 \div 5$. The student determines the answer and keeps a tally of any remainders; in this case the remainder would be “one”. However, if the student makes the sentence $45 \div 6$, the remainder would be “three”. The remainders become the student’s score. The winner is the first to reach a score of 20.

Goodies and baddies
Play Goodies and Baddies (an excellent home activity). Prepare cards with number facts from 0 x 1 up to 10 x 10. Cards are jumbled. The facts that students know go into the ‘goodies’ pile, those that they don’t know are the ‘baddies’

Previous NAPLAN Questions

Computer Learning Objects

The Array
TaLe Reference Number : L106
Pobble Arrays: Find two factors
TaLe Reference Number: L2058

Pobble Arrays: Make Multiples
TaLe Reference Number: L2056

Game 4 - Arrays

Multiplication Array
Type in reference number in search box, click on link when it appears and then click on View
Using Learning Objects To Teach Mathematics’ CD ROM
Or
Count Me In Too website
Click on link below)

**Ongoing**

**Multiplication Grid**

Students keep a multiplication grid, as shown below. When students are sure they have learnt particular multiplication facts, they fill in that section of the grid. Students are encouraged to recognise that if they know $3 \times 8 = 24$ they also know $8 \times 3 = 24$, and so they can fill in two squares on the grid.
Planned assessment

Pre Assessment
Give students a multiplication grid to complete in a given time frame

Creating Several Arrays Sample Units of Work pg 93
Students use counters to make an array for a particular number. They create new arrays for this number.
Students record their findings eg 20 can be 10 rows of 2 or 4 rows of 5.
Possible questions include:
  ■ how many different arrays can you make?
  ■ how many rows do I have if there are 5 counters in each row? (Adapted from CMIS)

Students are given 3 numbers eg. 15, 20 and 40. They write as many multiplication and division facts about the three numbers as possible.

Pre Assessment
Give students a multiplication grid and tell them they have 3 minutes to fill in as much as they can.
Encourage them to start with the ones they know. (Do this frequently, record and compare the results)

Assessment
Give students a multiplication grid with some of the answers given but some of the multipliers missing

Pre Assessment
Write the number 27 as the result of three different number sentences.

Eg 27 = 3 x 9
     27 = 2 x 10 + 7
     27 = 5 x 5 + 2

Paddocks
Students are given an A4 sheet of paper that has been divided into sections
### Area multiplication
Show the cardboard unit square and the “7 x 3” rectangle. How many squares like this would you need to cover the rectangle completely? Provide the student with a copy of the grid and ask:
Can you draw what the squares would look like?

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### Work it out in your head
Download the assessment proforma.

### Sheep and ducks
I can count 20 legs in the paddock. How many ducks and how many sheep are in the paddock?
How many solutions can you find?
The farmer is taking ducks and sheep to market.
Altogether there are 15 heads and 52 legs in the truck. How many ducks and how many sheep are going to market?