

Multiplication and Division 2

Stage 3 Outcome

A student:

- › describes and represents mathematical situations in a variety of ways using mathematical terminology and some conventions MA3-1WM
- › selects and applies appropriate problem-solving strategies, including the use of digital technologies, in undertaking investigations MA3-2WM
- › gives a valid reason for supporting one possible solution over another MA3-3WM
- › selects and applies appropriate strategies for multiplication and division, and applies the order of operations to calculations involving more than one operation MA3-6NA

Language: Students should be able to communicate using the following language: multiply, multiplied by, product, multiplication, multiplication facts, area, thousands, hundreds, tens, ones, double, multiple, factor, divide, divided by, quotient, division, halve, remainder, fraction, decimal, equals, strategy, digit, estimate, **speed, per, operations, order of operations, grouping symbols, brackets, number sentence**, is the same as.

Teaching and Learning Activities

Notes/ Future Directions/Evaluation

Date / LAC Icons

Ignition Activities

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. 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. (Value of the Ace is one and Value of Jack, Queen, King cards can be ten)

Percentage Dominoes

Children divide up the dominoes evenly and take turns placing dominoes down. First person to place down all of their dominoes first is the winner.

Follow Me Game –Mixed Tables

Deal out one card for each child. First child starts off with “I have 10. Who has 6x7? Children all look at the top of their card and the child with the correct answer says it out loud ‘I am 42’ and asks the next question which is on the bottom of their card ‘Who has 3x4?’ Game continues until all cards have been answered.

Explicit Teaching – Order of Operations

Use the term operations to describe collectively the process of addition, subtraction, multiplication and division.

B I D M A S

1) brackets $()$, $[\]$, $\{ \}$

2) indices 5^2 , 2^3

3) division and multiplication \div and \times

4) addition and subtraction $+$ and $-$

Explain that using brackets $()$ and $\{ \}$ are used in number sentences to indicate the operations that must go first.

Also explain that brackets may be inside brackets and operations must be performed from the inside to the outside.

Explain the following examples:

$$(a) 7 + (4 \times 10) = 7 + 40 \\ = 47$$

$$(b) 12 - 4 + 6 = 14$$



$$(c) 12 - (4 + 6) = 12 - 10 \\ = 2$$




$$(d) 15 + (6 \div 3) = 15 + 2 \\ = 17$$




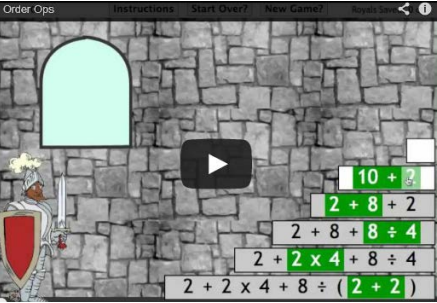

$$(e) 24 \div 4 \times 3 = 18$$

$$(f) 50 - (5 \times 7) = 15$$

Examples from mathsonline.com

<p><u>Explicit Teaching – Order of operations</u></p> <p>Perform calculations involving grouping symbols without the use of digital technologies, eg</p> $5+(2\times 3) =5+6 =11$ $(2+3)\times(16-9) =5\times 7 =35$ $3+[20\div(9-5)] =3+[20\div 4] =3+5 =8$ <p>Apply the order of operations to perform calculations involving mixed operations and grouping symbols, without the use of digital technologies, eg</p> $32 + 2 - 4 = 34 - 4 = 30$ <p>addition and subtraction only, therefore work from left to right</p> $32 \div 2 \times 4 =16 \times 4 = 64$ <p>multiplication and division only, therefore work from left to right</p> $32 \div (2\times 4) = 32 \div 8 = 4$ <p>perform operation in grouping symbols first</p> $(32+2) \times 4 = 34 \times 4 = 136$ <p>perform operation in grouping symbols first</p> $32 +2 \times 4 = 32 + 8 = 40$ <p>perform multiplication before addition</p>		 Critical and creative thinking
<p><u>Investigation Challenge</u></p> <p>Have students investigate whether digital technologies apply the order of operations.</p> <p>Students make a set of rules for when the use of brackets are not necessary. eg $32 + (2 \times 4)$ has the same answer as $32 + 2 \times 4$</p>		 Critical and creative thinking

<p>Value for Money Students collect supermarket brochures advertising weekly sales. Students investigate prices (eg 4 ice-blocks for \$2.95 or 6 ice-blocks for \$3.95), in order to recommend the best buys. Possible questions include:</p> <ul style="list-style-type: none"> ■ can you explain the best buy? Why is it the best buy? ■ how did you work it out? ■ is there a better strategy you could use to work it out? <p><i>Variation:</i> Students collect a variety of brochures and rate prices according to value for money.</p>		 Critical and creative thinking																		
<p>Averages Students calculate averages related to a range of everyday situations eg temperature, heights of students. Students investigate open-ended questions eg if the average height of 3 students is 140 cm, what are possible heights for each of the students? <i>Variation:</i> Students collect data on the exchange rate of the Australian dollar (AUD), petrol prices or the distribution of newspapers over a week, and determine averages. Students experiment with other ways of representing the information.</p>		 Critical and creative thinking																		
<p>Number Patterns Students are given a table such as:</p> <table border="1" data-bbox="118 708 680 831"> <tr> <td>$2 \times 8 = 16$</td> <td>$16 \div 2 = 8$</td> </tr> <tr> <td>$2 \times 80 = 160$</td> <td>$160 \div 2 = 80$</td> </tr> <tr> <td>$2 \times 800 = 1\ 600$</td> <td>$1600 \div 2 = 800$</td> </tr> </table> <p>They are asked to continue the pattern and describe the number pattern created. Students are encouraged to create further number patterns and are given access to a calculator. Further number patterns could include:</p> <table border="1" data-bbox="100 1038 721 1174"> <tr> <td>$10 \times 40 =$</td> <td>$400 \div 10 =$</td> <td>$10 \times 500 =$</td> <td>$5000 \div 10 =$</td> </tr> <tr> <td>$20 \times 40 =$</td> <td>$800 \div 20 =$</td> <td>$20 \times 500 =$</td> <td>$10\ 000 \div 20 =$</td> </tr> <tr> <td>$70 \times 40 =$</td> <td>$2800 \div 70 =$</td> <td>$70 \times 500 =$</td> <td>$35\ 000 \div 70 =$</td> </tr> </table> <p>Possible questions include:</p> <ul style="list-style-type: none"> ■ what happens if you multiply a number by a multiple of ten? ■ what happens if you divide a number by a multiple of ten? ■ can you devise a strategy for multiplying by a multiple of ten? ■ can you devise a strategy for dividing by a multiple of ten? 	$2 \times 8 = 16$	$16 \div 2 = 8$	$2 \times 80 = 160$	$160 \div 2 = 80$	$2 \times 800 = 1\ 600$	$1600 \div 2 = 800$	$10 \times 40 =$	$400 \div 10 =$	$10 \times 500 =$	$5000 \div 10 =$	$20 \times 40 =$	$800 \div 20 =$	$20 \times 500 =$	$10\ 000 \div 20 =$	$70 \times 40 =$	$2800 \div 70 =$	$70 \times 500 =$	$35\ 000 \div 70 =$		 Critical and creative thinking
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<p>Demonstrate the formal method for multiplication. EXPLAIN that the multiplication of a digit in the tens place value is multiplying by a multiple of ten and that is why we put the 0 place holder in the algorithm.</p>		
<p>Investigation You are having a pizza lunch as a treat for your class. Pizzas are cut into 8 pieces. How many pizzas will your teacher need to buy? -How could you calculate 16×25 if the 6 button on your calculator is broken? -What is the best way to multiply a number by 99? Give some examples and show how you worked it out? -Write a word problem which will give you an answer of 25 and a quarter. Now write another problem that will give you an answer of 25, remainder 1.</p>		<p> Critical and creative thinking</p>
<p>Order of operations Millionaire http://www.math-play.com/Order-of-Operations-Millionaire/order-of-operations-millionaire.html</p> 		<p> Information and communication technology capability</p>
<p>Order of Operations Royal Rescue http://mrmussbaum.com/orderops/</p> 		<p> Information and communication technology capability</p>

Maths Frog - Order of Operations Speed test

<http://cemc2.math.uwaterloo.ca/mathfrog/english/kidz/order.shtml>



Information and communication technology capability

iPad app

<https://itunes.apple.com/au/app/5-dice-order-operations-game/id572774867?mt=8>

5 Dice: Order of Operations Game

[View More By This Dev](#)

By Justin Holladay

Open iTunes to buy and download apps.



Description

Two Player Bluetooth Math Game! You can now use two devices and play against your classmates or parents.

A math game intended for upper elementary and middle school students that helps students enjoy practicing

[Justin Holladay Web Site](#) > [5 Dice: Order of Operations Game Support](#) >

What's New in Version 1.8

Try out another fun fraction game that also has Bluetooth integrated into it allowing for two players to play plli competitively or cooperatively using two devices.

[View in iTunes](#)

Information and communication technology capability