Capacity Matrix - Mathematics - Multiplication

Name:

				LEARNING				GOING FURTHER	
AIM	Capacity	Capacity Breakdown	Explanation	Information (I have heard of this)	Knowledge (I understand and can explain this) Possible Student Tutorial (I.e. Using Doceri)	Know-how (I can do this on my own)	EVIDENCE (Maths book page number)	Wisdom (I can teach others)	Evidence of Wisdom (I have taught others) Student Name or Hyperlink to Student Tutorial (I.e. Using Doceri)
To understand and use multiple strategies to solve written and mental multiplication	Multiplication	**Recognise and represent multiplication as repeated addition, groups and arrays** (ACMNA031)	* Representing array problems with available materials and explaining reasoning						
			* Visualising a group of objects as a unit and using this to calculate the number of objects in several identical groups						
		They represent multiplication and division by grouping into sets.							
		Recall multiplication facts of two, three, five and ten **and related division facts** (ACMNA056)	* Establishing multiplication facts using number sequences						
		Represent and solve problems involving multiplication **using efficient mental and written strategies and appropriate digital technologies** (ACMNA057)	* Writing simple word problems in numerical form and vice versa						
			* Using a calculator to check the solution and reasonableness of the answer						
		Students recognise the connection between addition and subtraction and solve problems using efficient strategies for multiplication							
		They recall addition and multiplication facts for single digit numbers.							
		Investigate number sequences **involving multiples of 3, 4, 6, 7, 8, and 9** (ACMNA074)	* Recognising that number sequences can be extended indefinitely, and determining any patterns in the sequences						
		Recall multiplication facts **up to 10×10** and related division facts (ACMNA075)	* Using known multiplication facts to calculate related division facts						
		Develop efficient mental and written strategies **and use appropriate digital technologies** for multiplication and for division where there is no remainder (ACMNA076)	* Using known facts and strategies, such as commutativity, doubling and halving for multiplication, and connecting division to multiplication when there is no remainder						
		Students choose appropriate strategies for calculations involving multiplication and division.							
		They recall multiplication facts to 10 x 10 and related division facts.							
		Identify and describe **factors** and multiples of **whole numbers** and **use them to solve problems** (ACMNA098)	* Exploring factors and multiples using number sequences						
			* Using simple divisibility tests						
		Use **estimation and rounding** to **check the reasonableness of answers to calculations** (ACMNA099)	* Recognising the usefulness of estimation to check calculations						
			* Applying mental strategies to estimate the result of calculations, such as estimating the cost of a supermarket trolley load						
		Solve problems involving multiplication of **large** numbers by one-or **two-digit** numbers using efficient mental, written strategies and appropriate digital technologies (ACMNA100)	* Exploring techniques for multiplication such as the area model, the Italian lattice method or the partitioning of numbers						
			* Applying the distributive law and using arrays to model multiplication and explain calculation strategies						
		Use efficient mental and written strategies and **apply** appropriate digital technologies to solve problems (ACMNA291)	* Using calculators to check the reasonableness of answers						
		Students solve simple problems involving the four operations using a range of strategies.							
		They check the reasonableness of answers using estimation and rounding.							
		Students identify and describe factors and multiples.							
		Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving **all four** operations with whole numbers (ACMNA123)	* Applying strategies already developed for solving problems involving small numbers to those involving large numbers						
			* Applying a range of strategies to solve realistic problems and commenting on the efficiency of different strategies						
		Multiply decimals by whole numbers and **perform divisions by non-zero whole numbers where the results are terminating decimals, with and without digital technologies** (ACMNA129)	* Interpreting the results of calculations to provide an answer appropriate to the context						
		Identify and describe properties of **prime, composite, square and triangular** numbers (ACMNA122)	* Understanding that some numbers have special properties and that these properties can be used to solve problems						
			* Representing composite numbers as a product of their prime factors and using this form to simplify calculations by cancelling common primes						
			* Understanding that if a number is divisible by a composite number then it is also divisible by the prime factors of that number (for example 216 is divisible by 8 because the number represented by the last three digits is divisible by 8, and hence 216 is also divisible by 2 and 4)						
		Multiply and divide decimals by powers of 10 (ACMNA130)	* Multiplying and dividing decimals by multiples of powers of 10						
		Students **make connections between the powers of 10 and the multiplication and division of decimals.**							
		They solve problems involving all four operations with whole numbers.							
		They add, subtract and **multiply decimals and divide decimals where the result is rational.**							
		Students recognise the properties of prime, composite, square and triangular numbers.							
		Multiply and divide **fractions** and decimals using efficient written strategies and digital technologies __ (ACMNA154)	* Investigating multiplication of fractions and decimals, using strategies including patterning and multiplication as repeated addition, with both concrete materials and digital technologies, and identifying the processes for division as the inverse of multiplication						
		Investigate **index** notation and represent whole numbers **as products of powers of prime numbers** (ACMNA149)	* Defining and comparing prime and composite numbers and explaining the difference between them						
			* Applying knowledge of factors to strategies for expressing whole numbers as products of powers of prime factors, such as repeated division by prime factors or creating factor trees						
			* Solving problems involving lowest common multiples and greatest common divisors (highest common factors) for pairs of whole numbers by comparing their prime factorisation						
		Investigate and use **square roots of perfect** square numbers (ACMNA150)	* Investigating square numbers such as 25 and 36 and developing square-root notation						
			* Investigating between which two whole numbers a square root lies						
		Apply the **associative, commutative and distributive laws to aid** mental and written computation (ACMNA151)	* Understanding that arithmetic laws are powerful ways of describing and simplifying calculations						
		They solve problems involving percentages and all four operations with fractions and decimals.							
		They make **the connections between whole numbers and index notation and the relationship between perfect squares and square roots.**							