Fact Families

From a bar model we can see four calculations

18					
3	3	3	3	3	3
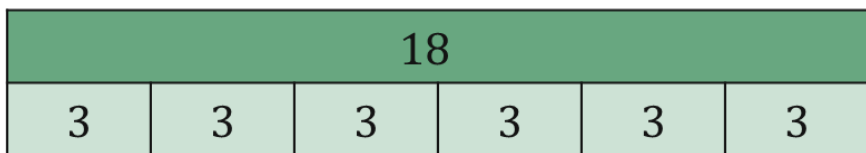
The the bar model above has the following fact family:

$6 \times 3 = 18$

Six blocks of 3 make 18

$3 \times 6 = 18$

$18 \div 3 = 6$

I can fit 6 blocks of 3 into 18

$18 \div 6 = 3$

Models of multiplication

I can model multiplication using the following models
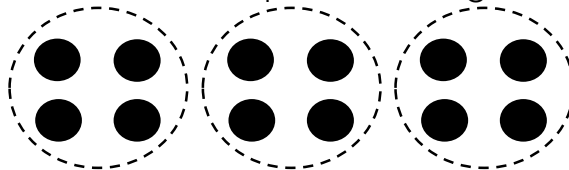
$4 \times 3 = 12$
A group of 4, 3 times is 12

$3 \times 4 = 12$
3 groups of 4 is 12

$12 \div 3 = 4$
12 divided into 3 groups is 4 per group

$12 \div 4 = 3$
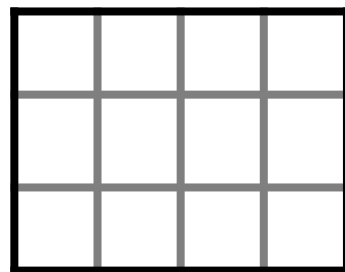12 divided into groups of 4 is 3 groups

$4 \times 3 = 12$
A group of 4, 3 times is 12

$3 \times 4 = 12$
3 groups of 4 is 12

$12 \div 3 = 4$
12 divided into 3 groups is 4 per group

$12 \div 4 = 3$
12 divided into groups of 4 is 3 groups

Keyword/Skill	Definition/Tips
Digital	Time displayed as 24 hours i.e. 2pm would be 14:00
Analogue	Time displayed as either am/pm i.e. 09:00 is 9am, whereas 21:00 is 9pm
AM	Time in the morning from midnight to midday (12am to 11am)
PM	Time in the afternoon from midday to midnight (12pm to 11pm)
Decade	10 years
Century	100 years
Array	*An object, picture or model that is in rows and columns* i.e**. multilink cubes,**
Commutativity	an operation is commutative if it can be applied to two numbers in any order
Associativity	multiplication problems can be split up into different groups
Distributive Property	a way of splitting up a calculation to make it more manageable

Other Topics/Units this could appear in:
- Numbers, powers, roots, decimals and rounding
- Time series
- Speed, Distance, Time
- Real Life Graphs
- Numbers, powers, root, decimals and rounding
- Perimeter and area
- Multiples in context

Commutativity

An operation is commutative if it can be applied to two numbers in **any order**

Example
3 x 4 = 12 is the same as 4 x 3 = 12
2 + 5 = 7 is the same as 5 + 2 = 7
Addition and multiplication are commutative

Non - Example
15 ÷ 5 is not the same as 5 ÷ 15
10 - 3 is not the same as 3 – 10
Division and subtraction are not commutative

Y7 Mastery: Unit 2 –Axioms and Arrays
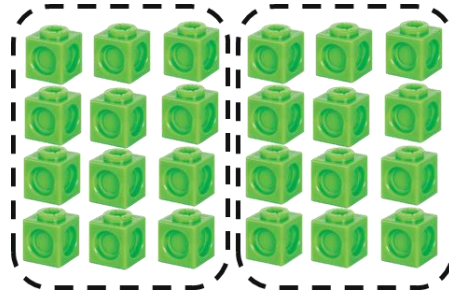
Associativity

Multiplication problems can be split up into different groups to make it easier to calculate
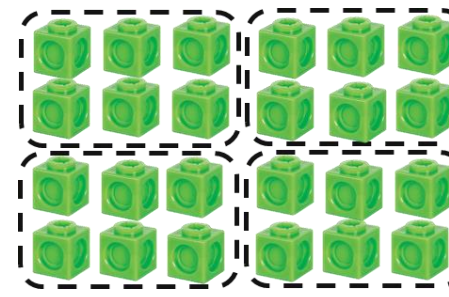
Example
To count the 24 cubes we use the associative property

A more challenging example!
12 x 25 can be split into
(3 x 4) x 25 = 3 x (4 x 25)

I can see two groups of 4 x 3
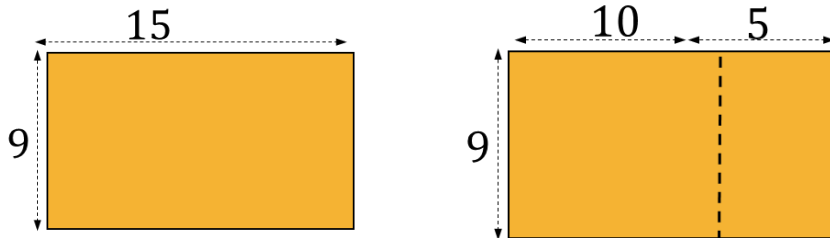So 2 x 4 x 3 = 24

I can see four groups of 2 x 3
So 4 x 2 x 3 = 24

Distributive Property

A way of splitting up a calculation to make it more manageable

15

10   5

9

9

9×15

$9 \times (10 + 5) = 9 \times 10 + 9 \times 5$
$= 90 + 45$
$= 135$

A more challenging example!

$12 \times 15 = 12 \times (10 + 5) = 12 \times 10 + 12 \times 5 = 120 + 60 = 180$

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