Mathletics

Series D Student

Multiplication and Division

My name

First edition printed 2009 in Australia.

A catalogue record for this book is available from 3P Learning Ltd.

ISBN 978-1-921860-40-9

Published 3P Learning Ltd

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Series D – Multiplication and Division

Contents

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Contents

Series Author:

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Multiplication revision – 2 times table

Here is the fact family for the 2 times table.

$0 \times 2 = 0$

$1 \times 2 = 2$ 

$2 \times 2 = 4$ 

$3 \times 2 = 6$ 

$4 \times 2 = 8$ 

$5 \times 2 = 10$ 

$6 \times 2 = 12$ 

$7 \times 2 = 14$ 

$8 \times 2 = 16$ 

$9 \times 2 = 18$ 

$10 \times 2 = 20$ 

$11 \times 2 = 22$ 

$12 \times 2 = 24$ 

Multiplication revision – 2 times table

Counting in 2s will help you know many times table facts.

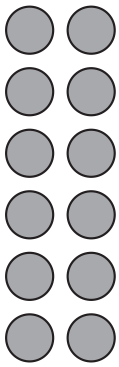
1 **Complete each pattern by counting in 2s:**

a 2 – 4 – ___ – ___ – ___ – 12 – 14 – ___ – 18

b 32 – 34 – ___ – ___ – ___ – ___ – ___ – ___ – ___

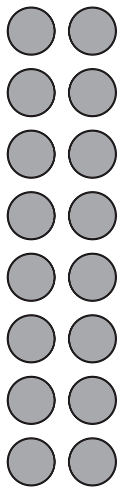
c 18 – ___ – ___ – ___ – 26 – ___ – ___ – ___ – ___

2 **Show how many dots there are in each array by counting in 2s. Then write the times table fact below:**



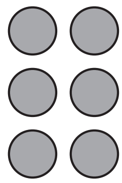
a 6 twos

☐ × 2 = ☐



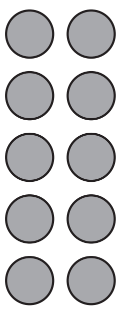
b 8 twos

☐ × 2 = ☐



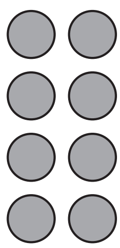
c 3 twos

☐ × 2 = ☐



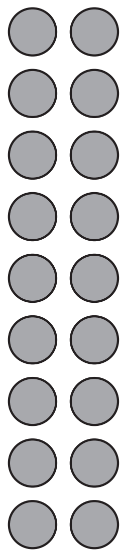
d 5 twos

☐ × 2 = ☐



e 4 twos

☐ × 2 = ☐



f 9 twos

☐ × 2 = ☐

3 **How many straws are in:**

a 3 drinks?

☐ × 2 = ☐

b 10 drinks?

☐ × 2 = ☐

c 5 drinks?

☐ × 2 = ☐

d 2 drinks?

☐ × 2 = ☐

4 **How many wheels have:**

a 4 bikes?

☐ × 2 = ☐

b 9 bikes?

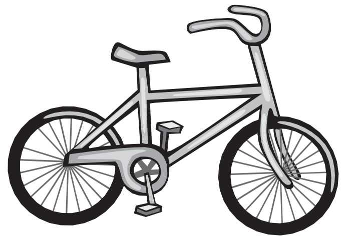
☐ × 2 = ☐

c 7 bikes?

☐ × 2 = ☐

d 3 bikes?

☐ × 2 = ☐



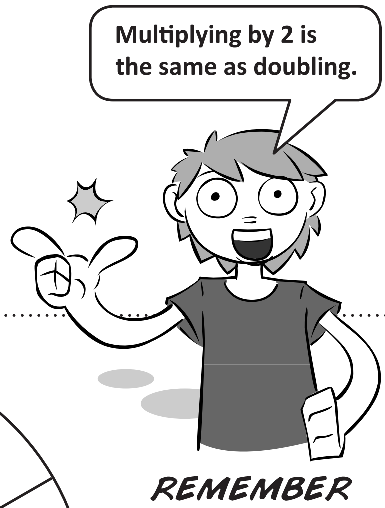
5 **Double each number:**

a 6 × 2 = ☐

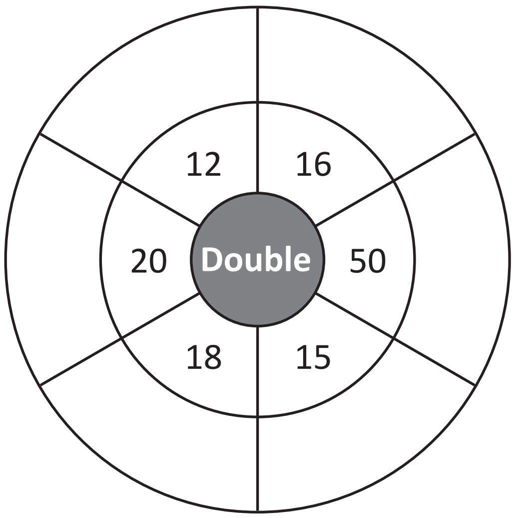
b 9 × 2 = ☐

c 8 × 2 = ☐

d 7 × 2 = ☐

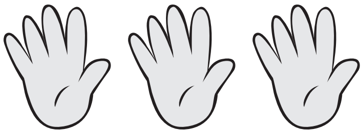


6 **Complete this doubling wheel. These facts are not in the 2 times table, but they are facts that are useful to know.**



Multiplication revision – 5 times table

Use repeated addition to find the total number of fingers.

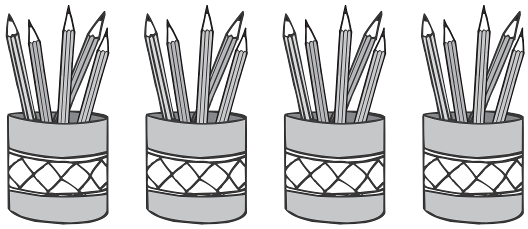


5 + 5 + 5 = 15

3 groups of 5 is equal to 15.

1 **Find the total of each group by using repeated addition.**

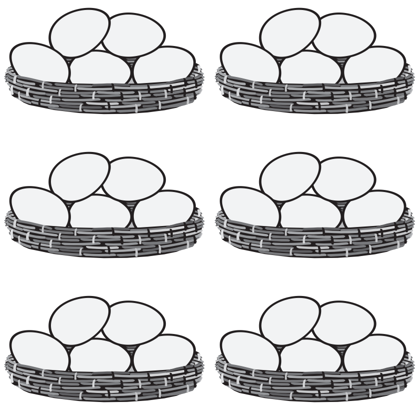
a How many pencils?



☐ + ☐ + ☐ + ☐ = ☐

☐ groups of ☐ is equal to ☐

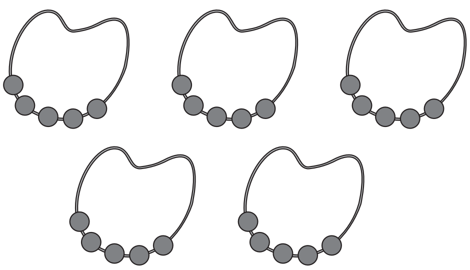
b How many eggs?



☐ + ☐ + ☐ + ☐ + ☐ + ☐ = ☐

☐ groups of ☐ is equal to ☐

c How many beads?



☐ + ☐ + ☐ + ☐ + ☐ = ☐

☐ groups of ☐ is equal to ☐

Multiplication revision – 5 times table

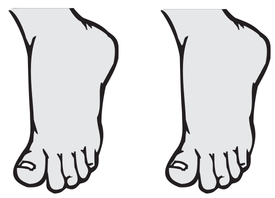
This is a multiplication symbol × and it means 'groups of' or 'rows of' .
So instead of repeated addition, we can use a multiplication symbol.

5 + 5 + 5 + 5 + 5 = 25   5 × 5 = 25

5 groups of 5 is equal to 25

2 **Find the total of each group by using repeated addition:**

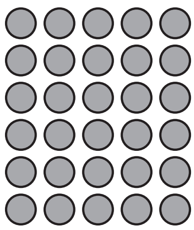
a



☐ groups of ☐ is equal to ☐

☐ × ☐ = ☐

b

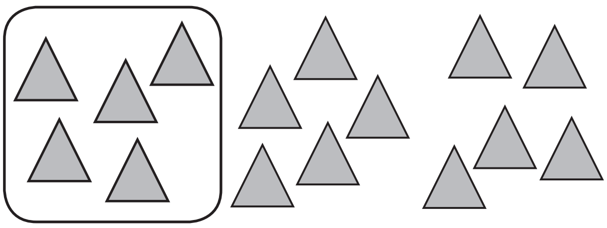


☐ rows of ☐ is equal to ☐

☐ × ☐ = ☐

3 **Ring the shapes in groups of 5. One group is ringed for you. Then complete the multiplication fact.**

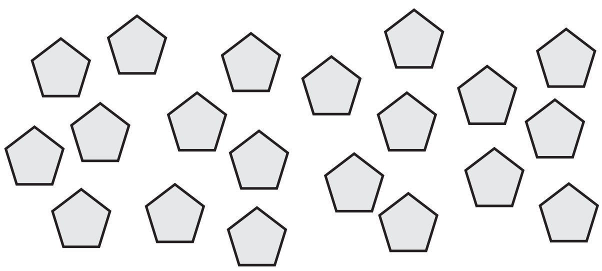
a



☐ groups of ☐ is equal to ☐

☐ × 5 = ☐

b



☐ groups of ☐ is equal to ☐

☐ × 5 = ☐

Multiplication revision – 5 times table

Times tables are families of multiplication facts for particular numbers.
The 5 times table is all the multiplication facts for 5.

0 × 5 = 0

1 × 5 = 5 

2 × 5 = 10 

3 × 5 = 15 

4 × 5 = 20 

5 × 5 = 25 

6 × 5 = 30 

7 × 5 = 35 

8 × 5 = 40 

9 × 5 = 45 

10 × 5 = 50 

11 × 5 = 55 

12 × 5 = 60 

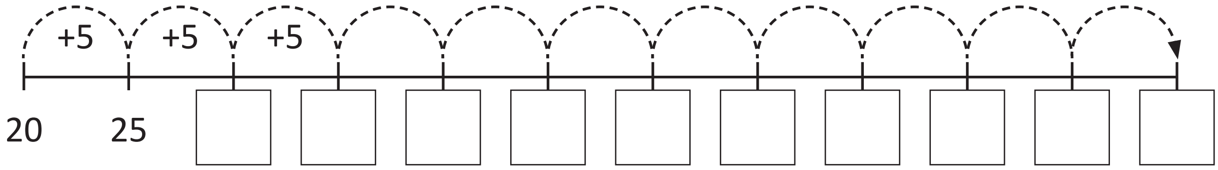
Multiplication revision – 5 times table

Here is a counting pattern on a hundred square. It shows a counting pattern of 5.

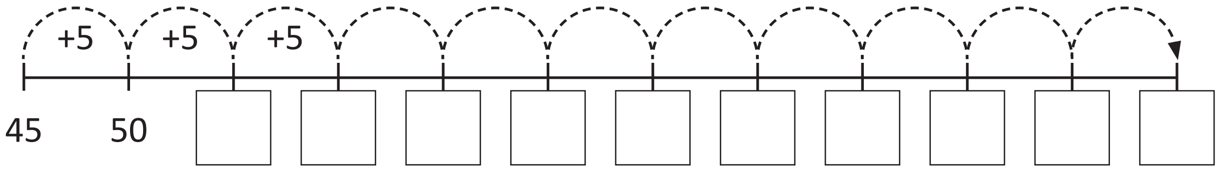
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1 **Finish each pattern by counting in 5s:**

a

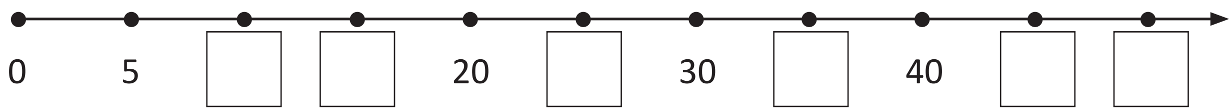


b



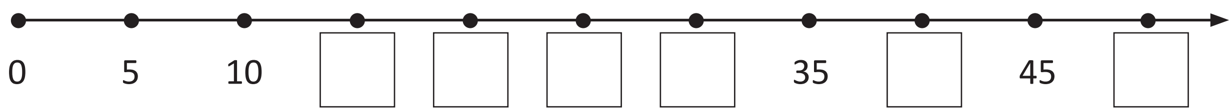
2 **Show × 5 multiplication facts on each number line.**

a Finish labelling this number line and then show 5 jumps starting from 0:



This is the same as ☐ × 5 = ☐

b Finish labelling this number line and then show 7 jumps starting from 0:



This is the same as ☐ × 5 = ☐

Multiplication revision – 5 times table

3 **Write a 5 times table fact for each set of 5 pence coins. The first one has been done for you.**

a 

4 × 5p = 20p

b 

☐ × ☐ = ☐

c 

☐ × ☐ = ☐

4 **Times tables are a set of multiplication facts from 1 to 10 based on multiplying by the same number each time. Write the answers for the 5 times table.**

1 × 5 = ☐

2 × 5 = ☐

3 × 5 = ☐

4 × 5 = ☐

5 × 5 = ☐

6 × 5 = ☐

7 × 5 = ☐

8 × 5 = ☐

9 × 5 = ☐

10 × 5 = ☐

11 × 5 = ☐

12 × 5 = ☐

5 **Now answer the mixed up 5 times table.**

a 2 × 5 = ☐ **b** 8 × 5 = ☐

c 9 × 5 = ☐ **d** 10 × 5 = ☐

e 3 × 5 = ☐ **f** 6 × 5 = ☐

g 7 × 5 = ☐ **h** 5 × 5 = ☐

i 1 × 5 = ☐ **j** 4 × 5 = ☐

6 **Write the missing number in each 5 times table fact.**

a ☐ × 5 = 35 **b** ☐ × 5 = 20

c ☐ × 5 = 50 **d** ☐ × 5 = 15

e ☐ × 5 = 40 **f** ☐ × 5 = 10

g ☐ × 5 = 30 **h** ☐ × 5 = 45

Multiplication revision – 10 times table

Here is the fact family for the 10 times table.

$0 \times 10 = 0$

$1 \times 10 = 10$

$2 \times 10 = 20$

$3 \times 10 = 30$

$4 \times 10 = 40$

$5 \times 10 = 50$

$6 \times 10 = 60$

$7 \times 10 = 70$

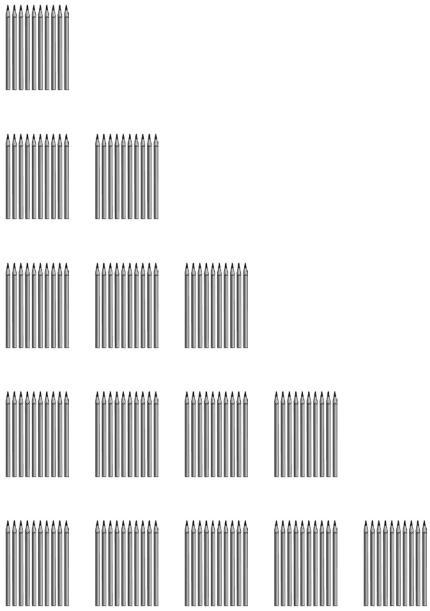
$8 \times 10 = 80$

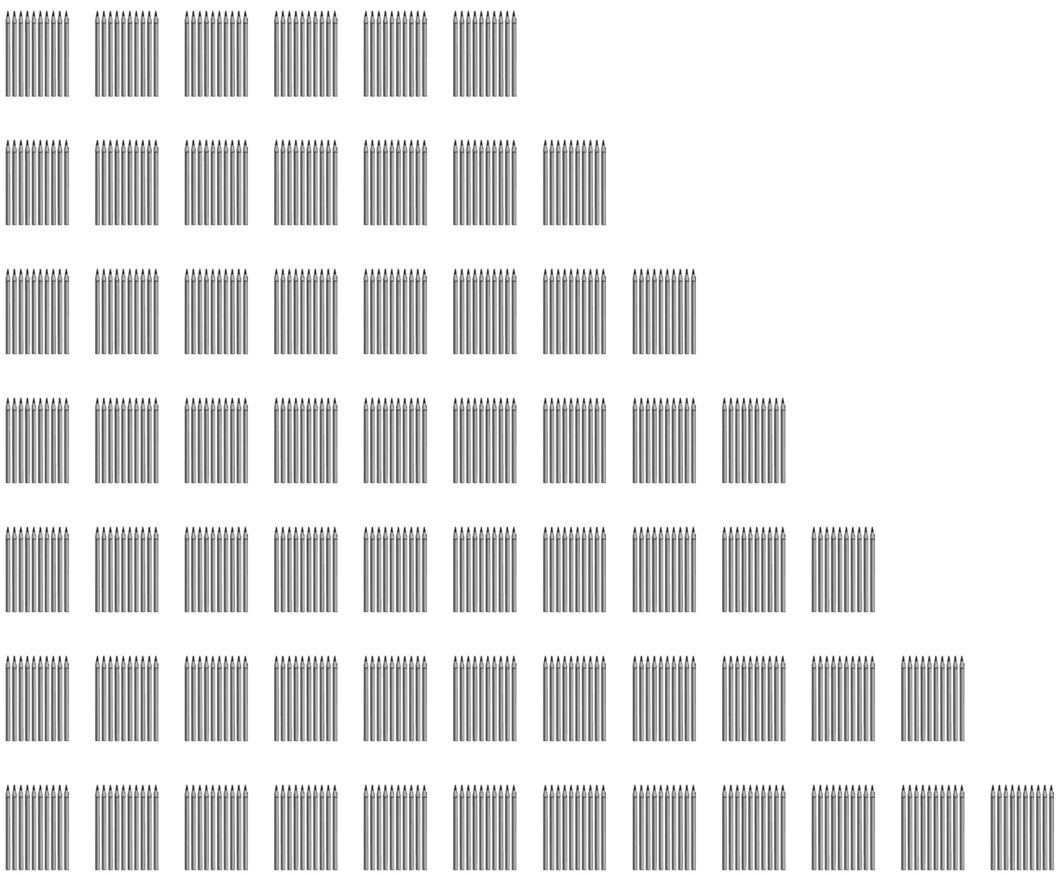
$9 \times 10 = 90$

$10 \times 10 = 100$

$11 \times 10 = 110$

$12 \times 10 = 120$

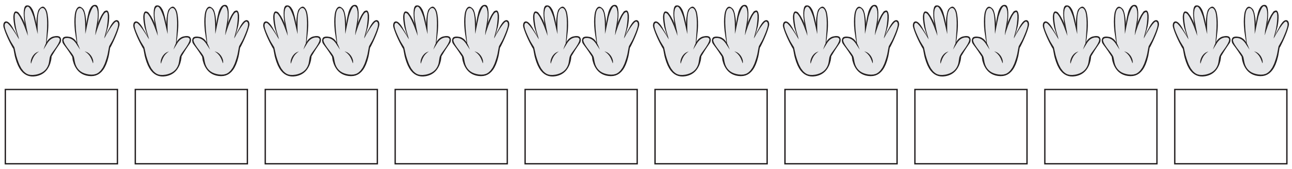




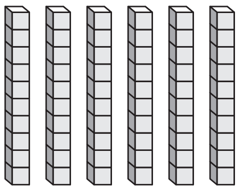
Multiplication revision – 10 times table

If you can count in 10s from zero, you know your 10 times table.

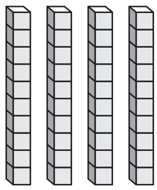
1 **Complete this sequence by counting in 10s:**



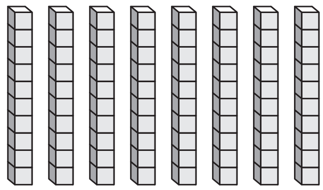
2 **Count the bars of 10 and then complete the multiplication fact:**

a 

☐ × 10 = ☐

b 

☐ × 10 = ☐

c 

☐ × 10 = ☐

3 **Complete the 10 times table:**

1 × 10 = ☐	7 × 10 = ☐
2 × 10 = ☐	8 × 10 = ☐
3 × 10 = ☐	9 × 10 = ☐
4 × 10 = ☐	10 × 10 = ☐
5 × 10 = ☐	11 × 10 = ☐
6 × 10 = ☐	12 × 10 = ☐

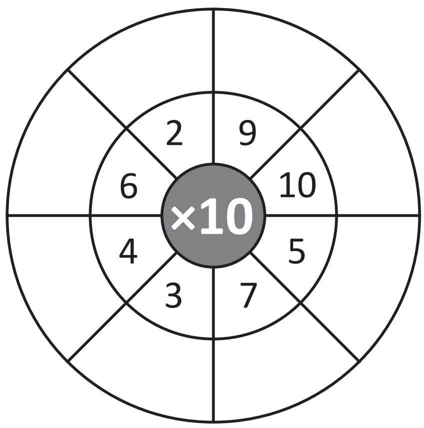
4 **Write the missing number in each 10 times table fact:**

a ☐ × 10 = 50

b ☐ × 10 = 80

c ☐ × 10 = 70

5 **Complete this × 10 wheel:**



Multiplication facts – multiplying any number by 10

When we multiply a number by 10, the number gets 10 times bigger. This means that each digit moves one place value column to the left and we need to use 0 as a placeholder in the ones column.

Hundreds	Tens	Ones
		2
	2	0

$2 \times 10 = 20$

1 **Show how the digits all move along when they are multiplied by 10 and write the answers below:**

a

Hundreds	Tens	Ones
		7
	7	0

$7 \times 10 =$ ☐

b

Hundreds	Tens	Ones
		3

$3 \times 10 =$ ☐

c

Hundreds	Tens	Ones
	1	5

$15 \times 10 =$ ☐

d

Hundreds	Tens	Ones
	2	2

$22 \times 10 =$ ☐

2 **Connect these × 10 facts to the answers:**

16 × 10	62 × 10	93 × 10	99 × 10	13 × 10

220 510 930 990 850 160 130 620 720 980

72 × 10	51 × 10	85 × 10	22 × 10	98 × 10

Multiplication facts – multiplying numbers by 0 and 1

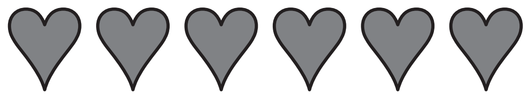
Any number multiplied by 1 always equals the same number.
Any number multiplied by 0 always equals zero.

1 **Practise multiplying by 1:**

a 

8 groups of 1 are equal to $\square$

$\square \times 1 = \square$

b 

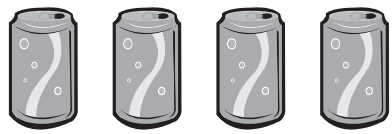
6 groups of 1 are equal to $\square$

$\square \times 1 = \square$

c 

5 groups of 1 are equal to $\square$

$\square \times 1 = \square$

d 

4 groups of 1 are equal to $\square$

$\square \times 1 = \square$

2 **Practise multiplying by 1 and 0:**

a $12 \times 0 = \square$　　**b** $6 \times 1 = \square$　　**c** $3 \times 0 = \square$

d $2 \times 1 = \square$　　**e** $8 \times 0 = \square$　　**f** $20 \times 1 = \square$

3 **Complete this table:**

×	9	10	6	1	5	12	4	7	3	11	8	2
0												
1												

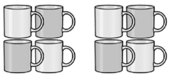
Multiplication facts – 4 times table

Here is the fact family for the 4 times table.

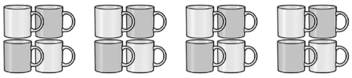
Compare it with the 2 times table. The answers are doubles of the equivalent multiples in the 2 times table.

$0 \times 4 = 0$

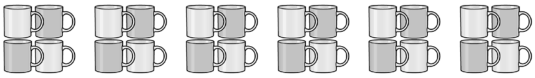
$1 \times 4 = 4$ 

$2 \times 4 = 8$ 

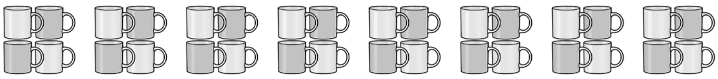
$3 \times 4 = 12$ 

$4 \times 4 = 16$ 

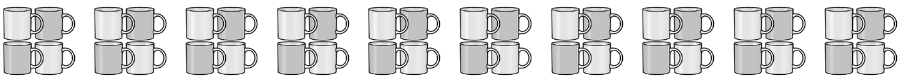
$5 \times 4 = 20$ 

$6 \times 4 = 24$ 

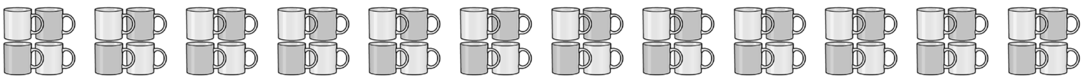
$7 \times 4 = 28$ 

$8 \times 4 = 32$ 

$9 \times 4 = 36$ 

$10 \times 4 = 40$ 

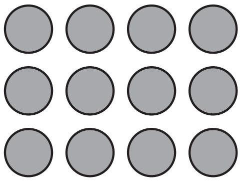
$11 \times 4 = 44$ 

$12 \times 4 = 48$ 

Multiplication facts – 4 times table

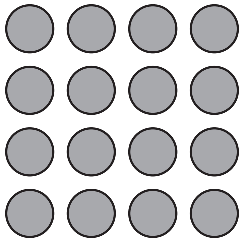
Practise your 4 times table.

1 **Write the multiplication fact for each array:**



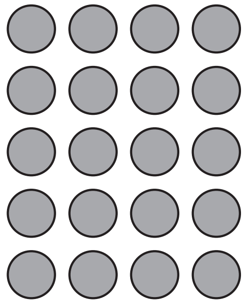
a 3 fours

$\square \times 4 = \square$



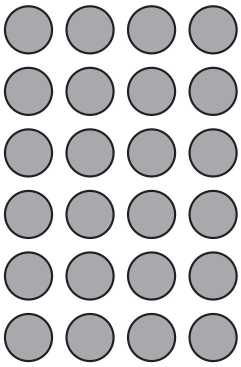
b 4 fours

$\square \times 4 = \square$



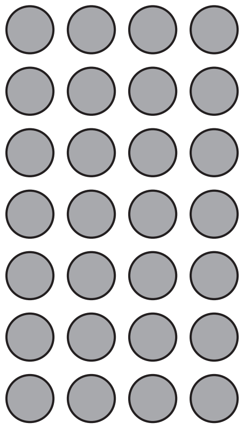
c 5 fours

$\square \times 4 = \square$



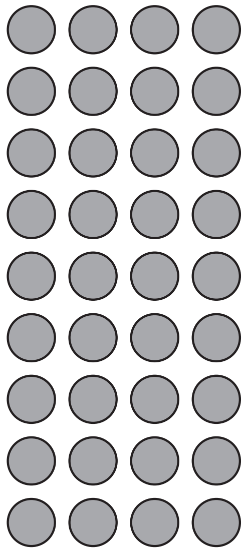
d 6 fours

$\square \times 4 = \square$



e 7 fours

$\square \times 4 = \square$



f 9 fours

$\square \times 4 = \square$

2 **How many cupcakes are there on:**

a 4 plates?

$\square \times 4 = \square$

b 3 plates?

$\square \times 4 = \square$

c 7 plates?

$\square \times 4 = \square$

d 9 plates?

$\square \times 4 = \square$

e 2 plates?

$\square \times 4 = \square$

Multiplication facts – 4 times table

3 **Here is a half of a 100 square:**

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

a Circle the counting pattern of 2s. Cross the counting pattern of 4s.

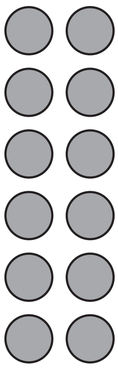
b What do you notice?

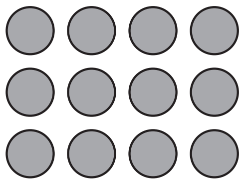
____

____

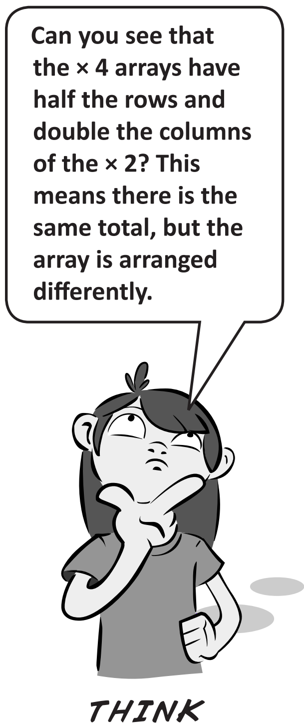
4 **Complete the matching × 2 and × 4 facts:**

a 6 × 2 = 12 and 3 × 4 = 12

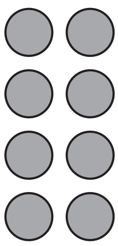


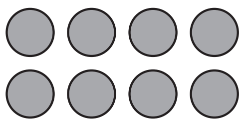


So, ☐ × 2 = ☐ × 4



b ☐ × 2 = ☐ and ☐ × 4 = ☐





So, ☐ × 2 = ☐ × 4

c 8 × 2 = ☐ × 4

d 10 × 2 = ☐ × 4

Multiplication facts – 8 times table

Here is the fact family for the 8 times table.

Compare it with the 4 and 2 times tables. Can you see how they are related?

Multiples of 8 are doubles of equivalent multiples of 4.

$0 \times 8 = 0$

$1 \times 8 = 8$

$2 \times 8 = 16$

$3 \times 8 = 24$

$4 \times 8 = 32$

$5 \times 8 = 40$

$6 \times 8 = 48$

$7 \times 8 = 56$

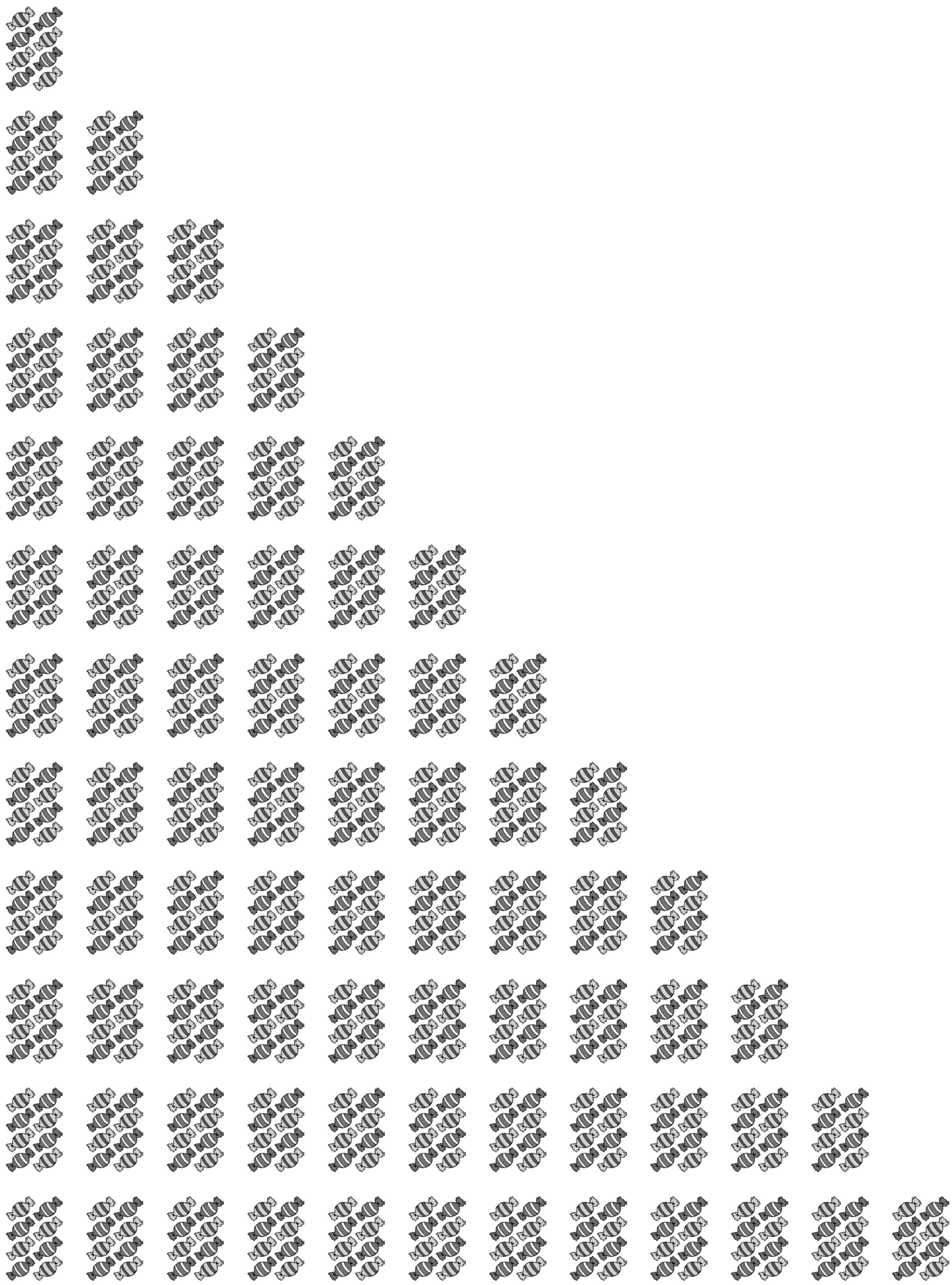
$8 \times 8 = 64$

$9 \times 8 = 72$

$10 \times 8 = 80$

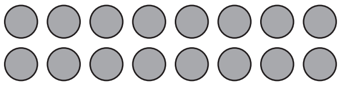
$11 \times 8 = 88$

$12 \times 8 = 96$



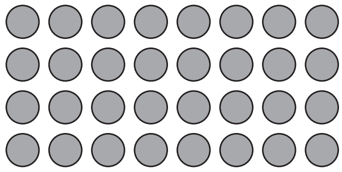
Multiplication facts – 8 times table

1 **Write the multiplication fact for each array.**



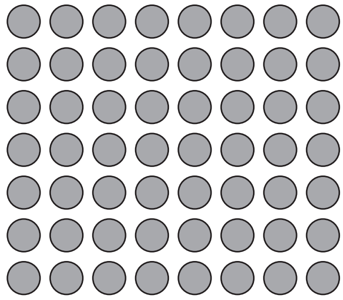
a 2 eights

□ × 8 = □



b 4 eights

□ × 8 = □



c 7 eights

□ × 8 = □

2 **Fill the gaps in the number line so it goes up in 8s.**

0 □ 16 □ □ 40 □ □ □ □ 80

3 **Complete this table by recalling the 8, 4 and 2 times tables.**

	10	3	7	8	1	11	4	0	9	2	12	6	5
× 2													
× 4													
× 8													

4 **Solve these problems:**

a I save £4 each week for 8 weeks.
How much money do I have in total after 8 weeks?

b Fred runs 8 km every day for a week.
How far has he run in total by the end of the week?

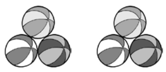
c Choco treats come in packets of 8.
How many packets do I have if I have 64 Choco treats altogether?

Multiplication facts – 3 times table

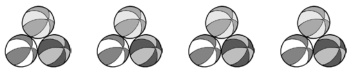
Here is the fact family for the 3 times table.

$0 \times 3 = 0$

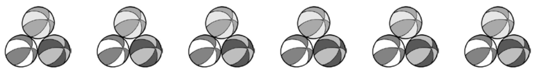
$1 \times 3 = 3$ 

$2 \times 3 = 6$ 

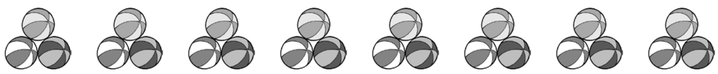
$3 \times 3 = 9$ 

$4 \times 3 = 12$ 

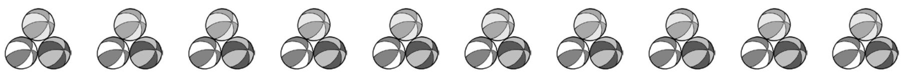
$5 \times 3 = 15$ 

$6 \times 3 = 18$ 

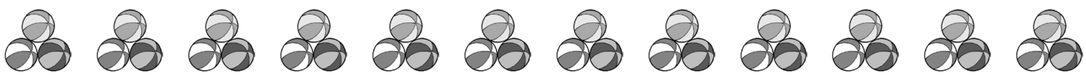
$7 \times 3 = 21$ 

$8 \times 3 = 24$ 

$9 \times 3 = 27$ 

$10 \times 3 = 30$ 

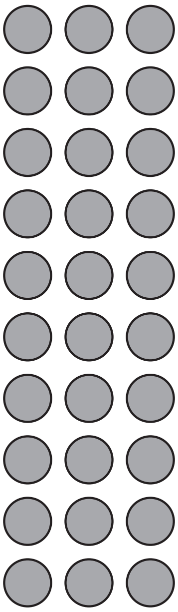
$11 \times 3 = 33$ 

$12 \times 3 = 36$ 

Multiplication facts – 3 times table

Practise your 3 times table.

1 **Use this array to complete the 3 times table:**



1 × 3 = ☐

2 × 3 = ☐

3 × 3 = ☐

4 × 3 = ☐

5 × 3 = ☐

6 × 3 = ☐

7 × 3 = ☐

8 × 3 = ☐

9 × 3 = ☐

10 × 3 = ☐

11 × 3 = ☐

12 × 3 = ☐

2 **Now try them mixed up:**

a 3 × 3 = ☐ **b** 12 × 3 = ☐

c 7 × 3 = ☐ **d** 10 × 3 = ☐

e 2 × 3 = ☐ **f** 4 × 3 = ☐

g 5 × 3 = ☐ **h** 6 × 3 = ☐

i 9 × 3 = ☐ **j** 1 × 3 = ☐

k 8 × 3 = ☐ **l** 11 × 3 = ☐

3 **Alfred is an alien from the Planet Trampolon. The surface of Planet Trampolon is like walking on a trampoline. That's why Alfred and all his race of aliens need 3 legs for extra balance. They also have 3 fingers on each hand and 3 eyes.**

a How many legs for:

6 aliens? 6 × ☐ = ☐

4 aliens? 4 × ☐ = ☐

b How many eyes for:

3 aliens? ☐ × ☐ = ☐

10 aliens? ☐ × ☐ = ☐

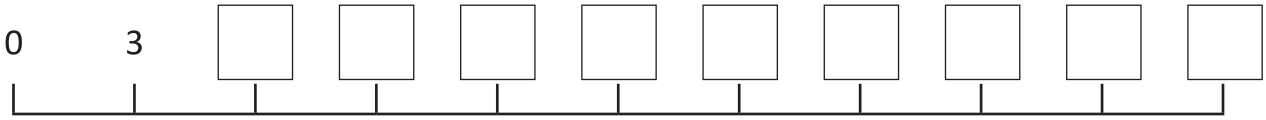
c How many fingers on one hand for:

9 aliens? ☐ × ☐ = ☐

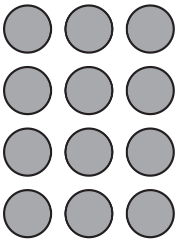
5 aliens? ☐ × ☐ = ☐

Multiplication facts – 3 times table

4 **Label the number line so it goes up in 3s:**

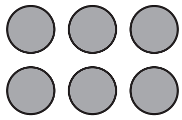


5 **Write two turnaround facts for each array. The first one has been done for you.**



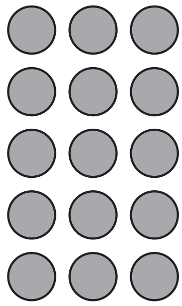
a 4 × 3 = 12

3 × 4 = 12



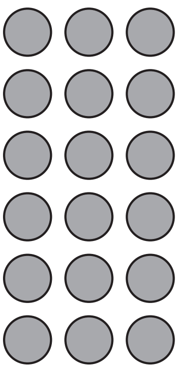
b ☐ × ☐ = ☐

☐ × ☐ = ☐



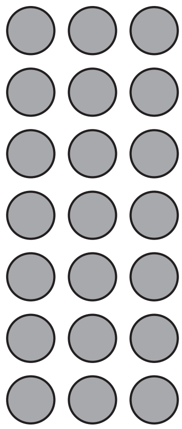
c ☐ × ☐ = ☐

☐ × ☐ = ☐



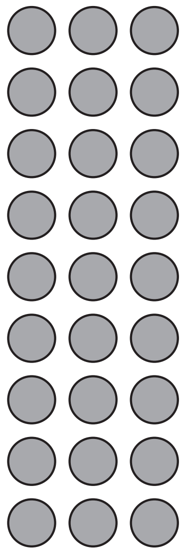
d ☐ × ☐ = ☐

☐ × ☐ = ☐



e ☐ × ☐ = ☐

☐ × ☐ = ☐



f ☐ × ☐ = ☐

☐ × ☐ = ☐

Multiplication facts – multiples

When two numbers are multiplied together, the answer is called a multiple.

For example, the first 3 multiples of 5 are 5, 10, 15.

$1 \times 5 = 5$ $2 \times 5 = 10$ $3 \times 5 = 15$

1 **Complete the list of multiples for each number in the circle:**

a **2**	2	4										
b **4**	4	8										
c **8**	8	16										
d **3**	3	6										

2 **In each group of multiples, cross out the number that does not belong. You will need to look carefully, because they are not in order.**

a Multiples of 5	10	20	35	40	12
b Multiples of 4	16	8	22	24	12
c Multiples of 8	25	16	32	40	8

3 **Use the clues to work out the multiples:**

a This number is a multiple of 3 and 4 and is greater than 10 but less than 20.

b This number is a multiple of 5. It is greater than 15 but less than 25.

c This number is a multiple of both 4 and 8 and is a 2-digit number less than 18.

Mental multiplication strategies – doubling strategy

There are many doubling number facts that make mental calculations easier if you know them by heart.

This includes numbers outside the times tables that we have been working on.

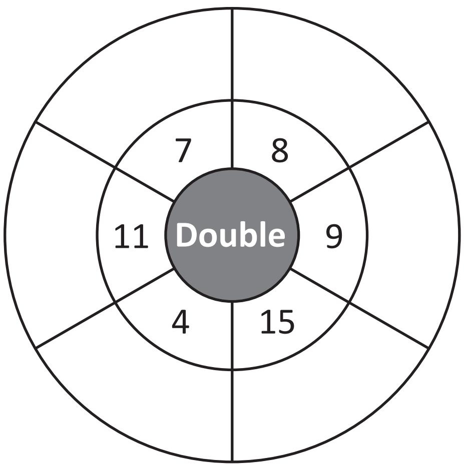
Here are 2 double facts that are handy to know:

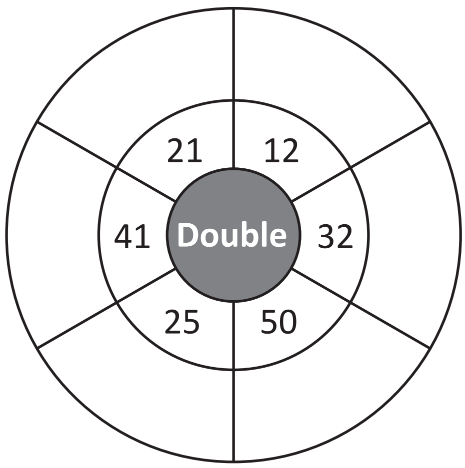
double 20 is 40   double 15 is 30   Can you think of more?

1 **List all the double facts outside of the 2 times table that you know in the space below. Here are two to start you off:**

double 12 is 24   double 50 is 100

2 **Complete these doubling wheels:**





3 **Doubling 2-digit numbers is easy if you split the digits and double each part. Complete this doubling table. The first one has been done for you.**

a Double 36 $= 30 \times 2 + 6 \times 2$ $= 60 + 12$ $= 72$	**b** Double 23
c Double 19	**d** Double 41

Mental multiplication strategies – doubling strategy

4 **The double-double strategy is when you multiply by 4. Look at double-double 2: double 2 once is 4 and double 2 twice is 8.**
Practise using the double-double strategy with these tables. The first one is done for you.

a

7 × 4 =	28
Double 7 once	14
Double 7 twice	28

b

15 × 4 =	
Double 15 once	
Double 15 twice	

c

21 × 4 =	
Double 21 once	
Double 21 twice	

d

12 × 4 =	
Double 12 once	
Double 12 twice	

e

11 × 4 =	
Double 11 once	
Double 11 twice	

f

14 × 4 =	
Double 14 once	
Double 14 twice	

5 **Play this game with a partner. You will need this page each and a die to share. The aim is to be the first to place a tick above all the numbers. Double or double-double the number rolled on the die, then tick the answer in the table.**

For example, Player 1 rolls a 4. They can either double it in order to tick 8 OR double-double it to tick 16. You must apply one of the strategies to the number rolled. If you can't tick a box, you miss a turn!

2	4	6	8	10	12	16	20	24

Mental multiplication strategies – split strategy

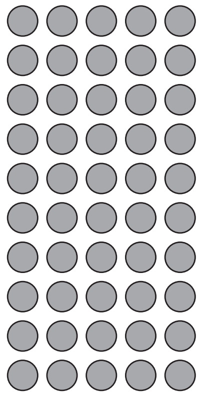
The split strategy is when we multiply numbers in 2 parts.

Let's use the split strategy for 12 × 5.

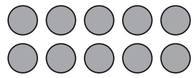
Split 12 into 10 and 2. Next multiply each part by 5, then add:

What is 12 × 5?

10 × 5 = 50



2 × 5 = 10



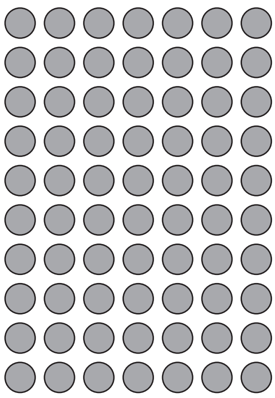
50 + 10 = 60

So, 12 × 5 = 60

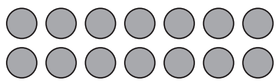
1 **Try the split strategy with these. Use the arrays if you get stuck.**

a What is 12 × 7?

10 × $\square$ = $\square$



2 × $\square$ = $\square$

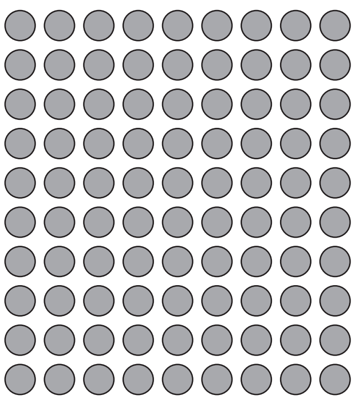


$\square$ + $\square$ = $\square$

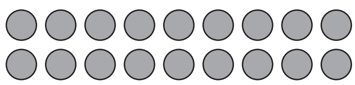
So, 12 × 7 = $\square$

b What is 12 × 9 ?

10 × $\square$ = $\square$



2 × $\square$ = $\square$



$\square$ + $\square$ = $\square$

So, 12 × 9 = $\square$

Mental multiplication strategies – split strategy

2 **Practise the split strategy again, this time without an array to look at.**

a What is 12 × 3?

10 × ☐ = ☐   2 × ☐ = ☐

☐ + ☐ = ☐

So, 12 × 3 = ☐

b What is 12 × 6 ?

10 × ☐ = ☐   2 × ☐ = ☐

☐ + ☐ = ☐

So, 12 × 6 = ☐

c What is 12 × 8 ?

10 × ☐ = ☐   2 × ☐ = ☐

☐ + ☐ = ☐

So, 12 × 8 = ☐

3 **Use the split strategy to multiply by 13.**

13 is ______ + ______

a 13 × 8 = ☐   **b** 13 × 9 = ☐

c 13 × 7 = ☐   **d** 13 × 5 = ☐

Mental multiplication strategies – compensation strategy

Compensation is when you get or give something back. If we need to solve a multiplication that is close to an easier calculation, we can work out the simplier one, and then adjust (by giving back a multiple) to find the answer. This is the compensation strategy.

Look at 3×19. 19 is close to 20, so we can multiply by the next multiple of ten which is 20. Then we build down because we have an extra group of 3.

$$3 \times 19 \longrightarrow 3 \times 20 = 60 - 3$$

$$\text{So, } 3 \times 19 = 57$$

1 **When you are multiplying by a multiple of ten, look for a fact you know then put a zero on the end. These patterns show you how to do this:**

a $3 \times 2 =$ ☐

$3 \times 20 =$ ☐

b $5 \times 3 =$ ☐

$5 \times 30 =$ ☐

c $7 \times 2 =$ ☐

$7 \times 20 =$ ☐

d $4 \times 4 =$ ☐

$4 \times 40 =$ ☐

2 **The steps for the compensation strategy are set out for you here. Practise multiplying by the next multiple of ten and then build down.**

a $5 \times 29 \longrightarrow 5 \times 30 =$ ☐ -5

So, $5 \times 29 =$ ☐

b $3 \times 19 \longrightarrow 3 \times 20 =$ ☐ -3

So, $3 \times 19 =$ ☐

c $2 \times 39 \longrightarrow 2 \times 40 =$ ☐ -2

So, $2 \times 39 =$ ☐

Mental multiplication strategies – compensation strategy

3 **Use the compensation strategy. This time you have to think of the next multiple of ten and what you have to build down by. The first one has been done for you.**

a $3 \times 39 \longrightarrow 3 \times \boxed{40} = \boxed{120} - \boxed{3}$

So, $3 \times 39 = \boxed{117}$

b $4 \times 29 \longrightarrow 4 \times \square = \square - \square$

So, $4 \times 29 = \square$

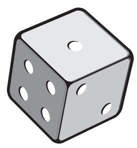
c $6 \times 19 \longrightarrow 6 \times \square = \square - \square$

So, $6 \times 19 = \square$

d $5 \times 59 \longrightarrow 5 \times \square = \square - \square$

So, $5 \times 59 = \square$

4 **Roll a die to make your own multiplication questions. Choose the compensation strategy for one column and the split strategy for the other.**



a $\square \times 29 = \square$

b $\square \times 39 = \square$

c $\square \times 19 = \square$

Which strategy did you use and why?

a $\square \times 13 = \square$

b $\square \times 12 = \square$

c $\square \times 13 = \square$

Which strategy did you use and why?

Mental multiplication strategies – word and missing number problems

1 **Can you find the missing numbers in these multiplications?**

a $5 \times \square = 40$ **b** $4 \times \square = 28$ **c** $\square \times 9 = 18$

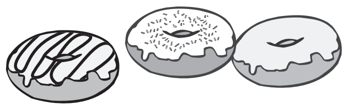
d $\square \times 7 = 40$ **e** $\square \times 11 = 22$ **f** $20 \times \square = 100$

2 **Solve these multiplication problems. Think carefully about which strategy to use.**

a Mike loves cycling. He cycles 3 km to work and back every day.
How far does he cycle in 1 week?

b Ben is collecting badges, but he has only just started.
He has 9 so far. His brother Tom has 8 times that number.
How many does Tom have?

c Tamsin wants to buy doughnuts for her many friends at school. The doughnuts come in packs of 4. If she buys 19 packets she will have exactly the right number.
How many friends does she have?

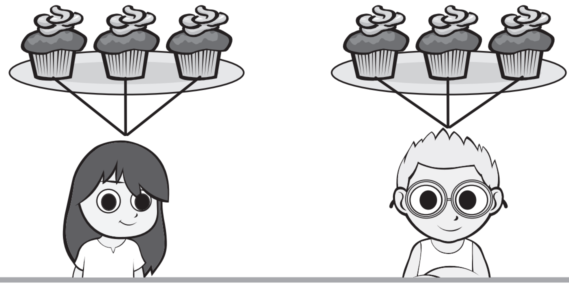


d Sarah, Xavier and Selena are going on a picnic. They call take mini packets of chocolate biscuits. There are 3 biscuits in each packet. Sarah takes 1 packet, Xavier takes double that number, and Selena takes double the number that Xavier takes.
How many biscuits do they have altogether?

Division – sharing

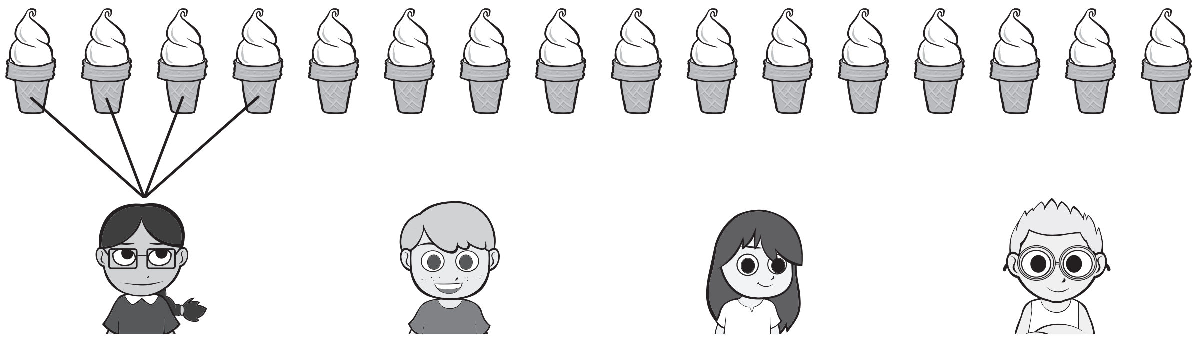
Division is when we share fairly.

If we share these 6 cakes equally between 2 kids, they each get 3 cakes. We call these fair shares because each share is equal.

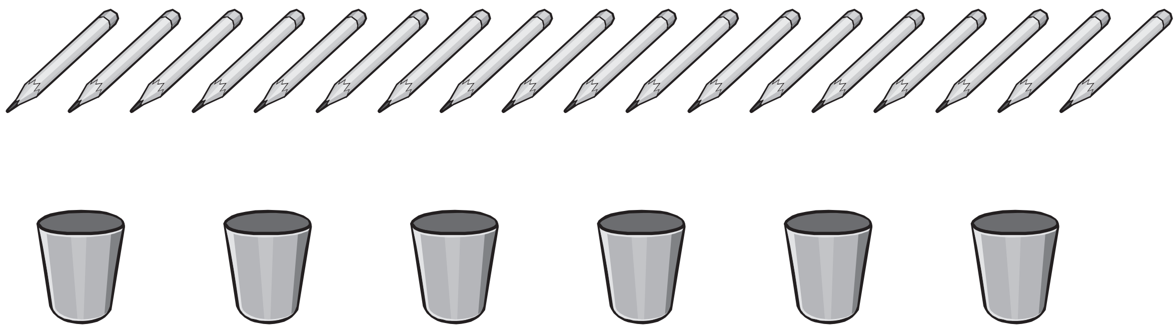


1 **Share the items equally in each picture by drawing lines to connect them. Write how many are in each share.**

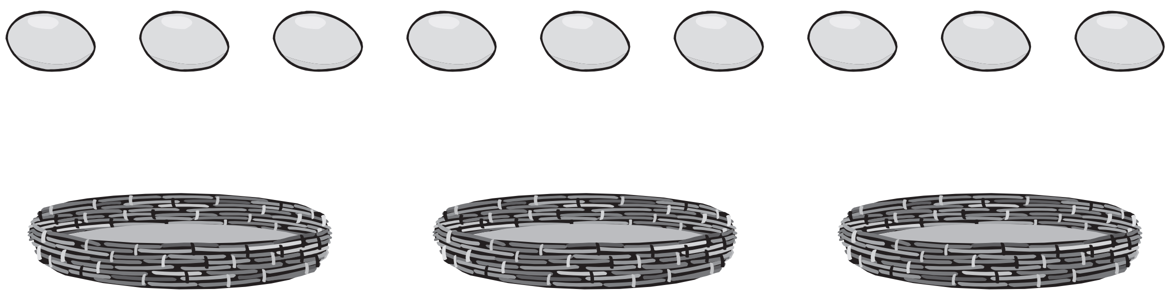
a Share these 16 ice creams between 4 kids. 4 equal shares = ________ each



b Share these 18 pencils between 6 pots. 6 equal shares = ________ each



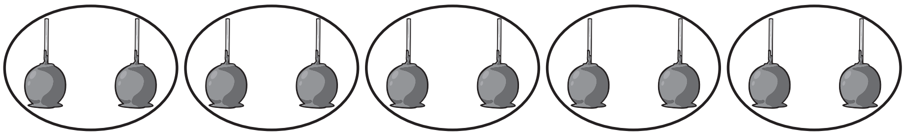
c Share these 9 eggs between 3 baskets. 3 equal shares = ________ each



Division – grouping

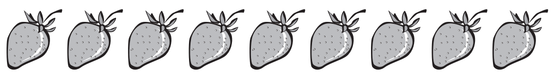
Division is also when we make equal groups.

Here are 10 toffee apples. How many bags do we need if we put 2 in each bag?

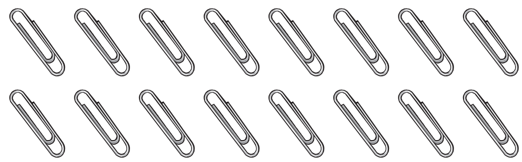


If we circle 2 toffee apples in each group, we can make 5 groups. So, we need 5 bags.

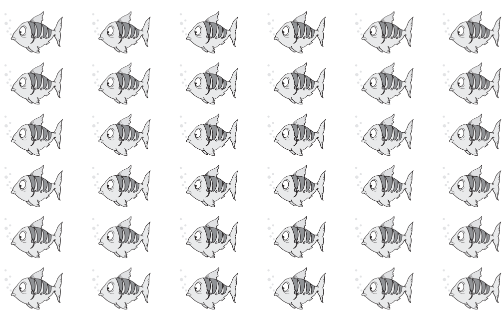
1 Circle equal groups in each picture and write how many are in each share:

a 

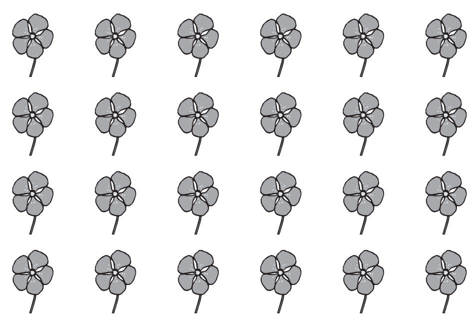
Out of 9 strawberries, how many groups are there if there are 3 in each group?

b 

Out of 16 paper clips, how many groups are there if there are 4 in each group?

c 

Out of 36 fish, how many groups are there if there are 6 in each group?

d 

Out of 24 flowers, how many groups are there if there are 4 in each group?

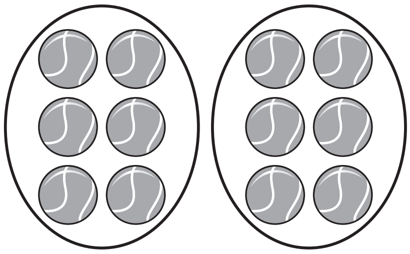
2 Draw a picture to show 7 groups with 5 in each share.

How many in total?

Division – the division symbol

This is the division symbol ÷.

So instead of saying 'Share 12 tennis balls fairly between 2 tennis players. How many balls do they each get?'



We can write: $12 \div 2 = 6$

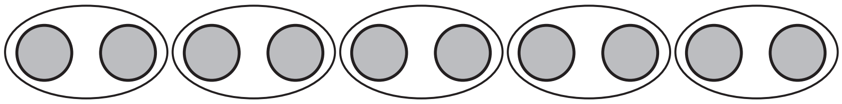
This says 12 divided by 2 is 6.

It means that there are 2 groups of 6.

1 **Write the division facts using the division symbol for each picture:**

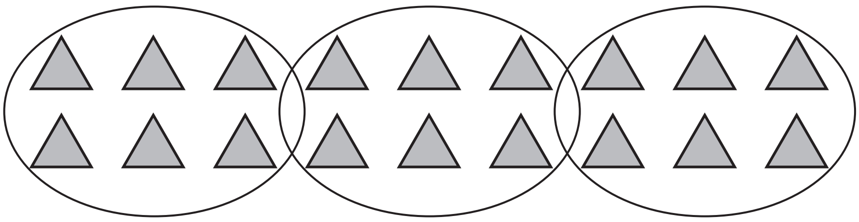
a 10 divided by 5

$\square \div \square = \square$



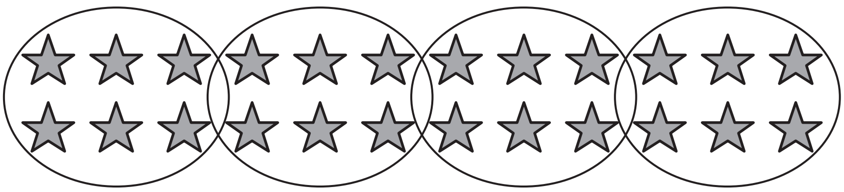
b 18 divided by 3

$\square \div \square = \square$



c 24 divided by 4

$\square \div \square = \square$



2 **Solve each of these division problems:**

a Share 15 lollies between 3 bowls. How many lollies are in each bowl?

$\square \div \square = \square$

b Share 20 oranges between 5 baskets. How many are in each basket?

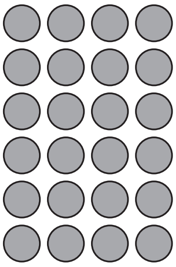
$\square \div \square = \square$

c Out of a pile of 48 coloured pencils, 8 go into each pot. How many pots are needed?

$\square \div \square = \square$

Division – linking multiplication and division facts

Knowing multiplication facts will help with division facts as they are inverse operations.

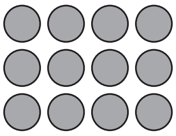


$6 \times 4 = 24$ 6 rows of 4 is 24.

$24 \div 4 = 6$ 24 divided into 4 shares is 6.

1 **Describe each of these arrays using one multiplication and one division fact:**

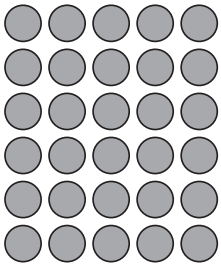
a



$\square \times 4 = 12$

$12 \div 4 = \square$

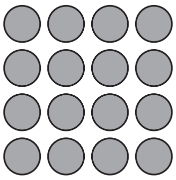
b



$\square \times 5 = 30$

$30 \div 5 = \square$

c

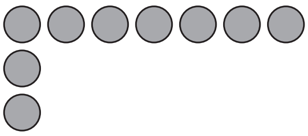


$\square \times 4 = 16$

$16 \div 4 = \square$

2 **This time, you are given part of the array. Complete the array and then write one multiplication and one division fact that matches:**

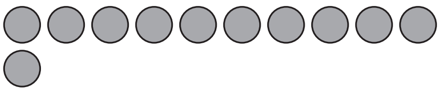
a



$\square \times \square = \square$

$\square \div \square = \square$

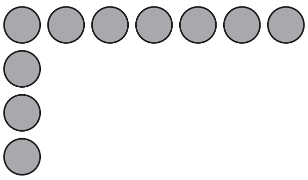
b



$\square \times \square = \square$

$\square \div \square = \square$

c



$\square \times \square = \square$

$\square \div \square = \square$

Division – linking multiplication and division facts

3 **Play this memory game with a partner. The aim of this game is to find pairs of matching multiplication and division facts. Each player needs a copy of this page and to cut out their cards. Players join their cards together, shuffle and lay them face down. Take turns in turning over a pair of cards. If they match the player keeps the pair, if they don't match, they must be placed back in the same position. The winner is the player with the most pairs.**

copy

$16 \div 4$	4×4
$20 \div 4$	4×5
$12 \div 2$	2×6
$21 \div 3$	3×7
$8 \div 4$	2×4
$18 \div 2$	2×9

Division – word and missing number problems

1 **Can you find the missing numbers in these divisions?**

a 16 ÷ ☐ = 4 **b** 18 ÷ ☐ = 6 **c** ☐ ÷ 8 = 3

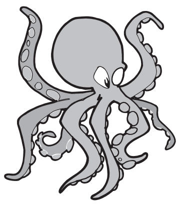
d ☐ ÷ 5 = 7 **e** ☐ ÷ 2 = 9 **f** 20 ÷ ☐ = 5

2 **Solve these division problems.**

a Joe does the same number of push-ups every day to stay fit. After 4 days he has done 36 push-ups.
How many push-ups does he do each day? ☐ ÷ ☐ = ☐

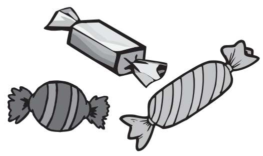
b I have some bikes in my garage. There are 12 wheels altogether.

How many bikes do I have? ☐ ÷ ☐ = ☐

c 

There is a tank of octopuses at the aquarium. In total there are 24 legs in the tank.

How many octopuses are there? ☐ ÷ ☐ = ☐



d Charlie has bought some sweets to share between his 3 friends. He has 27 sweets.
How many sweets does each friend get if they are shared fairly? ☐ ÷ ☐ = ☐

e Jon has 55p in his pocket. All the coins are silver and they all have the same value.
How many coins are there?

☐ ÷ ☐ = ☐

Patterns and functions – counting

Counting is a good skill to have because you can see number patterns more easily which makes you better at maths. You can also count things much faster!

This is a counting pattern of 2 on a hundred square.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

1 **Colour the counting pattern on each hundred square:**

a Show the 5s pattern.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

b Show the 10s pattern.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

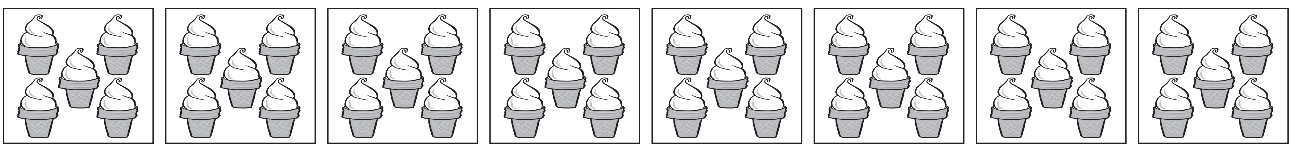
c What do you notice?

____

2 **Complete these counting patterns:**

a	60	65	70			85		95
b	17	22	27		37		47	
c	100	95			80		70	
d	102	92			62			

3 **Count the ice creams. How many are there?** ☐



Patterns and functions – counting

4 **Colour the counting pattern on each hundred square:**

a Show the 3s pattern.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

b Show the 4s pattern.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

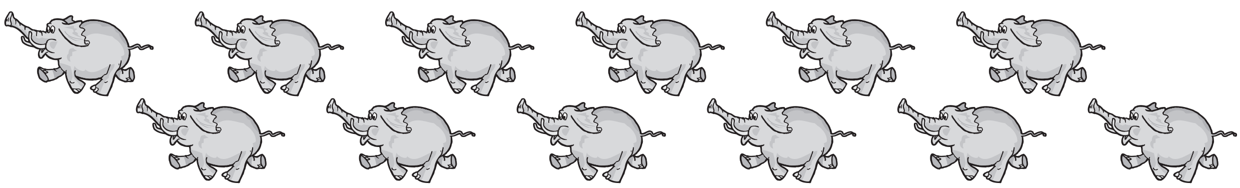
5 **Complete the missing numbers in these counting patterns:**

a	36			27	24			
b	12		20	24			36	40
c	50		46	44			38	
d	27			57		77	87	

6 **How many objects altogether? Count in groups.**

a How many candles? ☐

b How many legs? ☐



Patterns and functions – function machines

This is a function machine.

Numbers go in, have the rule applied, and come out again.

2 IN RULE $\times 4$ OUT 8

1 **What number will come out of these function machines?**

a 5 IN RULE $\times 8$ OUT

b 28 IN RULE $\div 4$ OUT

2 **Write the rule on these function machines:**

a 27 IN RULE OUT 9

b 12 IN RULE OUT 48

3 **What number will go in to these function machines?**

a IN RULE $\times 3$ OUT 24

b IN RULE $\div 8$ OUT 6

4 **Select a number to go in to these function machines. Then calculate a number that will come out.**

a IN RULE $\div 4$ OUT

b IN RULE $\times 8$ OUT

Patterns and functions – number patterns in tables

When we use number patterns in tables it can help us to predict what comes next. Look at the table below. Once we work out how the pattern works, we can predict the total number of feet for any amount of pupils.

This table shows us that when there is 1 child there are 2 feet.

When there are 2 children there are 4 feet and so on.

We can see that the rule for the pattern is to multiply the top row by 2 to get the bottom row each time.

Number of children	1	2	3	4	5	20
Number of feet	2	4	6	8	10	40

× 2

To find out how many feet 20 children would have, we don't need to extend the table, we can just apply the rule.

1 **Try these number pattern tables.**

At a party, one child receives 3 chocolates. Complete the table to show how many chocolates different numbers of students receive. Show how many 20 receive.

Number of children	1	2	3	4	5	20
Number of chocolates	3					

2 **Alfred is a type of alien from the Planet Trampolon. The surface of Planet Trampolon is like walking on a trampoline. That is why Alfred and all his race of aliens need 3 legs – for extra balance. They also have 2 antennae and 4 fingers on each hand.**

Complete the number pattern tables to show the number of different body parts for different amounts of aliens.

a

Number of aliens	1	2	3	4	20
Number of antennae	2				

b

Number of aliens	1	2	3	4	20
Number of fingers on each hand	4				

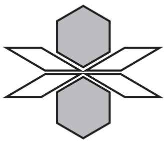
c

Number of aliens	1	2	3	4	20
Number of legs	3				

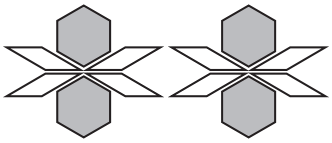
Patterns and functions – growing shape patterns

Let's look at this growing pattern:

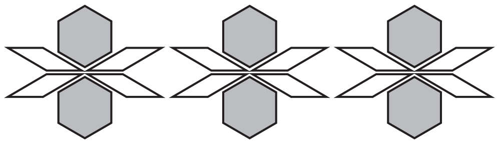
1 butterfly uses 2 hexagons.



2 butterflies use 4 hexagons.



3 butterflies use 6 hexagons.



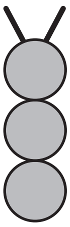
How many hexagons would 10 butterflies use?

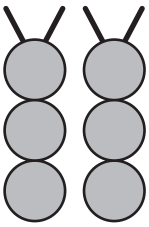
There is a way we can do this without using pattern blocks.

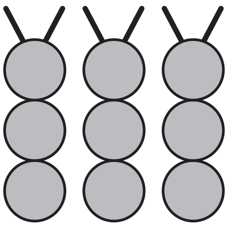
We just look for a pattern. The pattern is that you need to double the amount of hexagons for each butterfly. So for 10 butterflies, you would need 20 hexagons.

1 **Here are some pictures made from shapes.**

a Fill in the blanks for each part of the pattern and draw what comes next:



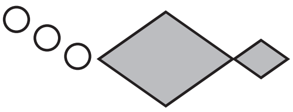


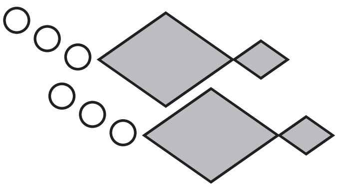


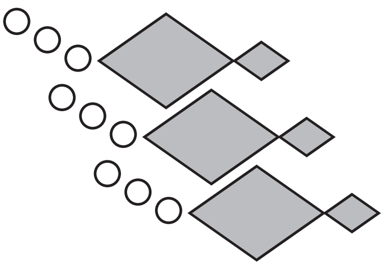
1 ant uses	2 ants use	3 ants use	______ ants use
3 circles.	______ circles.	______ circles.	______ circles.

b How many circles would you use for 10 ants? ___________

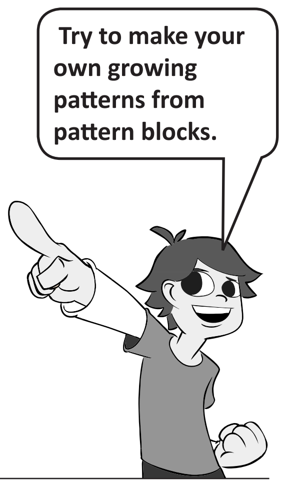
c The first fish is made up of 5 shapes. Fill in the boxes for 2 fish and 3 fish:







1 fish uses	2 fish use	3 fish use
5 shapes.	______ shapes.	______ shapes.

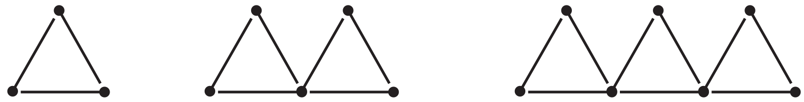


d How many shapes would you use for 10 fish? ____________

Patterns and functions – matchstick patterns

Number patterns in tables can help us with problems like this. Mia is making this sequence of shapes with matchsticks. How can she find out how many she needs for 10 shapes?

Shape 1 **Shape 2** **Shape 3**



Shape number	1	2	3	4	5	10
Number of matchsticks	3	6	9	12	15	30

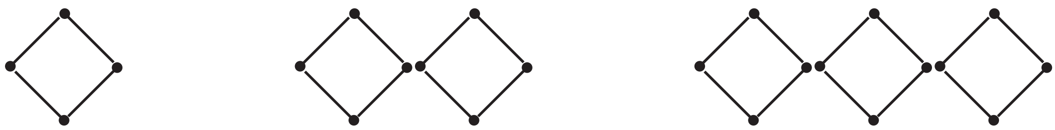
× 3

To find out how many matchsticks are needed for 10 triangles, we don't need to extend the table, we can just apply the function rule:

Number of matchsticks = Shape number × 3

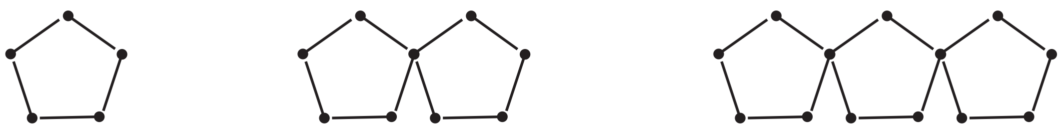
1 **Complete the table for each sequence of matchstick shapes and find the number of matchsticks needed for the 10th shape.**

a Shape 1 Shape 2 Shape 3



Shape number	1	2	3	4	5	**10**
Number of matchsticks	4					

b Shape 1 Shape 2 Shape 3

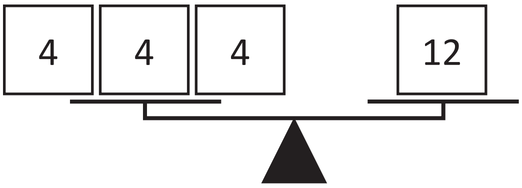


Shape number	1	2	3	4	5	**10**
Number of matchsticks	5					

c Draw the fourth shape in the sequence above:

Equations and equivalence – balanced equations using + and ×

There are 2 different equations we could write for one set of balanced scales.

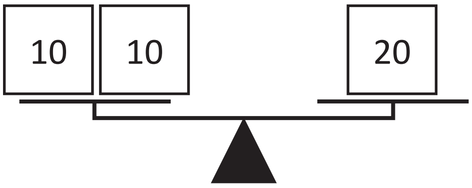


$4 + 4 + 4 = 12$

$3 \times 4 = 12$

1 **Work out the values of the symbols in each problem.**

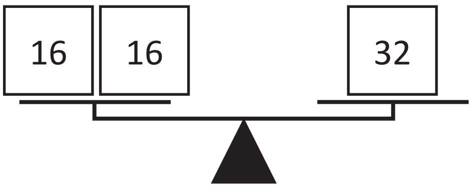
a



$\square + \square = 20$

$2 \times \square = 20$

b

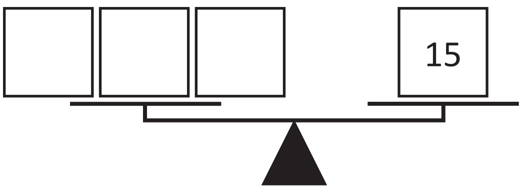


$\square + \square = 32$

$2 \times \square = 32$

2 **This time work out which number should go in the symbol.**

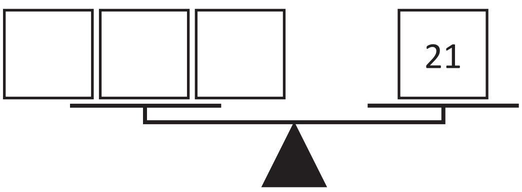
a



$\square + \square + \square = 15$

$\square \times 5 = 15$

b

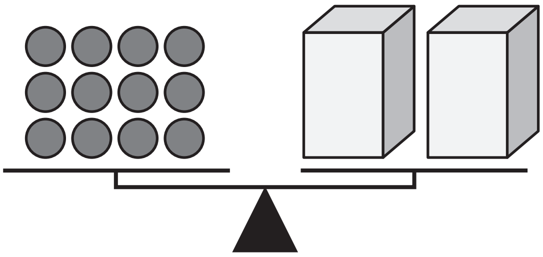


$\square + \square + \square = 21$

$\square \times 7 = 21$

Equations and equivalence – balanced equations using + and ×

How many dots are inside each box? On one side there are 12 dots and on the other side, there are 2 boxes. Because the equation is balanced, there must be 6 in each box.

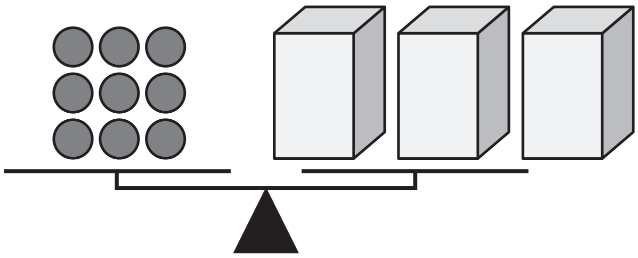


There are 2 different equations we could write for one set of balanced scales.

$\boxed{6} + \boxed{6} = \boxed{12}$

$\boxed{2} \times \boxed{6} = \boxed{12}$

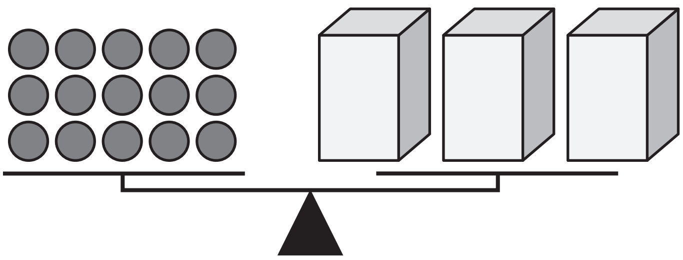
3 **How many dots are inside each box?**



$\boxed{} + \boxed{} + \boxed{} = \boxed{9}$

$\boxed{3} \times \boxed{} = \boxed{9}$

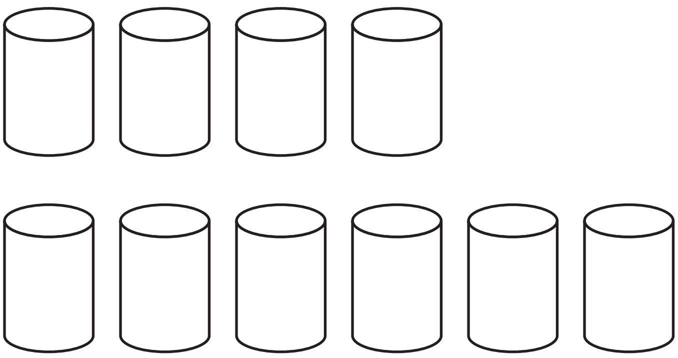
4 **How many dots are inside each box?**



$\boxed{} + \boxed{} + \boxed{} = \boxed{15}$

$\boxed{3} \times \boxed{} = \boxed{15}$

5 **If there are 16 dots in these 4 cylinders, how many dots are there in 6 cylinders? Show your working.**



$\boxed{4} \times \boxed{} = \boxed{16}$

$\boxed{} \times \boxed{} = \boxed{}$

Highest product apply

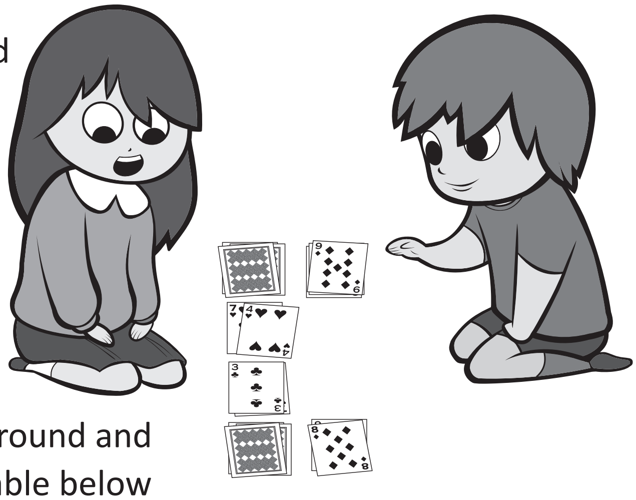
Getting ready

This is a game for two players. You will need a pack of playing cards but just the cards with numbers on them. You will also need a copy of this page so you can use the table to keep score.

copy

What to do

Shuffle the cards well and deal them evenly so you each get 18 cards. Player 1 turns over two cards and finds the product by multiplying these together. Player 2 does the same. The highest answer wins the round and scores a point. Use the table below to keep track of your scores.



Player 1	Player 2

Mystery numbers   solve

What to do

Read the clues to find out the mystery number:

I am a multiple of 8.

I am also a multiple of 4.

I am greater than 10, but less than 20.

☐

I am greater than 5 × 6.

I am less than 33.

I am an odd number.

☐

I am smaller than 4 × 7.

I am bigger than 60 ÷ 3.

The sum of my digits is 3.

☐

I am the number of sides of a triangle times by the number of socks in a pair times by the number of legs of an octopus.

☐

I am bigger than 50 ÷ 10.

I am less than 3 × 4.

I am an odd number divisible by 3.

☐

I am a factor of 48.

I am a multiple of 2, 3, 4, 6, 8, and 12.

☐

Multiplication concentration apply

Getting ready

This is a game for two players. Copy this page and page 46, and then cut out all the cards.

copy

What to do

Shuffle the cards well and lay them out face down in an array in two groups. The rectangles are the questions, the squares are the answers. Players take turns turning over one of each card. If they can make a multiplication fact, the player keeps the pair. Keep playing until there are no cards left. The winner is the player with the most matching pairs.

4 × 8	2 × 9	7 × 5	3 × 3
6 × 4	9 × 3	4 × 4	5 × 8
4 × 5	8 × 8	3 × 5	8 × 9
8 × 10	3 × 4	4 × 7	9 × 5
5 × 5	8 × 6	7 × 2	5 × 10

copy

3 × 7	3 × 10	
4 × 9	3 × 11	8 × 7

= 32	= 18	= 35	= 24	= 27
= 30	= 20	= 21	= 15	= 12
= 80	= 28	= 25	= 48	= 14
= 72	= 56	= 40	= 45	= 33
= 9	= 50	= 16	= 36	= 64

Product bingo

apply

Getting ready

This is a game for four players. Each player needs a copy of this page and 5 counters. The group needs 2 dice. Make extra copies of this page so you can play again.

copy

What to do

Choose one player to be the caller. The other players fill their grid with numbers from this list: 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 15, 16, 18, 20, 24, 25, 30 and 36.

The caller rolls the dice and calls out a times table fact based on the numbers rolled. For example, if they roll a 6 and a 5, they would say 6 × 5. If a player has 30 in their grid, they place a counter on the number. The winner is the first player to get rid of all their counters.

Harry and Tortista   solve

Getting ready

Read the problem below and use your knowledge of number patterns to solve the problem.

What to do

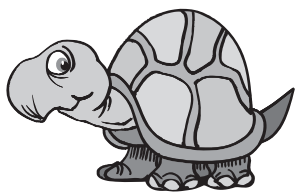
Harry and Tortista constantly argued over who was the faster runner out of the pair. To settle the dispute once and for all, they decided to race each other. Harry was so confident that he could beat Tortista, he gave Tortista a head start of 3 km.

If Harry runs 1 km every 3 minutes and Tortista runs 1 km every 4 minutes, who will win the 12 km race?

Complete the table for Harry and Tortista to find out:

Harry	
km	**mins**
0	0
1	3
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

Tortista	
km	**mins**
3	0
4	4
5	
6	
7	
8	
9	
10	
11	
12	



Rows and columns — apply

Getting ready

This is a game for 2 players. You will need 3 dice, this page and 12 counters each in 2 different colours.

What to do

Player 1 rolls all 3 dice, adds them together and puts this value in the first function rule. *For example, if they roll a 3, 5 and 2, they should add these and get 10. They put 10 into the first rule and get 10 + 5 = 15. Player 1 places one of their counters on 15. Then Player 2 repeats these steps.*

Keep taking turns using a different function rule each time. If the answer is already taken, you lose a turn.

The winner is the first person to get rid of all their counters.

Function Rule 1	Function Rule 2	Function Rule 3
◈ + 5	2 × ⊙	▣ − 2

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	1	2	3	4
5	6	7	8	9	10	11	12	13	14
15	16	17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32	33	34
35	36	1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28

What to do next

Change the object of the game. For example, the winner might be the person who has their counters on the most even numbers.