

Mental multiplication strategies – multiplying by 10 and 100

How do you multiply by other multiples of 10? Let's look at 8×20 .
We can use known times tables facts and write this as place value amounts:

$$8 \times 2 \text{ tens} = 16 \text{ tens So, } 8 \times 20 = 160$$

1 Draw lines from the numbers written as place value amounts to the times tables facts:

10 tens 14 tens 36 tens 27 tens 12 tens 16 tens

3×4 tens 4×4 tens 5×2 tens 7×2 tens 6×6 tens 9×3 tens

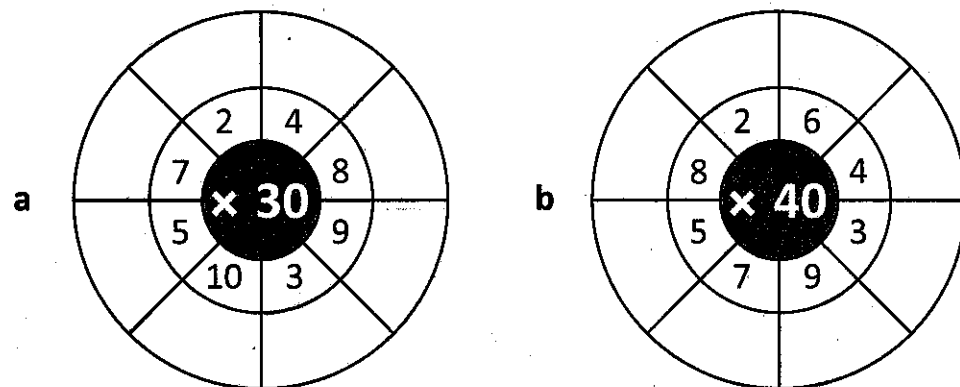
2 Write the digit that represents each place value amount:

- a 10 tens = b 36 tens = c 12 tens =
 d 15 tens = e 22 tens = f 8 tens =
 g 19 tens = h 16 tens = i 18 tens =

3 First complete the hints and then use them to write the facts:

- Hints: Facts:
 a 4×6 tens = tens 4×60 =
 b 9×2 tens = tens 9×20 =
 c 2×7 tens = tens 2×70 =

4 Complete the number wheels:



Mental multiplication strategies – doubling strategy

There are many double facts that you should know.
This includes numbers outside the times tables we have been working on.
Here are 2 double facts that are handy to know:

double 15 is 30 double 50 is 100 Can you think of more?

1 Complete these function machines:

a

Double	
IN	OUT
15	30
24	
30	
45	
18	

b

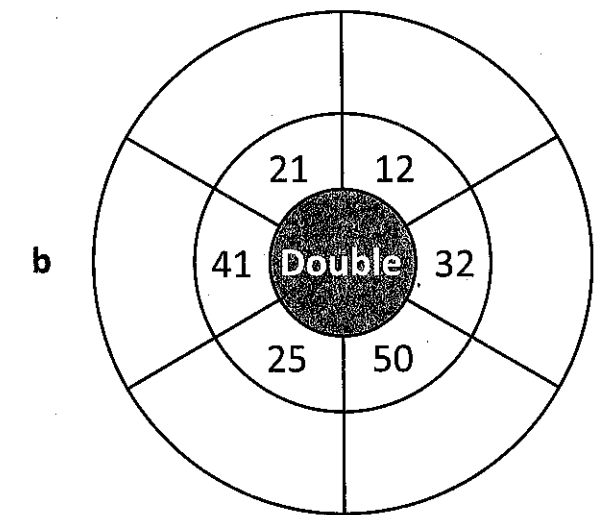
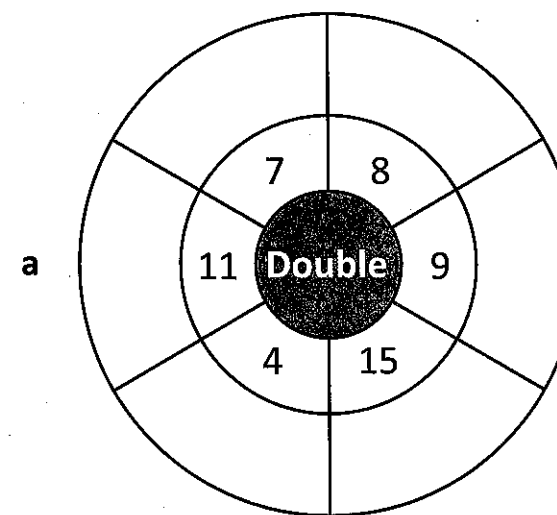
Double-double	
IN	OUT
15	60
24	
30	
45	
50	

Can you see what double-double is the same as? Yes, that's right, it's the same as $\times 4$.



REMEMBER

2 Complete these doubling wheels:



Mental multiplication strategies – doubling strategy

We also use doubling when we multiply by 4 and by 8.

To multiply a number by 4,
double it twice.

$10 \times 4 = 40$	
Double 10 once	20
Double 10 twice	40

To multiply a number by 8,
double it 3 times.

$11 \times 8 = 88$	
Double 11 once	22
Double 11 twice	44
Double 11 three times	88

1 Keep doubling to get the $\times 4$ and $\times 8$ facts. Here are some tables to help you. The first one has been done for you.

a

$12 \times 4 = 48$	
Double 12 once	24
Double 12 twice	48

b

$15 \times 4 = \square$	
Double 15 once	
Double 15 twice	

c

$18 \times 4 = \square$	
Double 18 once	
Double 18 twice	

d

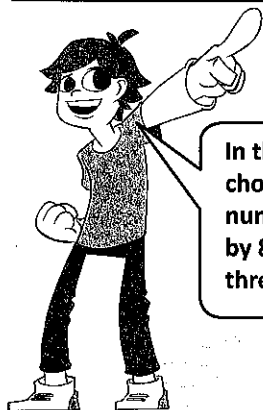
$22 \times 4 = \square$	
Double 22 once	
Double 22 twice	

e

$16 \times 8 = \square$	
Double 16 once	
Double 16 twice	
Double 16 three times	

f

$35 \times 8 = \square$	
Double 35 once	
Double 35 twice	
Double 35 three times	



In this last table choose a 2-digit number to multiply by 8 and double it three times.

g

$\square \times 8 = \square$	
Double \square once	
Double \square twice	
Double \square three times	

Mental multiplication strategies – doubling strategy

Doubling is a useful strategy to use when multiplying.

To multiply a number by four, double it twice.

$$15 \times 4 \text{ double once} = 30$$

$$\text{double twice} = 60$$

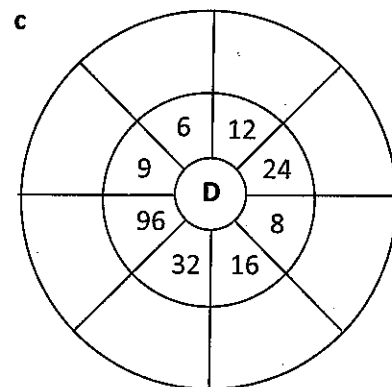
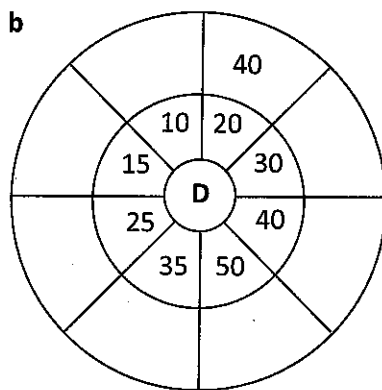
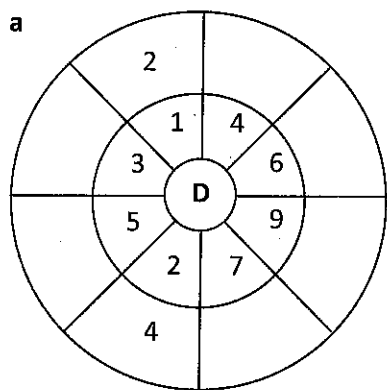
To multiply a number by eight, double it three times.

$$13 \times 8 \text{ double once} = 26$$

$$\text{double twice} = 52$$

$$\text{double three times} = 104$$

1 Warm up with some doubling practice:



2 Finish the doubling patterns:

a	4	<u>8</u>	<u>16</u>	<u> </u>	<u>64</u>	<u> </u>
b	3	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u>96</u>
c	5	<u> </u>	<u> </u>	<u>40</u>	<u> </u>	<u> </u>
d	25	<u>50</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
e	7	<u> </u>	<u>28</u>	<u> </u>	<u> </u>	<u>224</u>
f	75	<u> </u>	<u>300</u>	<u> </u>	<u> </u>	<u> </u>

3 Choose a number and create your own doubling pattern. How high can you go? What patterns can you see within your pattern?

4 Two sets of twins turn 12. They decide to have a joint birthday party with 1 giant cake but they all want their own candles. How many candles will they need?

Mental multiplication strategies – doubling strategy

5 Use the doubling strategy to solve these:

To multiply by 4, double twice. To multiply by 8, double three times.



REMEMBER

	$\times 2$	$\times 4$
a 13×4	<u>26</u>	<u>52</u>
b 16×4	_____	_____
c 24×4	_____	_____
d 25×4	_____	_____
e 32×4	_____	_____
f 21×4	_____	_____
g 35×4	_____	_____

6 Use the doubling strategy to solve these:

	$\times 2$	$\times 4$	$\times 8$
a 12×8	<u>24</u>	_____	<u>96</u>
b 14×8	_____	_____	<u>112</u>
c 25×8	_____	_____	_____
d 21×8	_____	<u>84</u>	_____
e 13×8	_____	_____	_____
f 16×8	<u>32</u>	_____	_____

7 Work out the answers in your head using the appropriate doubling strategy. Use a table like the one above if it helps.

a $18 \times 4 =$

b $16 \times 4 =$

c $26 \times 4 =$

d $24 \times 8 =$

e $15 \times 8 =$

f $22 \times 8 =$

8 Nick's dad offered him two methods of payment for helping with a 5 week landscaping project.

Method 1: \$24 a week for 5 weeks.

Method 2: \$8 for the first week, then double the payment each week.

Which method would earn Nick the most money? Why?