Mental multiplication strategies – doubling strategy

Doubling is a useful strategy to use when multiplying.

To multiply a number by four, double it twice.

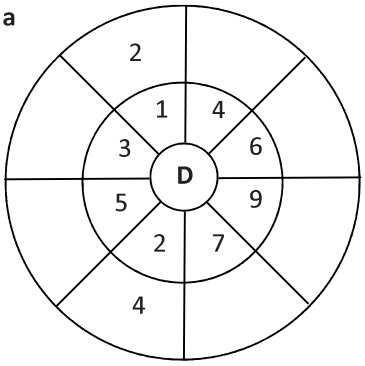
15 × 4 double once = 30
double twice = 60

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

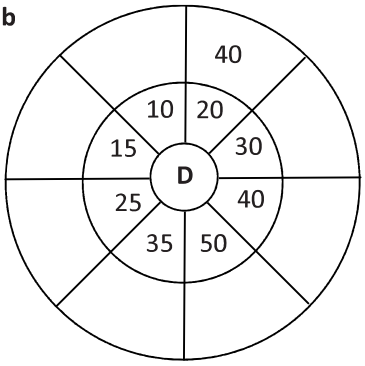
13 × 8 double once = 26
double twice = 52
double three times = 104

1 **Warm up with some doubling practice:**

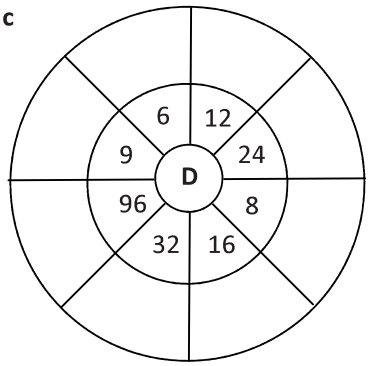
a



b



c



2 **Finish the doubling patterns:**

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

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?**

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5 **Use the doubling strategy to solve these:**

		× 2	× 4
a	13 × 4	26	52
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:**

		× 2	× 4	× 8
a	12 × 8	24		96
b	14 × 8			112
c	25 × 8			
d	21 × 8		84	
e	13 × 8			
f	16 × 8	32		

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 × 4 = ☐ **b** 16 × 4 = ☐ **c** 26 × 4 = ☐

d 24 × 8 = ☐ **e** 15 × 8 = ☐ **f** 22 × 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?

Mental multiplication strategies – multiply by 10s, 100s and 1,000s

When we multiply by 10 we move the number one place value to the left.
When we multiply by 100 we move the number two place values to the left.
When we multiply by 1,000 we move the number three place values to the left.
Look at how this works with the number 45:

Ten Thousands	Thousands	Hundreds	Tens	Ones	
			4	5	
		4	5	0	× 10
	4	5	0	0	× 100
4	5	0	0	0	× 1,000

1 **Multiply the following numbers by 10, 100 and 1,000:**

a

T Th	Th	H	T	O	
			1	7	
					× 10
					× 100
					× 1,000

b

T Th	Th	H	T	O	
			4	3	
					× 10
					× 100
					× 1,000

c

T Th	Th	H	T	O	
			8	5	
					× 10
					× 100
					× 1,000

d

T Th	Th	H	T	O	
			9	9	
					× 10
					× 100
					× 1,000

2 **Try these:**

a 14 × 10 = ☐ **b** 14 × 100 = ☐ **c** 14 × 1,000 = ☐

d 92 × 10 = ☐ **e** 92 × 1,000 = ☐ **f** 92 × 100 = ☐

g 0.1 × 1,000 = ☐ **h** 0.1 × 100 = ☐ **i** 0.1 × 10 = ☐

3 **You will need a partner for this activity. Take turns giving each other × 10, × 100 and × 1,000 problems, such as "What is 678 × 100?" "What is 0.92 × 1,000?" Both independently work out the answer. If you are correct you get 10 points. If you disagree, ask the teacher to adjudicate. The first person to 50 points wins.**

Multiplication facts – multiply by 10s, 100s and 1,000s

It is also handy to know how to multiply multiples of 10 such as 20 or 200 in our heads.

4 × 2 helps us work out 4 × 20: 4 × 2 = 8 4 × 20 = 80

We can express this as 4 × 2 × 10 = 80 How would you work out 4 × 200?

4 **Use patterns to help you solve these:**

a	5 × 2	_____	5 × 20	_____	5 × 200	_____
b	2 × 9	_____	2 × 90	_____	2 × 900	_____
c	6 × £4	_____	6 × £40	_____	6 × £400	_____
d	8 × 0.3	_____	8 × 3	_____	8 × 30	_____
e	3 × £7	_____	3 × £70	_____	3 × £700	_____
f	0.02 × 8	_____	0.2 × 8	_____	2 × 8	_____
g	3 × 9	_____	30 × 9	_____	300 × 9	_____

5 **Answer these problems:**

a Jock runs 7.5 km per week. How far does he run over 10 weeks?

b Huy earns £20 pocket money per week. If he saves half of this, how much will he have saved at the end of 8 weeks?

c The sum of two numbers is 28. When you multiply them together, the answer is 160. What are the numbers?

6 **Finish these counting patterns:**

a	10	20	30	_____	_____	60
b	20	40	_____	80	_____	_____
c	30	60	_____	_____	150	_____
d	40	80	_____	_____	200	240
e	50	100	150	_____	_____	_____
f	100	200	_____	400	_____	_____
g	200	400	_____	_____	_____	1,200