Use factors to simplify calculations

1 Tommy wants to multiply 26 by 6

> I can see from the bar model that I can work this out by multiplying by 2 and then by 3
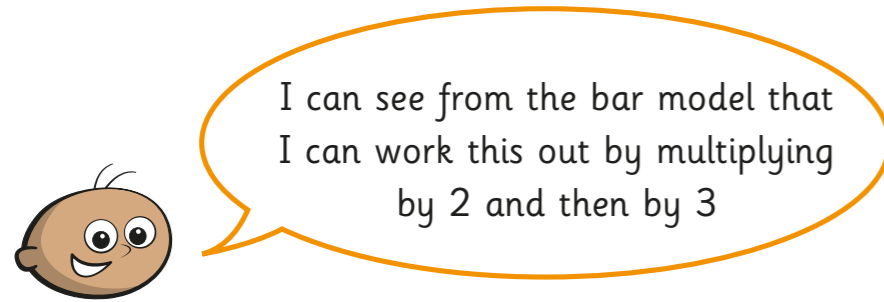
a) Talk to a partner about why the bar model helps Tommy.

26	26	26	26	26	26
52		52		52	
156					

b) Fill in the missing values on the bar model.
Do the calculations mentally.

c) Explain why multiplying by 2 and then by 3 is the same as multiplying by 6

   $2 \times 3 = 6$

d) How else could you work out 26 × 6 mentally?
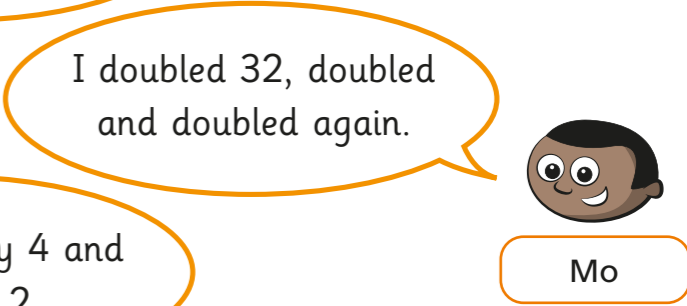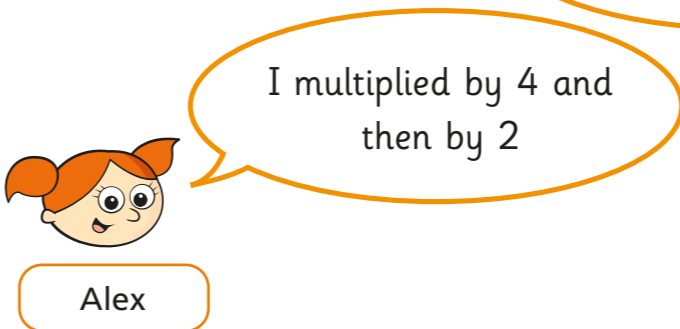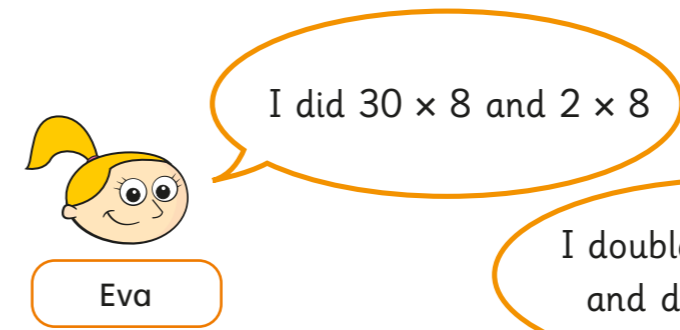
   e.g. $25 \times 6 + 1 \times 6$

2 Eva, Mo and Alex are multiplying 32 by 8

> I did 30 × 8 and 2 × 8

Eva

> I doubled 32, doubled and doubled again.

Mo

> I multiplied by 4 and then by 2

Alex

a) Explain why Mo's method works.
You may draw a diagram to help.

   $32 \times 8 = 32 \times 2 \times 2 \times 2$

b) Work out 32 × 8 using each method.
Which method did you prefer?

   256

3 **a)** Write the factors of 24

   1, 2, 3, 4, 6, 8, 12, 24

b) Use factors to work out 24 × 25 in your head.

   600

c) Write the mental calculations you did to show how you worked this out.

   Various answers

4 Tick the calculation that does **not** give the answer to 32 × 18

16 × 9 × 2 × 2	8 × 8 × 9	9 × 8 × 2 × 2 × 2	30 × 2 × 10 × 8
☐	☐	☐	✓

a) Use one of the correct calculations to work out 32 × 18 mentally.

576

b) Which one did you use and why?

Various answers

5 Here are three methods for working out 24 × 12

Multiply 24 by 6 and then by 2	Multiply 12 by 12 and then by 2	Multiply 12 by 8 and then by 3

Tick the method you prefer. Various answers

Talk to a partner about why you prefer this method.

6 Complete the calculations.

a) 37 × 20 = 37 × 2 × 10 = 740

b) 16 × 40 = 16 × 2 × 2 × 10 = 640

c) 30 × 49 = 49 × 3 × 10 = 1,470

d) 32 × 300 = 32 × 3 × 100 = 9,600

7 Find three different ways to multiply 16 by 50 using factors.

e.g.   16 × 5 × 10

     4 × 25 × 4 × 2

     8 × 2 × 50

8 The bar model helps you divide 264 by 6

264					
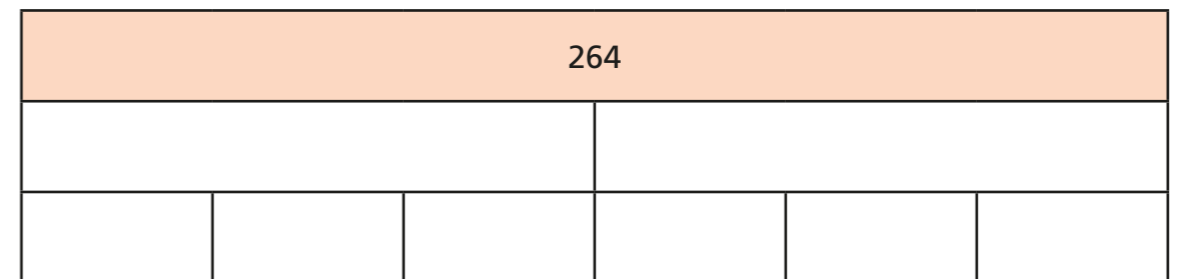
Work out 264 ÷ 6

44

9 Use factors to work out these divisions mentally.
Show each step of your thinking.

a) 124 ÷ 4 = 31   **c)** 276 ÷ 12 = 23

b) 352 ÷ 16 = 22

10 Show that 80 divided by 24 is equal to $3\frac{1}{3}$ using factors.

$80 \div 24 = 80 \div 8 \div 3 = 10 \div 3$

$= \frac{10}{3} = 3\frac{1}{3}$