Multiplying Doubles and Digits

Learning Objective:

To use place value, known and derived facts to multiply mentally, then use a formal, written multiplication method.

Next

$$3 \times 2 = 6$$

$$2 \times 3 = 6$$

$$6 \div 3 = 2$$

$$= \quad =$$

This is a multiplication fact family.

One of the four calculations is missing.

Can you work out what it should show?

$$3 \times 2 = 6$$

$$2 \times 3 = 6$$

$$6 \div 3 = 2$$

$$6 \div 2 = 3$$

Did you work it out?

Why are multiplication fact families helpful?

What do they show?

How can we use them?

$3 \times 2 = 6$

$2 \times 3 = 6$

$6 \div 3 = 2$

$6 \div 2 = 3$

Knowing our times tables, understanding place value, and understanding how to make fact families can all help us mentally solve calculations involving bigger numbers.

Let's write everything we know about this fact family…

I was able to work out $30 \times 20 = 600$ using this fact family, and because I know my 2 times and 3 times tables.

In fact, I could now write a fact family for $30 \times 20 = 600$ without having to do any more calculations!

Copy the fact family below. Around it, write lots of Maths facts and calculations that can be derived from knowing this fact family:

$3 \times 2 = 6$

$2 \times 3 = 6$

$6 \div 3 = 2$

$6 \div 2 = 3$

Knowing your times tables, being able to make fact families, and spotting patterns are all useful skills for estimating and solving more complicated calculations, too.

411 × 6

Can you estimate the answer?

Can you explain how you estimated it?

How did you estimate an answer?

411 × 6

Estimate: 2,400

I noticed that 411 is close to 400.

I know that 4 × 6 = 24, so 400 ×6 = 2,400.

The actual answer will be a bit higher than 2,400.

Think about the multiplication methods you've been developing. **What method will you use to solve this?**

You could have used a mental method, a grid method, long multiplication or short multiplication.

Did you get it right?

How can we check the answer?

Estimate: 2,400

×	400	10	1
6	*2,400*	*60*	*6*

$$
\begin{array}{rr}
 & 411 \\
\times & 6 \\
\hline
 & 6 \\
 & 60 \\
+ & 2400 \\
\hline
 & 2466 \\
\hline
\end{array}
$$

$$
\begin{array}{rr}
 & 411 \\
\times & 6 \\
\hline
 & 2466 \\
\hline
\end{array}
$$

We could use an inverse calculation to check our answer!

Making a fact family shows you the different inverse calculations you could choose from to check your answer.

Estimate: 2,400

$$411 \times 6 = 2{,}466$$
$$6 \times 411 = 2{,}466$$
$$2{,}466 \div 411 = 6$$
$$2{,}466 \div 6 = 411$$

$$\begin{array}{r} 411 \\ \times \quad 6 \\ \hline 2{,}466 \end{array}$$

Once you've made a fact family, choose the easiest inverse calculation to solve.

Most people would probably find 2,466 ÷ 6 easier than 2,466 ÷ 411!

Let's look at a division method for calculating 2,466 ÷ 6. I wonder if our fact family is correct?

Divisor

Dividend

6	2	4	6	6	
-	2	4	0	0	*(6 × 400)*
			6	6	*+*
-			6	0	*(6 × 10)*
				6	*+*
-				6	*(6 × 1)*
					411

This is an ‘ad hoc’, ‘chunking’ or repeated subtraction method of division. Each time, subtract a multiple of the divisor that is smaller than the dividend. Multiples of TENS or HUNDREDS are usually easy to calculate mentally.

Keep going until you can’t subtract any more multiples of the divisor.

Finally, add all the multiples together.

2,466 ÷ 6 = 411.

Our estimate was good, and our answer for 411 × 6 was correct!

Estimate: 2,400

$$\begin{array}{r} 411 \\ \times \quad 6 \\ \hline 2{,}466 \end{array}$$

411 × 6 = 2,466
6 × 411 = 2,466
2,466 ÷ 411 = 6
2,466 ÷ 6 = 411

Estimate,
then calculate:

338 × 5

Make a
fact family:

Choose an inverse
calculation to solve.

Solve the inverse:

338 × 5

Estimate,
then calculate:

Estimate:
1,500 to 2,000

$$\begin{array}{r} 338 \\ \times \quad 5 \\ \hline 1,690 \\ \hline {\scriptstyle 1\quad 4} \end{array}$$

Make a
fact family:

338 × 5 = 1,690
5 × 338 = 1,690
1,690 ÷ 338 = 5
1,690 ÷ 5 = 338

Choose an inverse
calculation to solve.

Solve the inverse:

5	1	6	9	0	
-	1	5	0	0	*(5 × 300)*
		1	9	0	*+*
-		1	5	0	*(5 × 30)*
			4	0	*+*
-			4	0	*(5 × 8)*
					338

Did you get it
right? Let's try one
more…

Estimate,
then calculate:

394 × 7

Make a
fact family:

Choose an inverse
calculation to solve.

Solve the inverse:

394 × 7

Estimate,
then calculate:

Estimate:
2,800

$$\begin{array}{r} 394 \\ \times \quad 7 \\ \hline 2{,}758 \\ \hline {\scriptstyle 6 \quad 2} \end{array}$$

Make a
fact family:

394 × 7 = 2,758
7 × 394 = 2,758
2,758 ÷ 394 = 7
2,758 ÷ 7 = 394

Choose an inverse
calculation to solve.

Solve the inverse:

7	2	7	5	8	
-	2	1	0	0	*(7 × 300)*
		6	5	8	*+*
-		6	3	0	*(7 × 90)*
			2	8	*+*
-			2	8	*(7 × 4)*
					394

Did you get it
right? Well done,
everyone!

PLENARY

Can you find the missing numbers in this calculation?

Work with a partner.

$$\begin{array}{r} \bigcirc 19 \\ \times \quad 8 \\ \hline 3,35\bigcirc \\ \hline {\scriptstyle 1\quad 7} \end{array}$$

PLENARY

Did you work it out?

How did you find the missing numbers?

$$
\begin{array}{r}
4\ 1\ 9 \\
\times \quad 8 \\
\hline
3,3\ 5\ 2 \\
\hline
1\quad 7\quad
\end{array}
$$