SUM IT UP

Dear parent or guardian: This is a summary of the key ideas your child is learning in mathematics. You can use this summary as background as you support your child's work.
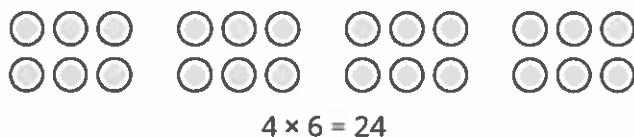
(2) Relating Multiplication Facts
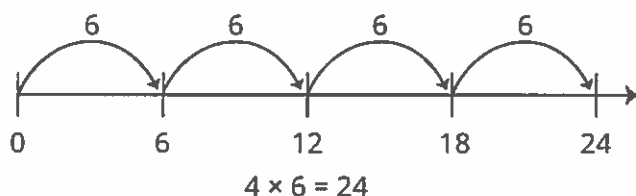
Modelling to Figure Out a Multiplication Fact

One way to figure out the <u>product</u> of a <u>multiplication fact</u> is to model it. You can use counters or draw a number line.

For example, to solve 4 × 6, you can make 4 groups of 6 and count the total.

4 × 6 = 24

Or, you could make 4 jumps of 6 on a number line.

4 × 6 = 24

Using a Multiplication Fact You Know to Figure Out One You Don't Know

You can also use multiplication facts you know to figure out ones you don't.
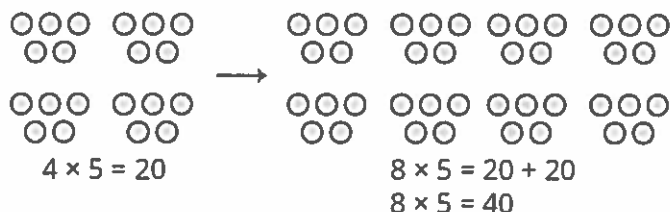
For example:

• You can figure out 8 × 5 using the fact 4 × 5 = 20.

4 × 5 = 20 means 4 groups of 5 is 20.
8 × 5 means 8 groups of 5 (twice as many), so
8 × 5 = 20 + 20 = 40.

This model shows why this works.

4 × 5 = 20 → 8 × 5 = 20 + 20
8 × 5 = 40

Using a Multiplication Fact You Know to Figure Out One You Don't Know (continued)

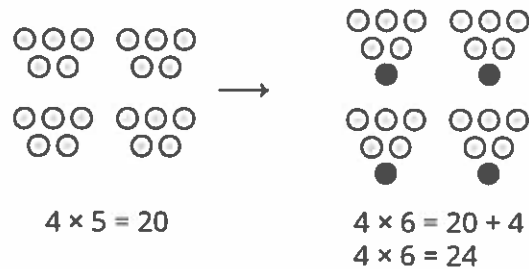So, you can use $4 \times 5 = 20$ to figure out that $8 \times 5 = 40$.

• You can also figure out 4×6 using the fact $4 \times 5 = 20$.

$4 \times 5 = 20$ means 4 groups of 5 is 20.
4×6 means there is 1 extra in each of the 4 groups, so
$4 \times 6 = 20 + 4 = 24$.

This model shows why this works.

$4 \times 5 = 20$ $4 \times 6 = 20 + 4$
                          $4 \times 6 = 24$

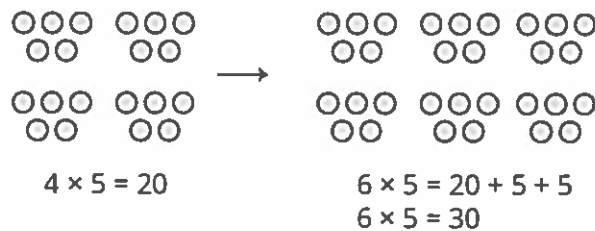So, you can use $4 \times 5 = 20$ to figure out that $4 \times 6 = 24$.

• You can also figure out 6×5 using the fact $4 \times 5 = 20$.

$4 \times 5 = 20$ means 4 groups of 5 is 20.
6×5 means there are 2 extra groups of 5, so
$6 \times 5 = 20 + 5 + 5 = 30$.

This model shows why this works.

$4 \times 5 = 20$ $6 \times 5 = 20 + 5 + 5$
                          $6 \times 5 = 30$

So, you can use $4 \times 5 = 20$ to figure out that $6 \times 5 = 30$.

Using a Multiplication Fact You Know to Figure Out One You Don't Know (continued)
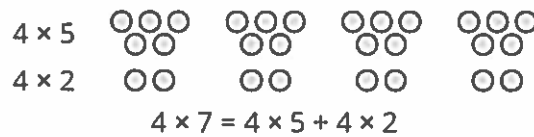
• Here's a fact you can figure out using $4 \times 5 = 20$ and $4 \times 2 = 8$.

$4 \times 5 = 20$ means 4 groups of 5 is 20 and $4 \times 2 = 8$ means 4 groups of 2 is 8.
4×7 means 4 groups of $5 + 4$ groups of 2, so
$$4 \times 7 = 4 \times 5 + 4 \times 2$$
$$= 20 + 8$$
$$= 28$$

This model shows why this works.

$$4 \times 7 = 4 \times 5 + 4 \times 2$$

So, you can use $4 \times 5 = 20$ and $4 \times 2 = 8$ to figure out that $4 \times 7 = 28$.

The 9 × Facts

Since 9 is 1 less than 10 and multiplying by 10 is easy, multiplying by 9 can be easy too.
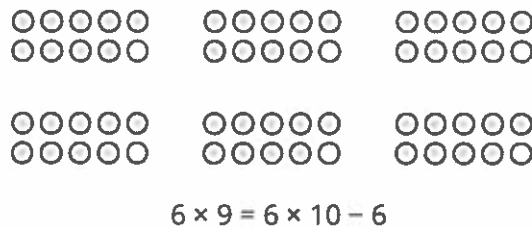
For example:

6×10 means 6 groups of 10.
6×9 means 1 less in each of the 6 groups, so
$6 \times 9 = 6 \times 10 - 6 = 54$.

This model shows why this works.

$$6 \times 9 = 6 \times 10 - 6$$

So, to multiply a number by 9, multiply it by 10, then subtract the number.

The 8 × Facts

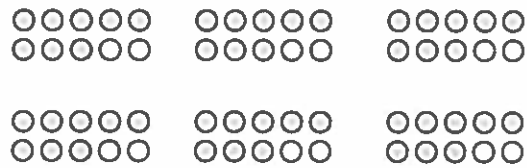Since 8 is 2 less than 10 and multiplying by 10 is easy, multiplying by 8 can be easy too.

For example:

6×10 means 6 groups of 10.
6×8 means 2 less in each of the 6 groups, so
$6 \times 8 = 6 \times 10 - 6 \times 2 = 48$.

This model shows why this works.

$$6 \times 8 = 6 \times 10 - 6 \times 2$$

So, to multiply a number by 8, multiply it by 10 and then subtract twice the number.

Notes

• Students can switch the order of the <u>factors</u> (e.g., change 6×7 to 7×6), if it makes it easier for them to visualize a model. For example, it might be easier to visualize 7 groups of 6 (7×6) instead of 6 groups of 7 (6×7) in order to think of 8×6 as having 1 more group of 6.

• Students should not be expected to practise and use every strategy available to them. The key is to expose them to and allow them to invent and try a variety of strategies. They can then choose strategies that resonate with them, depending on the numbers involved.

• Although students will eventually be expected to recall their multiplication facts quickly, it is essential at this stage that they continue to think about what each calculation means. Early work that focuses on understanding multiplication and relating multiplication facts will help students later on when working with greater numbers.

Notes (continued)

For example, if students know they can multiply a small number in parts (e.g., 4 × 6 = 2 × 6 + 2 × 6 = 12 + 12), then they will know to apply this strategy to greater numbers (e.g., 8 × 250 = 4 × 250 + 4 × 250 = 1000 + 1000).

Definitions

factor: one of the numbers you multiply in a multiplication sentence; for example, in 2 × 5 = 10, 2 and 5 are factors

multiplication fact: a multiplication sentence that has one-digit factors; for example, 7 × 8 = 56

product: the result of multiplying; for example, in 2 × 5 = 10, 10 is the product