Multiplication Problems

Learning Objective:

To use the expanded short multiplication method.

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Can you figure out which numbers are being blocked by the starfish?

10 x ⭐ = 20

20 x 2 = ⭐

⭐ x 2 = 60

⭐ x 4 = 40

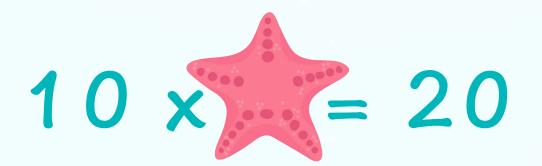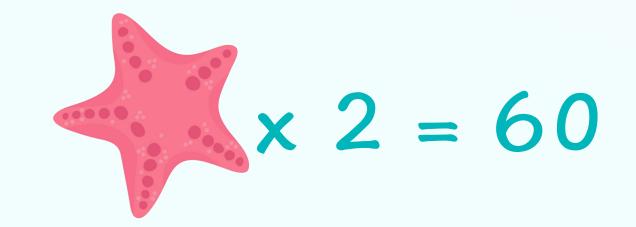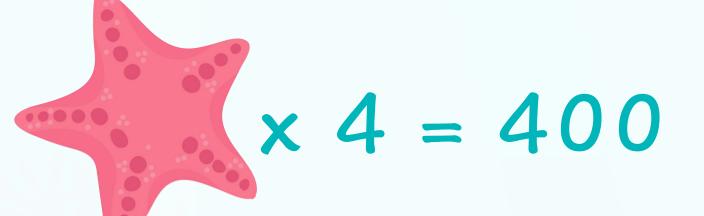⭐ x 4 = 400

200 x 4 = ⭐

10 x 3 = ⭐

⭐ x 3 = 60

⭐ x 3 = 90

Can you figure out which numbers are being blocked by the starfish?

$10 \times 2 = 20$

$20 \times 2 = 40$

$30 \times 2 = 60$

$10 \times 4 = 40$

$100 \times 4 = 400$

$200 \times 4 = 800$

$10 \times 3 = 30$

$20 \times 3 = 60$

$30 \times 3 = 90$

Good effort!

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What method could you use to solve this multiplication problem? Be ready to explain your method.

34 x 5 =

It can be a written method or a mental method.

ones

partition

34 x 5 =

multiply

add

grid method

tens

Try to explain your method using some of the words in the bubbles.

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Which numbers go in these boxes?

$34 \times 5 =$

A little penguin told me that you guys know the grid method for multiplication.

x		
5		

Tell your partner the steps for working this out using the grid method.

'First you need to...'

34 x 5 =

x	30	4
5		

First you need to partition the two-digit number into 30 and 4. These go into the boxes at the top.

$$34 \times 5 =$$

x	30	4
5		

Next, you use the grid like a multiplication square.
What is 30 multiplied by 5?
What are 5 lots of 4?

$34 \times 5 =$

x	30	4
5	150	20

We're not at our answer yet! Lastly, we have to find the total of the answers by adding them together.

$$34 \times 5 = 170$$

x	30	4
5	150	20

```
  1 5 0
+   2 0
───────
  1 7 0
```

Fantastic! Well remembered guys!

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$34 \times 5 = 170$

x	30	4
5	150	20

$$\begin{array}{r} 1\ 5\ 0 \\ +\quad 2\ 0 \\ \hline 1\ 7\ 0 \end{array}$$

Today we are learning a new method for multiplication called expanded short multiplication.

As we learn the steps for the new method, think about how it is similar or different to the grid method.

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$34 \times 5 = 170$

x	30	4
5	150	20

$$\begin{array}{r} 1\ 5\ 0 \\ +\ \ \ 2\ 0 \\ \hline 1\ 7\ 0 \end{array}$$

First we need to set up our calculations in the place value columns like this.

$$\begin{array}{ccc} H & T & O \\ & 3 & 4 \\ \times & & 5 \\ \hline \end{array}$$

Is this similar or different to the grid method?

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$34 \times 5 = 170$

x	30	4
5	150	20

$$\begin{array}{r} 1\ 5\ 0 \\ +\quad 2\ 0 \\ \hline 1\ 7\ 0 \end{array}$$

Our first calculation is to multiply the number in the ones by our single digit.

H T O

3 4

x 5

(4 x 5)

Write the calculation here to remind you.

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$34 \times 5 = 170$

x	30	4
5	150	20

$$
\begin{array}{r}
1\ 5\ 0 \\
+\quad 2\ 0 \\
\hline
1\ 7\ 0
\end{array}
$$

We write the answer in the first row.
Next we multiply the tens number.

Why is it 30 x 5 not 3 x 5?

$$
\begin{array}{ccc}
H & T & O \\
 & 3 & 4 \\
\times & & 5 \\
\hline
 & 2 & 0 \quad (4 \times 5) \\
\end{array}
$$

(30 x 5)

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$34 \times 5 = 170$

x	30	4
5	150	20

$$\begin{array}{r} 1\ 5\ 0 \\ +\quad 2\ 0 \\ \hline 1\ 7\ 0 \end{array}$$

We write this answer in the second row. Now we have all our answers, we can find the total.

Remember to start adding from the ones column.

H T O

$$\begin{array}{r} 3\ 4 \\ \times\quad 5 \\ \hline 2\ 0 \quad (4 \times 5) \\ +\ 1\ 5\ 0 \quad (30 \times 5) \\ \hline \end{array}$$

$34 \times 5 = 170$

x	30	4
5	150	20

$$\begin{array}{r} 1\ 5\ 0 \\ +\quad 2\ 0 \\ \hline 1\ 7\ 0 \end{array}$$

There you go! The expanded short multiplication method.
Tell your partner all the similarities and differences between this method and the grid method.

$$\begin{array}{r} H\ T\ O \\ 3\ 4 \\ \times\quad\ 5 \\ \hline 2\ 0 \quad (4 \times 5) \\ +\ 1\ 5\ 0 \quad (30 \times 5) \\ \hline 1\ 7\ 0 \end{array}$$

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Solve this calculation using the expanded method, following the steps on the slides.

36 x 3 =

```
H  T  O

   3  6
x     3
_____

      ?
```

Set up your calculation in columns. What is your first calculation going to be?

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36 x 3 =

```
H  T  O
   3  6
x     3
_____
   1  8   (6 x 3)
```

Did you remember? Now what is the next step? Which numbers have we not multiplied yet?

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$36 \times 3 =$

What is the next step?

It is very similar to the last step in grid method.

Did you remember it is 30×3 not 3×3?

H T O

3 6

$\times$ 3

1 8 (6×3)

9 0 (30×3)

$36 \times 3 = 108$

You need to find the total of the answers by adding them together.

Are you ready to try on your own?

```
  H  T  O
     3  6
  ×     3
  _____
     1  8   (6 x 3)
  +  9  0   (30 x 3)
  _____
  1₁ 0  8
```

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Next

Try one of these calculations using the expanded method.
If you're feeling less confident, work with a partner.

Tricky
15 x 5 =

Trickier
26 x 4 =

Trickiest
67 x 4 =

How did you find those? Ready for one more?

Tricky
15 x 5 =

```
T  O
1  5
x  5
-------
2  5   (5 x 5)
+ 5  0  (10 x 5)
-------
7  5
```

Trickier
26 x 4 =

```
H  T  O
   2  6
x     4
-------
   2  4   (6 x 4)
+  8  0   (20 x 4)
-------
1, 0  4
```

Trickiest
67 x 4 =

```
H  T  O
   6  7
x     4
-------
   2  8   (7 x 4)
+ 2  4  0  (60 x 4)
-------
2  6  8
```

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Try one of these calculations using the expanded method. If you're feeling less confident, work with a partner.

Tricky

14 x 3 =

Trickier

53 x 3 =
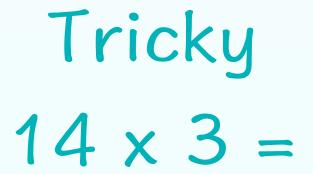
Trickiest

46 x 8 =

I think you're ready to try these on your own!

Tricky	Trickier	Trickiest
$14 \times 3 =$	$53 \times 3 =$	$46 \times 8 =$

Tricky

```
  T O
  1 4
x   3
-------
  1 2   (4 x 3)
+ 3 0   (10 x 3)
-------
  4 2
```

Trickier

```
H T O
  5 3
x   3
-------
    9   (3 x 3)
+ 1 5 0 (50 x 3)
-------
  1 5 9
```

Trickiest

```
H T O
  4 6
x   8
-------
  4 8   (6 x 8)
+ 3 2 0 (40 x 8)
-------
  3 6 8
```

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Can you spot the mistake in my expanded short multiplication?

```
H  T  O

   4  4

x     3
_____
   1  6   (4 x 4)

+ 1  2  0  (40 x 3)
_____
  1  3  6
```

Which method do you prefer, grid method or expanded short multiplication? Why?

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