Multiplication & Division

Master The Curriculum

5

Fluency & Reasoning Teaching Slides

Multiply Four Digits by One Digit

5

Fluency & Reasoning Teaching Slides

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Activity 1

Multiply Four Digits by One Digit

Complete the calculation.

TH	H	T	O
1000 1000		10	1 1 1 1
1000 1000		10	1 1 1 1
1000 1000		10	1 1 1 1

	TH	H	T	O
	2	0	1	4
x				3

?

Why is it important to set out multiplication using columns?

Activity 1 Multiply Four Digits by One Digit

Complete the calculation.

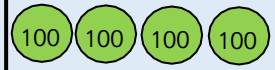
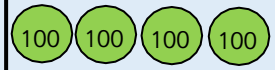
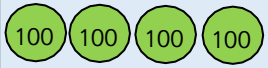
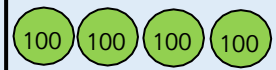
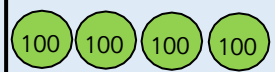
TH	H	T	O
1000 1000		10	1 1 1 1
1000 1000		10	1 1 1 1
1000 1000		10	1 1 1 1

	TH	H	T	O
	2	0	1	4
x				3
	6	0	4	2

1

Activity 1 Multiply Four Digits by One Digit

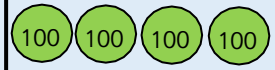
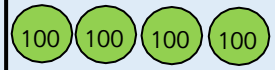
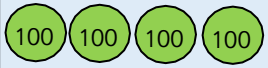
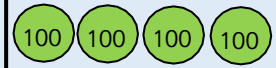
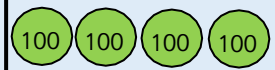
Complete the calculation.

TH	H	T	O
			
			
			
			
			

	TH	H	T	O
	1	4	0	3
x				5

Activity 1 Multiply Four Digits by One Digit

Complete the calculation.

TH	H	T	O
			
			
			
			
			

	TH	H	T	O
	1	4	0	3
x				5
	7	0	1	5
	2		1	

Activity 2

Multiply Four Digits by One Digit

Write the multiplication calculation represented
and find the answer.

TH	H	T	O
1000 1000 1000	100 100 100		1 1
1000 1000 1000	100 100 100		1 1
1000 1000 1000	100 100 100		1 1

	TH	H	T	O
x				

If there are ten or more counters in a column, make an exchange.

Activity 2 Multiply Four Digits by One Digit

Write the multiplication calculation represented and find the answer.

TH	H	T	O
1000 1000 1000	100 100 100		1 1
1000 1000 1000	100 100 100		1 1
1000 1000 1000	100 100 100		1 1

	TH	H	T	O
	3	3	0	2
x				3
	9	9	0	6

If there are ten or more counters in a column, make an exchange.

Activity 3 Multiply Four Digits by One Digit

Write the multiplication calculation represented and find the answer.

TH	H	T	O
1000	10		1 1 1 1 1 1 1
1000	10		1 1 1 1 1 1 1
1000	10		1 1 1 1 1 1 1
1000	10		1 1 1 1 1 1 1

	TH	H	T	O

If there are ten or more counters in a column, make an exchange.

Activity 3 Multiply Four Digits by One Digit

Write the multiplication calculation represented and find the answer.

TH	H	T	O
1000	10		1 1 1 1 1 1 1
1000	10		1 1 1 1 1 1 1
1000	10		1 1 1 1 1 1 1
1000	10		1 1 1 1 1 1 1

	TH	H	T	O
	1	1	0	7
x				4
	4	4	2	8
			2	

If there are ten or more counters in a column, make an exchange.

Activity 5 Multiply Four Digits by One Digit

Esin earns £1,213 per week.
How much would she earn in four weeks?

TH	H	T	O
1000	100 100	10	1 1 1
1000	100 100	10	1 1 1
1000	100 100	10	1 1 1
1000	100 100	10	1 1 1

	TH	H	T	O
x				

If there are ten or more counters in a column, make an exchange.

Activity 5 Multiply Four Digits by One Digit

Esin earns £1,213 per week.
How much would she earn in four weeks?

TH	H	T	O
1000	100 100	10	1 1 1
1000	100 100	10	1 1 1
1000	100 100	10	1 1 1
1000	100 100	10	1 1 1

	TH	H	T	O
	1	2	1	3
x				4
	4	8	5	2
			1	

If there are ten or more counters in a column, make an exchange.

Reasoning 1

Multiply Four Digits by One Digit

Rosie calculated 1,531 x 5.
Here is her answer.

	TH	H	T	O
	1	5	3	1
x				5
	5	25	15	5

1,531 x 5 = 525,155

Can you explain what Rosie has done wrong?

Reasoning 1

Multiply Four Digits by One Digit

Rosie calculated 1,531 x 5.
Here is her answer.

	TH	H	T	O
	2 1	1 5	3	1
x				5
	7	6	5	5

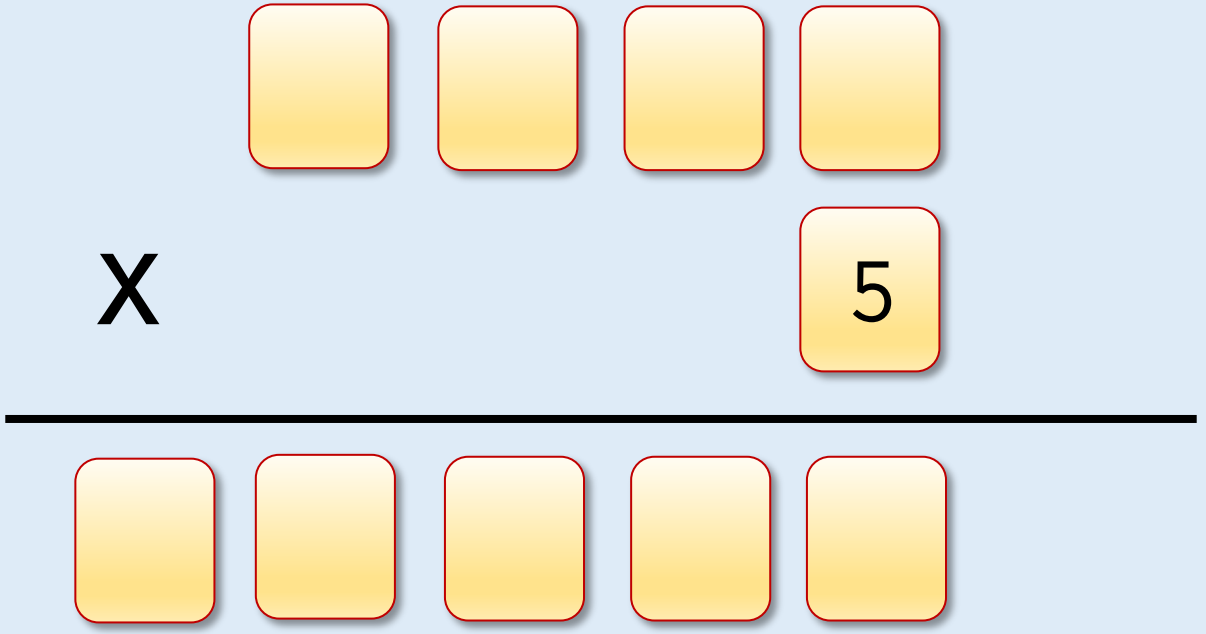
1,531 x 5 = 7,655

Rosie has not exchanged when she has got 10 or more in the tens and hundreds columns.

Can you explain what Rosie has done wrong?

Reasoning 2 Multiply Four Digits by One Digit

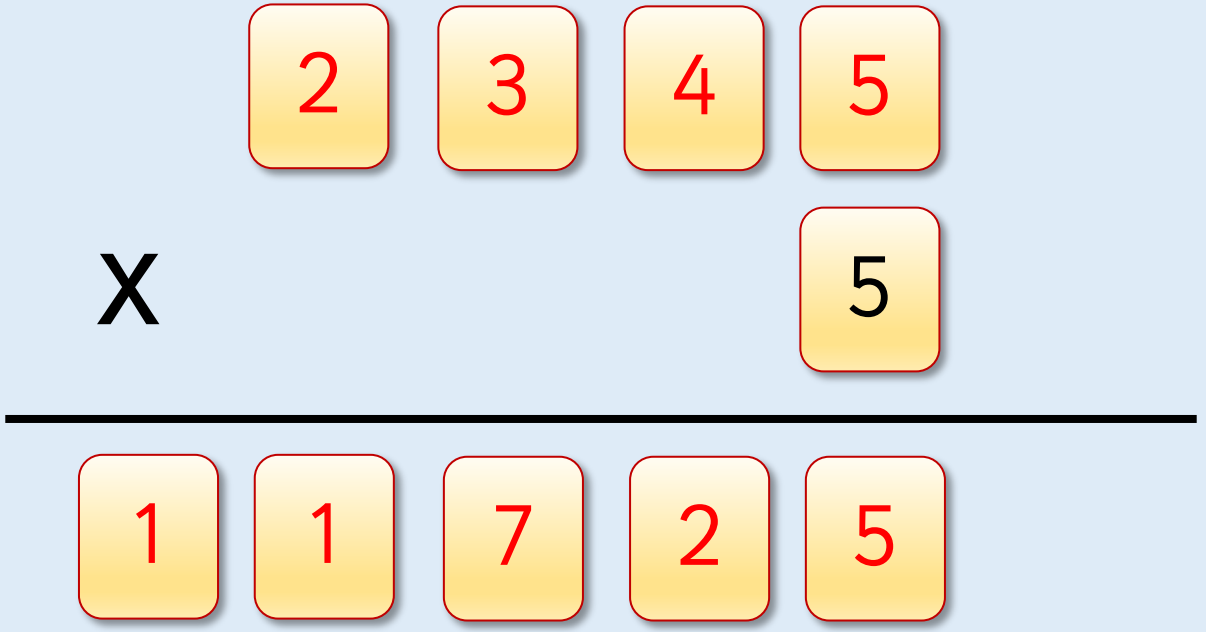
Can you work out the missing numbers using the clues?



- The four digits being multiplied by 5 are consecutive numbers.
- The first two digits of the product are the same.
- The sum of the answer's fourth and fifth digits is the third digit.

Reasoning 2 Multiply Four Digits by One Digit

Can you work out the missing numbers using the clues?



- The four digits being multiplied by 5 are consecutive numbers.
- The first two digits of the product are the same.
- The sum of the answer's fourth and fifth digits is the third digit.

Discuss

Multiply Four Digits by One Digit

Why is it important to set out multiplication using columns?

Explain the value of each digit in your calculation.

How do we show there is nothing in a place value column?

What do we do if there are ten or more counters in a place value column?

Which part of the multiplication is the product?

Multiply Two Digits (Area Model)

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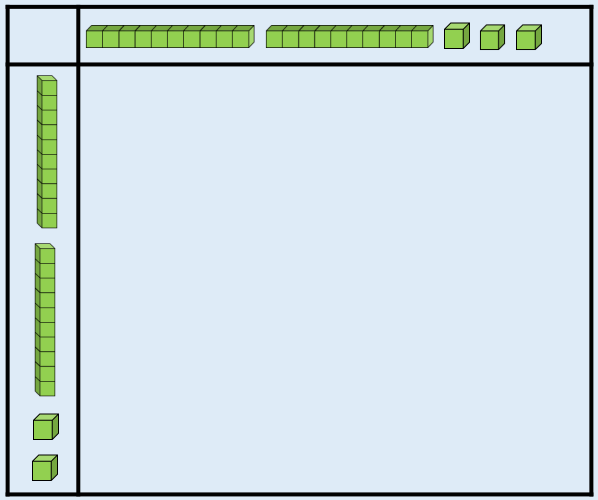
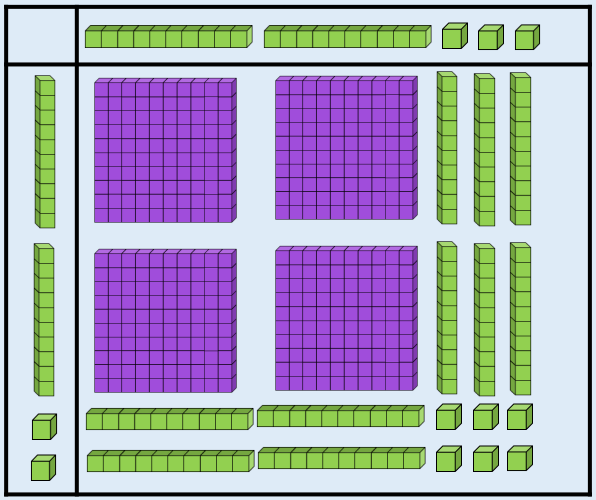
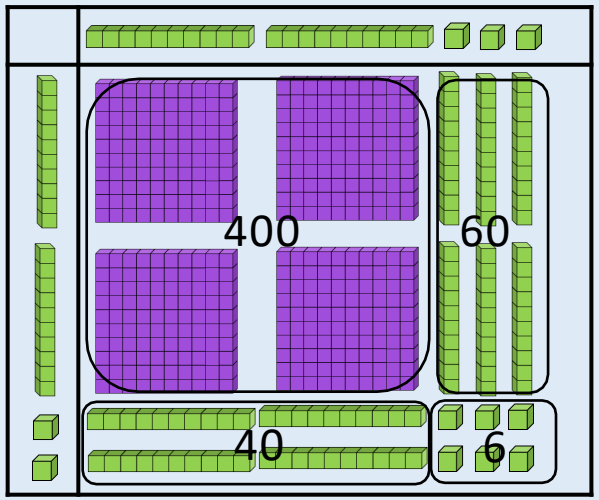
Activity 1 Multiply Two Digits (Area Model)

Tia uses base 10 to solve 23 x 22.

1. Build the length and width using the multiplication calculation	2. Multiply the length by the width	3. Find the total of your area
23 x 22	23 x 22	23 x 22
		

Use base 10 to solve 32 x 24, 25 x 31, 34 x 23.

Activity 2 Multiply Two Digits (Area Model)

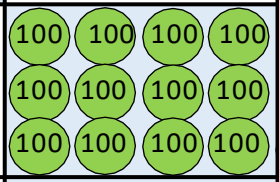
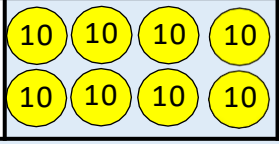
Esin adapts this method to solve 44 x 32.

1. Build the length and width using the multiplication calculation	2. Multiply the length by the width	3. Find the total of your area

44 x 32 =

	40	4
30		
2		

44 x 32 =

	40	4
30		10 10 10 10 10 10 10 10 10 10 10 10
2		1 1 1 1 1 1 1 1

	40	4
30	1,200	120
2	80	8

44 x 32 =

	40	4
30	1,200	120
2	80	8

1200
120
80
8
1408
1

Use place value counters and a grid to solve 45 x 32, 53 x 22 and 34 x 41.

Activity 2 — Multiply Two Digits (Area Model)

Esin adapts this method to solve 45 x 32.

1. Build the length and width using the multiplication calculation

45 x 32 =

	40	5
30		
2		

2. Multiply the length by the width

45 x 32 =

	40	5
30	100 100 100 100 100 100 100 100 100 100 100 100	10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
2	10 10 10 10 10 10 10 10	1 1 1 1 1 1 1 1 1 1

	40	5
30	1200	150
2	80	10

3. Find the total of your area

45 x 32 =

	40	4
30	1200	150
2	80	10

1200
150
80
10
1440

Use place value counters and a grid to solve 45 x 32, 53 x 22 and 34 x 41.

Activity 2 Multiply Two Digits (Area Model)

Esin adapts this method to solve 53 x 22.

1. Build the length and width using the multiplication calculation

53 x 22 =

	50	3
20		
2		

2. Multiply the length by the width

53 x 22 =

	50	3
20	100 100 100 100 100 100 100 100 100 100	10 10 10 10 10 10 10 10 10
2	10 10 10 10 10 10 10 10 10 10	1 1 1 1 1 1 1 1 1

	50	3
20	1000	60
2	100	6

3. Find the total of your area

53 x 22 =

	50	3
20	1000	60
2	100	6

1000
100
60
6
1166

Use place value counters and a grid to solve 45 x 32, 53 x 22 and 34 x 41.

Activity 2 Multiply Two Digits (Area Model)

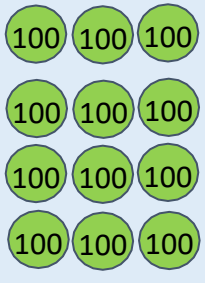
Esin adapts this method to solve 34 x 41.

1. Build the length and width using the multiplication calculation	2. Multiply the length by the width	3. Find the total of your area

34 x 41 =

	30	4
40		
1		

34 x 41 =

	30	4
40		10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
1		1 1 1 1

	30	4
40	1200	160
1	30	4

34 x 41 =

	30	4
40	1200	160
1	30	4

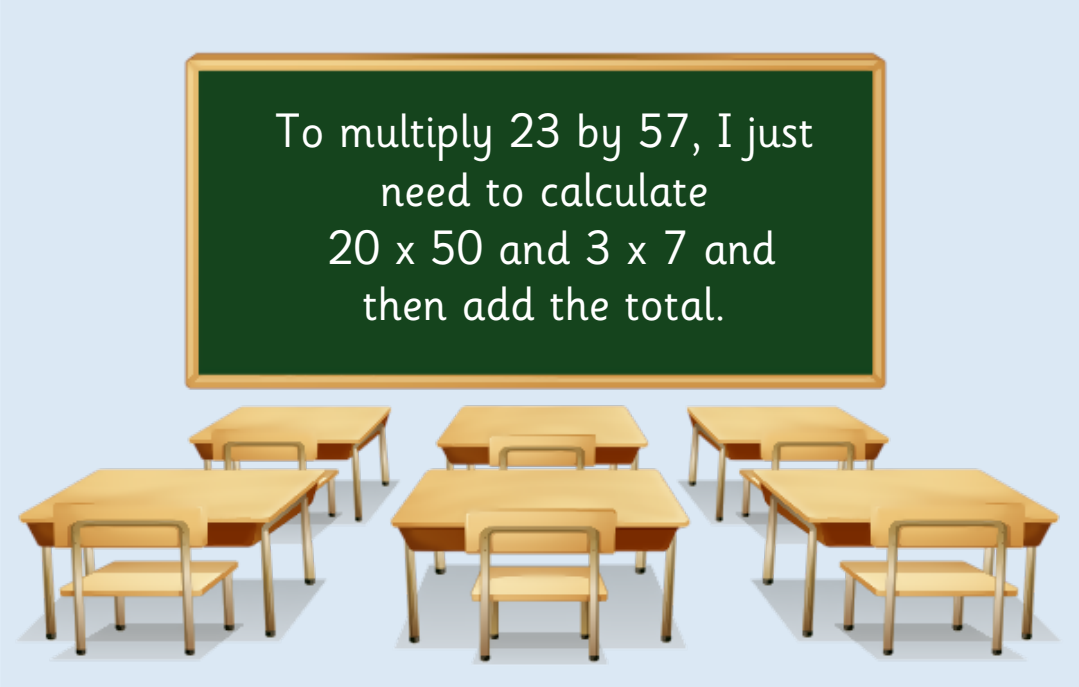
1200
160
30
4
1394

Use place value counters and a grid to solve 45 x 32, 53 x 22 and 34 x 41.

Reasoning 1

Multiply Two Digits (Area Model)

Zach says,



What mistake has Zach made?
Explain your answer.

Reasoning 1

Multiply Two Digits (Area Model)

Zach says,

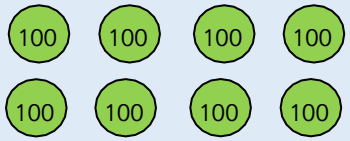
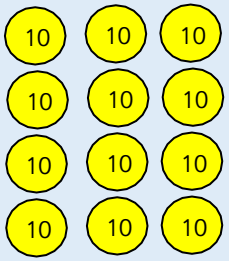
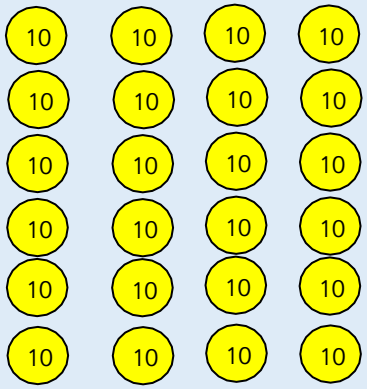
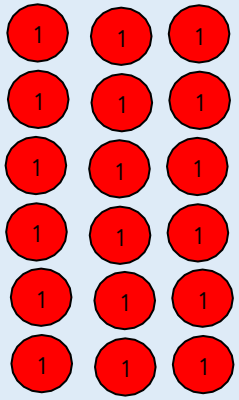
To multiply 23 by 57, I just need to calculate 20 x 50 and 3 x 7 and then add the total.

Zach's calculation does not include 20 x 7 and 50 x 3.

What mistake has Zach made?
Explain your answer.

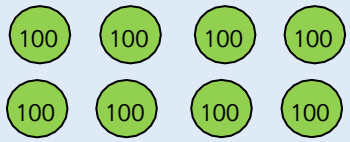
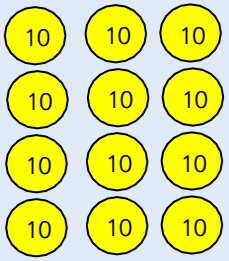
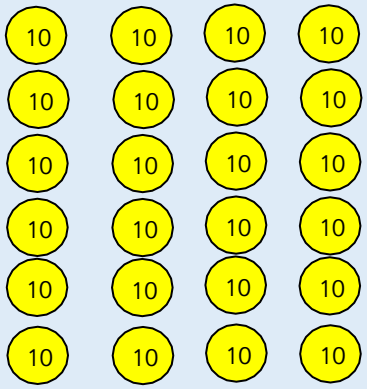
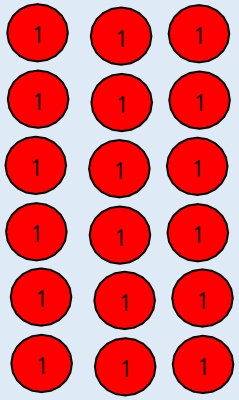
Reasoning 2 Multiply Two Digits (Area Model)

Malachi hasn't finished his calculation.
Complete the missing information and record the calculation with an answer.

x	40	3
40		
6		

Reasoning 2 Multiply Two Digits (Area Model)

Malachi hasn't finished his calculation.
Complete the missing information and record the calculation with an answer.

x	40	3
40		
6		

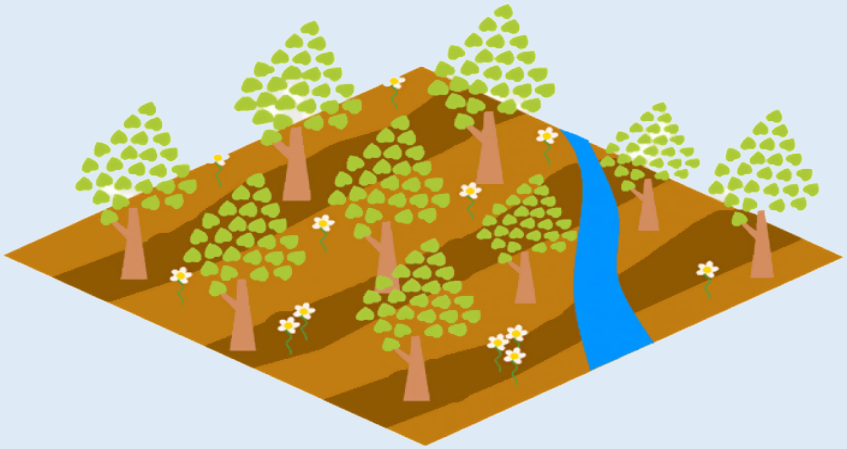
Malachi needs 8 more hundreds, 40 x 40 = 1,600 and he only has 800.

His calculation is 43 x 46 = 1,978.

Reasoning 3

Multiply Two Digits (Area Model)

Farmer Zach has a field that measures 25 m long and 25 m wide.

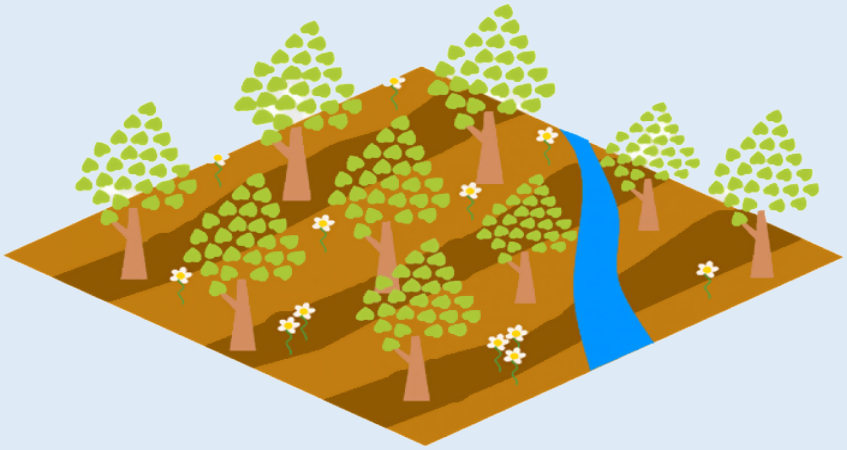


Farmer Malachi has a field that measures 24 m long and 26 m wide.

Tia thinks that they will have the same area because the numbers have only changed by one digit.
Do you agree? Prove it.

Reasoning 3 Multiply Two Digits (Area Model)

Farmer Zach has a field that measures 25 m long and 25 m wide.



Farmer Malachi has a field that measures 24 m long and 26 m wide.

Tia thinks that they will have the same area because the numbers have only changed by one digit.
Do you agree? Prove it.

Tia is wrong. 25 x 25 = 625; 24 x 26 = 624.

Discuss

Multiply Two Digits (Area Model)

How are we multiplying?

How can we partition these numbers?

Where can we see 20 x 20?

What does 40 represent?

What's the same and what's different about the three representations (base 10, place value counters, grid)?

Multiply Two Digits by Two Digits

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Activity 1 Multiply Two Digits by Two Digits

Complete the following to calculate 26 x 13.

	2	6				
x	1	3				
	7_1	8	(26 x 3)			
2	6	0	(26 x 10)			

Use the method to calculate:

35 x 21 =

56 x 27 =

73 x 31 =

Activity 1 Multiply Two Digits by Two Digits

Complete the following to calculate 26 x 13.

	2	6				
x	1	3				
	7_1	8	(26 x 3)			
2	6	0	(26 x 10)			
3	3	8				

Use the method to calculate:

35 x 21 =

56 x 27 =

73 x 31 =

Activity 1 Multiply Two Digits by Two Digits

Complete the following to calculate 35 x 21.

	3	5				
x	2	1				

Use the method to calculate:

35 x 21 =

56 x 27 =

73 x 31 =

Activity 1 Multiply Two Digits by Two Digits

Complete the following to calculate 35 x 21.

	3	5				
x	2	1				
	3	5	(35 x 1)			
7_1	0	0	(35 x 20)			
7	3	5				

Use the method to calculate:

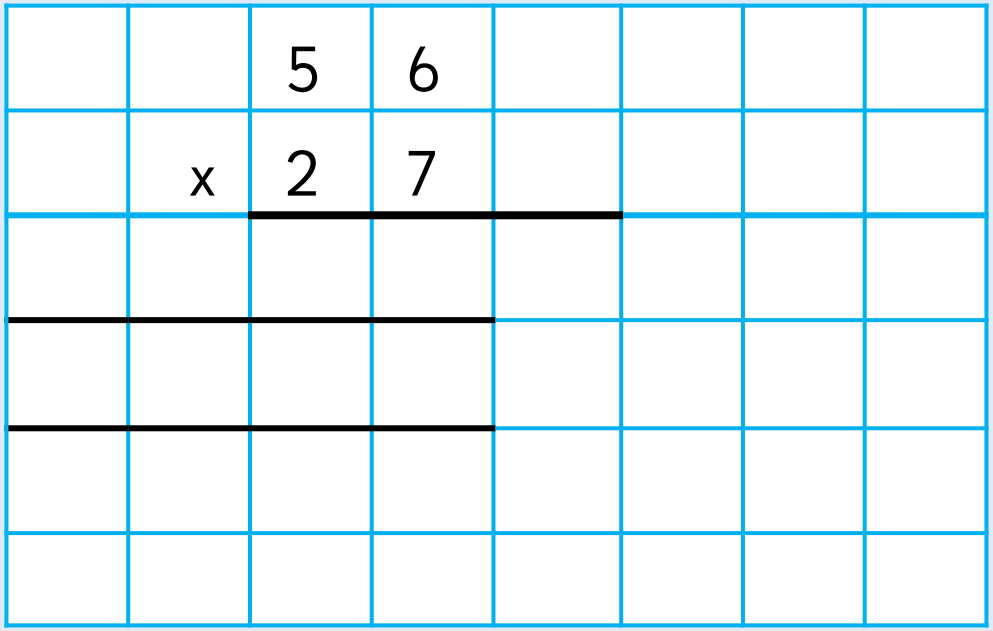
35 x 21 =

56 x 27 =

73 x 31 =

Activity 1 Multiply Two Digits by Two Digits

Complete the following to calculate 56 x 27.



Use the method to calculate:

35 x 21 =

56 x 27 =

73 x 31 =

Activity 1 Multiply Two Digits by Two Digits

Complete the following to calculate 56 x 27.

		5	6				
	x	2	7				
	3_3	9_4	2	(56 x 7)			
1	1_1	2	0	(56 x 20)			
1	5	1	2				

Use the method to calculate:

35 x 21 =

56 x 27 =

73 x 31 =

Activity 1 Multiply Two Digits by Two Digits

Complete the following to calculate 73 x 31.

		7	3				
	x	3	1				

Use the method to calculate:

35 x 21 =

56 x 27 =

73 x 31 =

Activity 1 Multiply Two Digits by Two Digits

Complete the following to calculate 73 x 31.

		7	3				
	x	3	1				
		7	3	(73 x 1)			
2_2	1	9	0	(73 x 30)			
2	2_1	6	3				

Use the method to calculate:

35 x 21 =

56 x 27 =

73 x 31 =

Activity 2 Multiply Two Digits by Two Digits

Complete the following to solve the calculation.

		4	7				
	x	2	6				
	2	8_4	2	(___	x	___)	
	9_1	4	0	(___	x	___)	

Use the method to calculate:

24 x 31 =

53 x 13 =

72 x 34 =

Activity 2 Multiply Two Digits by Two Digits

Complete the following to solve the calculation.

		4	7				
	x	2	6				
	2	8_4	2	(47 x 6)			
	9_1	4	0	(47 x 20)			
1	2_1	2	2				

Use the method to calculate:

24 x 31 =

53 x 13 =

72 x 34 =

Activity 2 Multiply Two Digits by Two Digits

Complete the following to solve the calculation.

		2	4				
	x	3	1				
		2	4	(___	x ___	)	
	7_1	2	0	(___	x ___	)	

Use the method to calculate:

24 x 31 =

53 x 13 =

72 x 34 =

Activity 2 Multiply Two Digits by Two Digits

Complete the following to solve the calculation.

		2	4				
	x	3	1				
		2	4	(24 x 1)			
	7_1	2	0	(24 x 30)			
	7	4	4				

Use the method to calculate:

24 x 31 =

53 x 13 =

72 x 34 =

Activity 2 Multiply Two Digits by Two Digits

Complete the following to solve the calculation.

		5	3				
	x	1	3				
	1	5	9	(___	x	___)	
	5	3	0	(___	x	___)	

Use the method to calculate:

24 x 31 =

53 x 13 =

72 x 34 =

Activity 2 Multiply Two Digits by Two Digits

Complete the following to solve the calculation.

		5	3				
	x	1	3				
	1	5	9	(53 x 3)			
	5	3	0	(53 x 10)			
	6	8	9				

Use the method to calculate:

24 x 31 =

53 x 13 =

72 x 34 =

Activity 2 Multiply Two Digits by Two Digits

Complete the following to solve the calculation.

		7	2				
	x	3	4				
	2_2	8	8	(___	x	___)	
2_2	1	6	0	(___	x	___)	

Use the method to calculate:

24 x 31 =

53 x 13 =

72 x 34 =

Activity 2 Multiply Two Digits by Two Digits

Complete the following to solve the calculation.

		7	2				
	x	3	4				
	2_2	8	8	(72 x 4)			
2_2	1	6	0	(72 x 30)			
2	4_1	4	8				

Use the method to calculate:

24 x 31 =

53 x 13 =

72 x 34 =

Activity 3 Multiply Two Digits by Two Digits

Complete the following:

38 x 12 =

39 x 12 =

37 x 11 =

?

What's the same and what's different?

Activity 3 Multiply Two Digits by Two Digits

Complete the following:

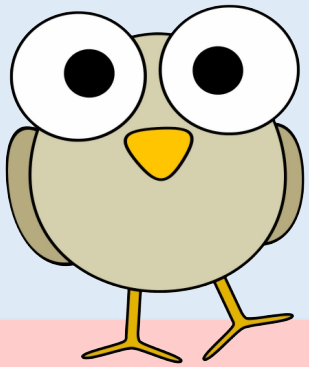
38 x 12 = 456

39 x 12 = 468

37 x 11 = 407

Reasoning 1

Multiply Two Digits by Two Digits



??

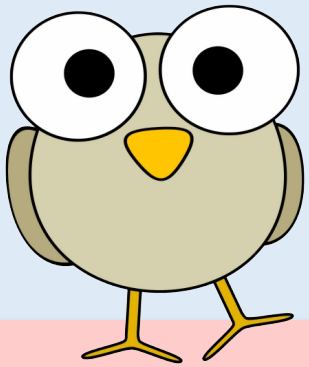
It is not possible to make 999 by multiplying two 2-digit numbers.

Esin says,

Do you agree?
Explain your answer.

Reasoning 1

Multiply Two Digits by Two Digits



??

It is not possible to make 999 by multiplying two 2-digit numbers.

Esin says,

Do you agree?
Explain your answer.

Esin is wrong because 27 x 37 is equal to 999.

Reasoning 2

Multiply Two Digits by Two Digits

Malachi has multiplied 47 by 36.

		4	7	
	x	3	6	
	2	8_4	2	
	1	4_2	1	
	3	2	3	

Malachi is wrong because the answer should be 1,692 not 323.

Leanna says,

Who is correct?
What mistake has been made?

Reasoning 2 Multiply Two Digits by Two Digits

Malachi has multiplied 47 by 36.

		4	7	
	x	3	6	
	2	8_4	2	
	1	4_2	1	
	3	2	3	

Leanna is correct. Malachi has forgotten to use zero as a place holder when multiplying by 3 tens.

Leanna says,

Malachi is wrong because the answer should be 1,692 not 323.

Who is correct?
What mistake has been made?

Discuss

Multiply Two Digits by Two Digits

Why is zero important?

What numbers are being multiplied in the first line and in the second line?

When do we need to make an exchange?

What can we exchange if the product is 42 ones?

If we know what 38 x 12 is equal to, how else could we work out 39 x 12?

Multiply Three Digits by Two Digits

5

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Activity 1

Multiply Three Digits by Two Digits

Complete the following:

	1	3	2	
x		1	4	
	5_1	2	8	
+ 1	3	2	0	(132 x 4) (132 x 10)

	1	3	2	
x		2	7	
+				(__ x __) (__ x __)

Why is zero important?

Activity 1 — Multiply Three Digits by Two Digits

Complete the following:

$$
\begin{array}{rrrrl}
 & 1 & 3 & 2 & \\
\times & & 1 & 4 & \\
\hline
 & 5_{1} & 2 & 8 & (132 \times 4) \\
+ & & & & \\
1 & 3 & 2 & 0 & (132 \times 10) \\
\hline
1 & 8 & 4 & 8 &
\end{array}
$$

$$
\begin{array}{rrrrl}
 & 1 & 3 & 2 & \\
\times & & 2 & 7 & \\
\hline
 & 9_{2} & 2_{1} & 4 & (132 \times 7) \\
+ & & & & \\
2 & 6 & 4 & 0 & (132 \times 20) \\
\hline
3_{1} & 5 & 6 & 4 &
\end{array}
$$

Activity 2

Multiply Three Digits by Two Digits

Complete the following:

642 x 34

42 x 328

71 x 443

Activity 2 Multiply Three Digits by Two Digits

Complete the following:

642 x 34 = 21,828

42 x 328 = 13,776

71 x 443 = 31,453

Activity 3

Multiply Three Digits by Two Digits

A park is 134 yards by 68 yards.
What is the area of the park?

Activity 3 Multiply Three Digits by Two Digits

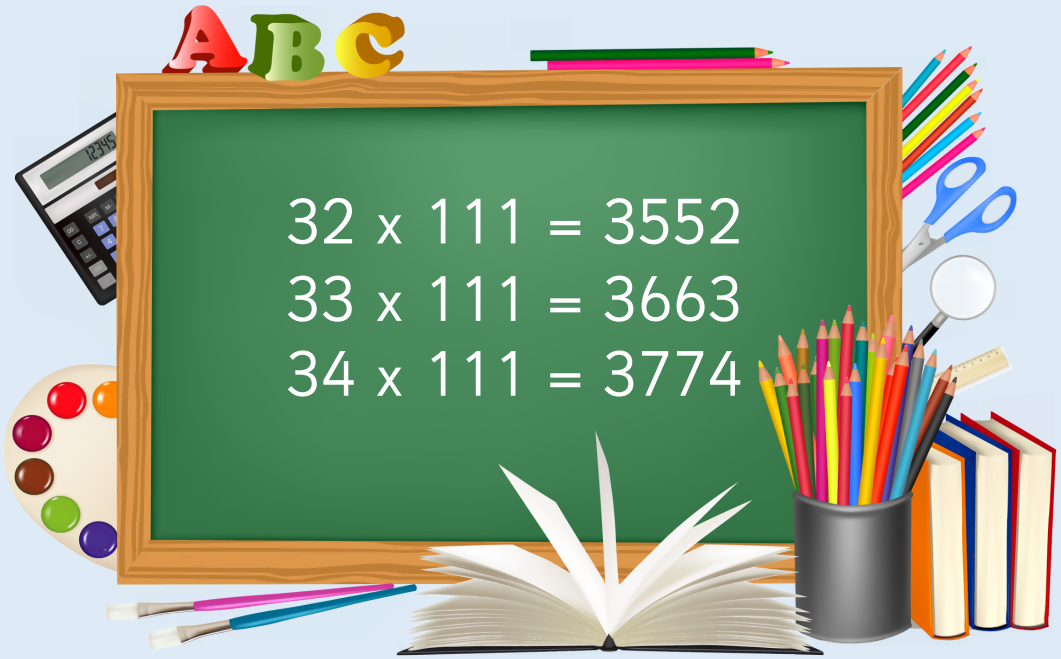
A park is 134 yards by 68 yards.
What is the area of the park?

The area of the park is 134 x 68 = 9,112 yards^2.

Reasoning 1

Multiply Three Digits by Two Digits

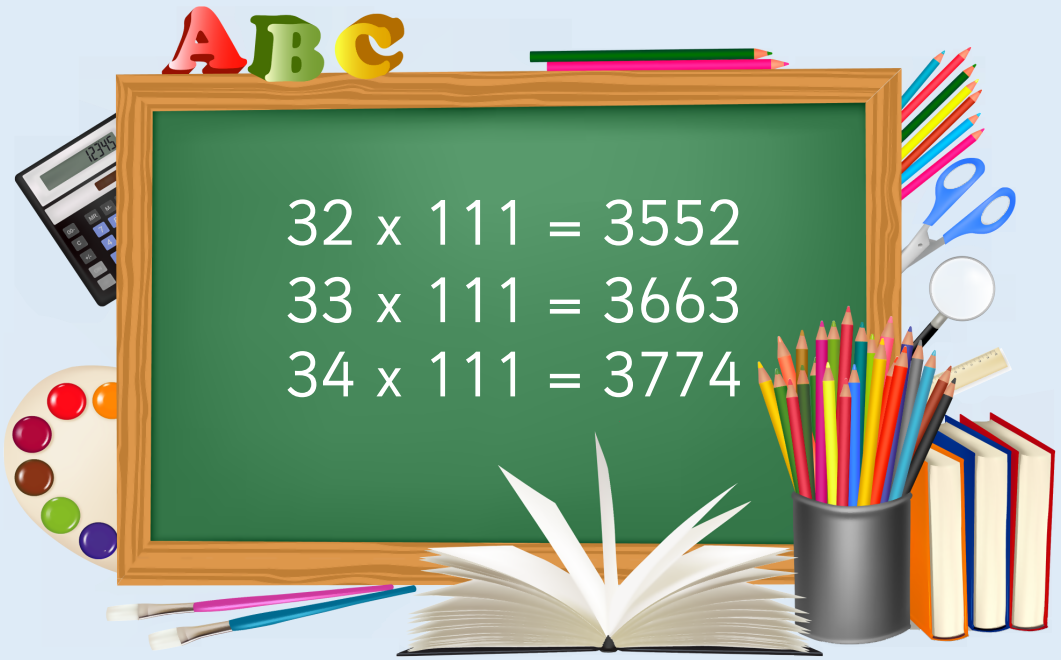
What do you think the answer to 35 x 111 will be?



What do you notice?
Does this always work?

Reasoning 1 — Multiply Three Digits by Two Digits

What do you think the answer to 35 x 111 will be?



What do you notice?
Does this always work?

35 x 111 = 3885

The pattern stops after 36 x 111 because exchanges need to take place.

Reasoning 2

Multiply Three Digits by Two Digits

Pencils come in boxes of 50.

A school bought 250 boxes.

Rulers come in packs of 35.

A school bought 950 packs.

How many more rulers were ordered than pencils?

Reasoning 2 Multiply Three Digits by Two Digits

Pencils come in boxes of 50.

A school bought 250 boxes.

Rulers come in packs of 35.

A school bought 950 packs.

How many more rulers were ordered than pencils?

Total number of pencils: 50 x 250 = 12,500.
Total number of rulers: 35 x 950 = 33,250.
There are 20,750 more rulers than pencils.

Reasoning 3 Multiply Three Digits by Two Digits

Here are examples of Zach's maths work.

		9	8	7
	x		7	6
	5	5_9	4_2	2
	6	6_9	4_0	9
1	1_2	8	1_3	1

		3	2	4
	x		7	8
	2	5_1	9_3	2
2	2_1	6_2	8	0
	3	2	7	2

He has made a mistake in each question.
Can you spot it and explain why it's wrong?
Correct each calculation.

Reasoning 3 Multiply Three Digits by Two Digits

Here are examples of Zach's maths work.

		9	8	7
	x		7	6
	5	5_9	4_2	2
	6	6_9	4_0	9
1	1_2	8	1_3	1

		3	2	4
	x		7	8
	$_2$	5_1	9_3	2
$_2$	2_1	6_2	8	0
	3	2	7	2

He has made a mistake in each question.
Can you spot it and explain why it's wrong?
Correct each calculation.

In his first calculation, Zach has forgotten to use a zero when multiplying by 7 tens. It should have been 987 x 76 = 75,012.

In the second calculation, Zach has not included his final exchanges.
324 x 8 = 2,592
324 x 70 = 22,680
The final answer should have been 25,272.

Discuss

Multiply Three Digits by Two Digits

How many do we have?

What number does this represent?

What would be the number after/before …?

What is one more/one less than…?

When finding one more and one less, which digit changes?

Why? Does this always happen?

Multiply Four Digits by Two Digits

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Activity 1 Multiply Four Digits by Two Digits

Complete the following:

$$\begin{array}{rrrrr} & 5 & 1 & 8 & 0 \\ & & \times & 2 & 3 \\ \hline & 1 & 5 & 5_{2} & 4 & 0 & (\_\_\_ \times \_\_\_) \\ + & 1 & 0 & 3_{2} & 6 & 0 & 0 & (\_\_\_ \times \_\_\_) \\ \hline & & & & & & \end{array}$$

$$\begin{array}{rrrrr} & 3 & 2 & 5 & 0 \\ & & \times & 2 & 6 \\ \hline & 1 & 9_{1} & 5_{3} & 0 & 0 & (\_\_\_ \times \_\_\_) \\ + & 6 & 5 & 0 & 0 & 0 & (\_\_\_ \times \_\_\_) \\ \hline & & & & & & \end{array}$$

? *Explain the steps followed when using this multiplication method.*

Activity 1

Multiply Four Digits by Two Digits

Complete the following:

$$\begin{array}{rcccc} & 5 & 1 & 8 & 0 \\ & & \times & 2 & 3 \\ \hline & 1 & 5 & 5_{2} & 4 & 0 \\ + & 1 & 0 & 3_{2} & 6 & 0 & 0 \\ \hline & 1 & 1 & 9_{1} & 1 & 4 & 0 \\ \hline \end{array}$$

(5180 x 3)

(5180 x 20)

$$\begin{array}{rcccc} & 3 & 2 & 5 & 0 \\ & & \times & 2 & 6 \\ \hline & 1 & 9_{1} & 5_{3} & 0 & 0 \\ + & 6 & 5 & 0 & 0 & 0 \\ \hline & 8 & 4_{1} & 5 & 0 & 0 \\ \hline \end{array}$$

(3250 x 6)

(3250 x 20)

Activity 2

Multiply Four Digits by Two Digits

Complete the following:

	6	3	6	8
	x		4	6
				(___ x ___)
+				
				(___ x ___)

	7	3	4	7
	x		7	4
				(___ x ___)
+				
				(___ x ___)

Activity 2

Multiply Four Digits by Two Digits

Complete the following:

$$
\begin{array}{rrrrrr}
 & & 6 & 3 & 6 & 8 \\
 & & \times & & 4 & 6 \\
\hline
 & 3_{3} & 8_{2} & 2_{4} & 0_{4} & 8 \\
+ & 2 & 5_{1} & 4_{2} & 7_{3} & 2 & 0 \\
\hline
 & 2 & 9_{1} & 2 & 9 & 2 & 8
\end{array}
$$

(6368 x 6)

(6368 x 40)

$$
\begin{array}{rrrrrr}
 & & 7 & 3 & 4 & 7 \\
 & & \times & & 7 & 4 \\
\hline
 & 2_{1} & 9_{1} & 3_{1} & 8_{2} & 8 \\
+ & 5_{5} & 1_{2} & 4_{3} & 2_{4} & 9 & 0 \\
\hline
 & 5 & 4_{1} & 3 & 6_{1} & 7 & 8
\end{array}
$$

(7347 x 4)

(7347 x 70)

Activity 3

Multiply Four Digits by Two Digits

Complete the following:

7,524 x 52	1,043 x 23	5,630 x 76

Activity 3 Multiply Four Digits by Two Digits

Complete the following:

7,524 x 52 = 391,248

1,043 x 23 = 23,989

5,630 x 76 = 427,880

Activity 4 Multiply Four Digits by Two Digits

Add comparison symbols to make the statements correct.

3,429 x 43 ◯ 3,924 x 41

3,942 x 42 ◯ 3,924 x 42

?

Look at the numbers in each question. Can they help you estimate which answer will be the largest?

Activity 4 Multiply Four Digits by Two Digits

Add comparison symbols to make the statements correct.

3,429 x 43 < 3,924 x 41

3,942 x 42 > 3,924 x 42

Reasoning 1 Multiply Four Digits by Two Digits

Spot the mistakes.

	2	5	3	4
x			2	3
	7_1	5	9_1	2
	5_1	0	6	8
1	2	6_1	6_1	0

Can you spot and correct the errors in the calculation?

Reasoning 1 Multiply Four Digits by Two Digits

Spot the mistakes.

	2	5	3	4
x			2	3
	7_1	6_1	0_1	2
5_1	0_1	6	8	0
5	8_1	2	8	2

In the first line of working out, the exchanged tens have not been added.

In the second line of working out, the placeholder zero is missing.
The correct answer is 58,282.

Can you spot and correct the errors in the calculation?

Reasoning 2

Multiply Four Digits by Two Digits

Malachi has spilt some paint on his calculation.

	2		6	9
X			2	
2	2_6	9_5	5_7	2
5_1	7_1	3_1		0
1_1	0_1	3_1	3	2

What are the missing digits?
What do you notice?

Reasoning 2 Multiply Four Digits by Two Digits

Malachi has spilt some paint on his calculation.

	2	8	6	9
X			2	8
2	2_6	9_5	5_7	2
5_1	7_1	3_1	8	0
8_1	0_1	3_1	3	2

What are the missing digits?
What do you notice?

Discuss

Multiply Four Digits by Two Digits

Explain the steps followed when using this multiplication method.

Look at the numbers in each question. Can they help you estimate which answers will be the largest?

Explain why there is a 9 in the thousands column.

Why do we write the larger number above the smaller number?

What links can you see between these questions?

How can you use these to support your answer?

Divide Four Digits by One Digit

5

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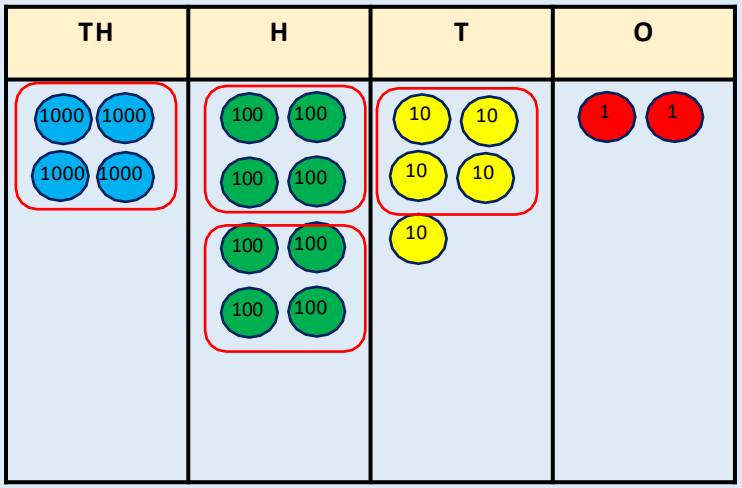
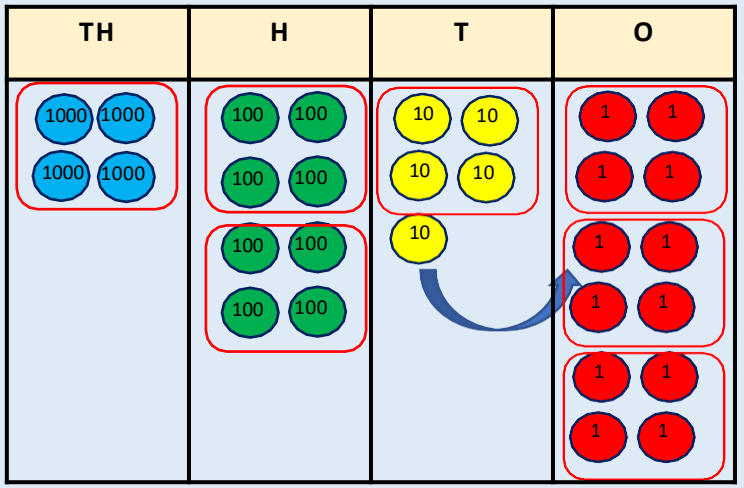
Activity 1 — Divide Four Digits by One Digit

Here is a method to solve 4,852 divided by 4 using place value counters and short division.





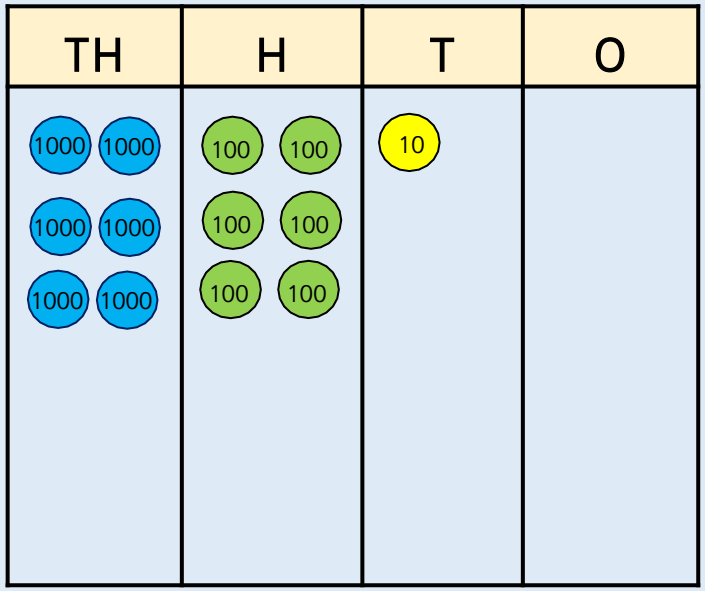
$$\begin{array}{r} 1213 \\ 4 \overline{)\,4^{1}852} \end{array}$$

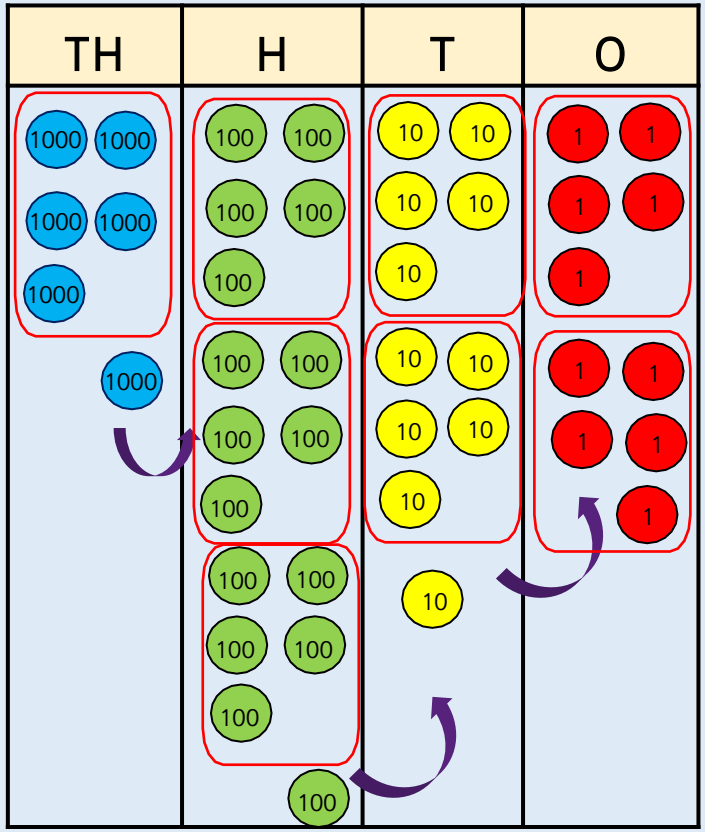
Use the above method to solve:

6,610 ÷ 5 2,472 ÷ 3 9,360 ÷ 4

Activity 1 Divide Four Digits by One Digit

Here is a method to solve 6,610 divided by 5 using place value counters and short division.

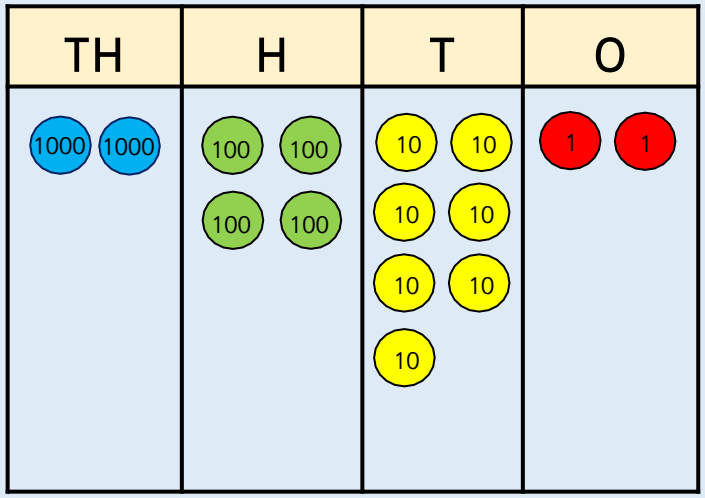


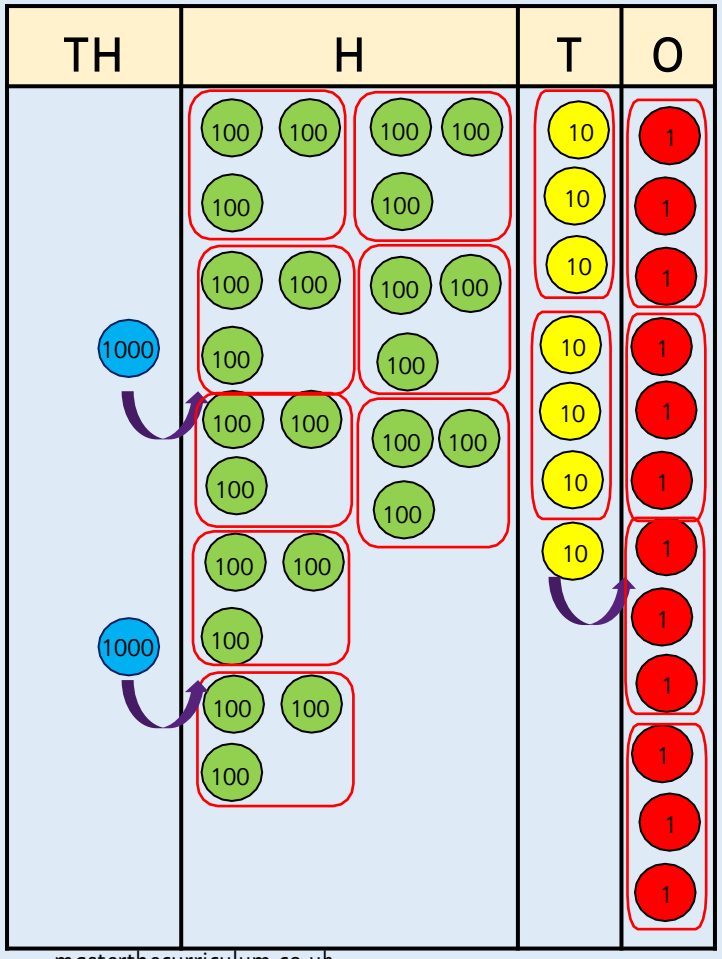


$$\begin{array}{r} 1322 \\ 5\overline{)6610} \end{array}$$

Activity 1 Divide Four Digits by One Digit

Here is a method to solve 2,472 divided by 3 using place value counters and short division.

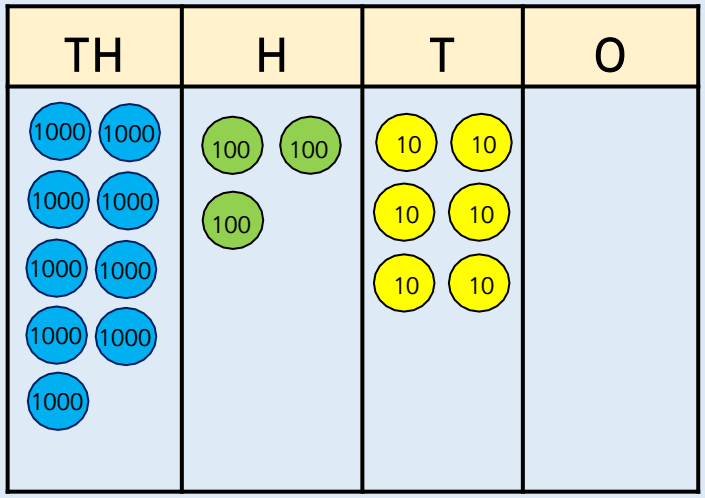


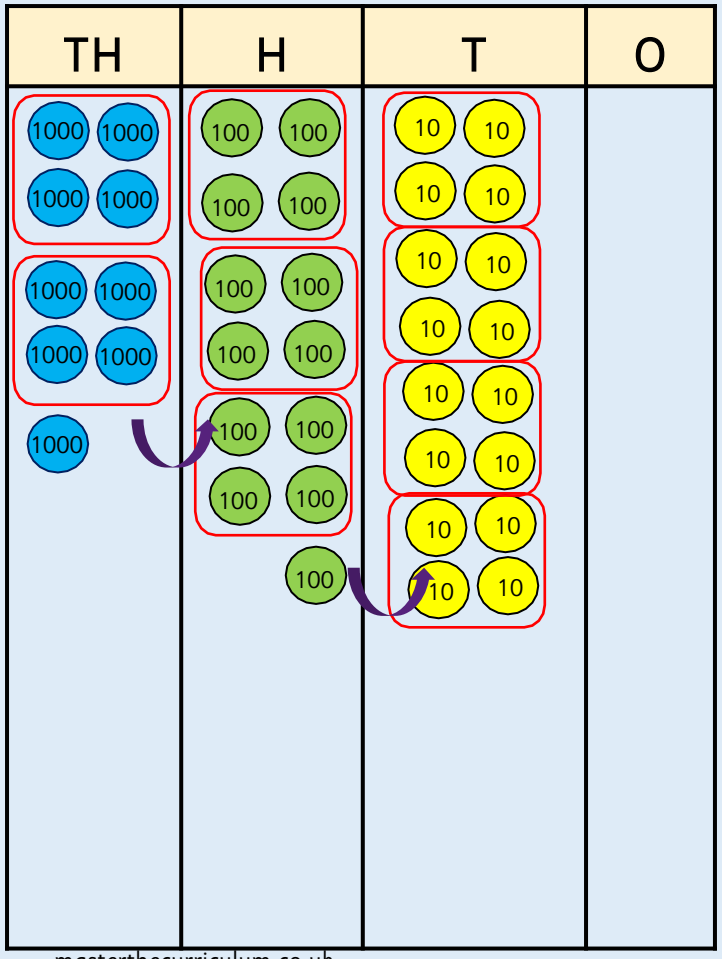


$$\begin{array}{r} 824 \\ 3\overline{)2472} \end{array}$$

Activity 1 Divide Four Digits by One Digit

Here is a method to solve 9,360 divided by 4 using place value counters and short division.





$$\begin{array}{r|l} & 2340 \\ \hline 4 & 9360 \end{array}$$

Activity 2

Divide Four Digits by One Digit

Rosie wins £5,736 in a competition!
She decides to share it equally
between four charities.
How much money will each charity receive?

Activity 2 Divide Four Digits by One Digit

Rosie wins £5,736 in a competition!
She decides to share it equally
between four charities.
How much money will each charity receive?

$$4 \overline{)5736} = 1434$$

Each charity will receive £1,434.

Activity 3 Divide Four Digits by One Digit

Add comparison symbols to make the statements correct.

5,370 ÷ 6 ◯ 5,370 ÷ 3

6,705 ÷ 9 ◯ 6,248 ÷ 8

?

Do I need to solve both calculations to compare the divisions?

Activity 3 Divide Four Digits by One Digit

Add comparison symbols to make the statements correct.

$5{,}370 \div 6 \quad < \quad 5{,}370 \div 3$

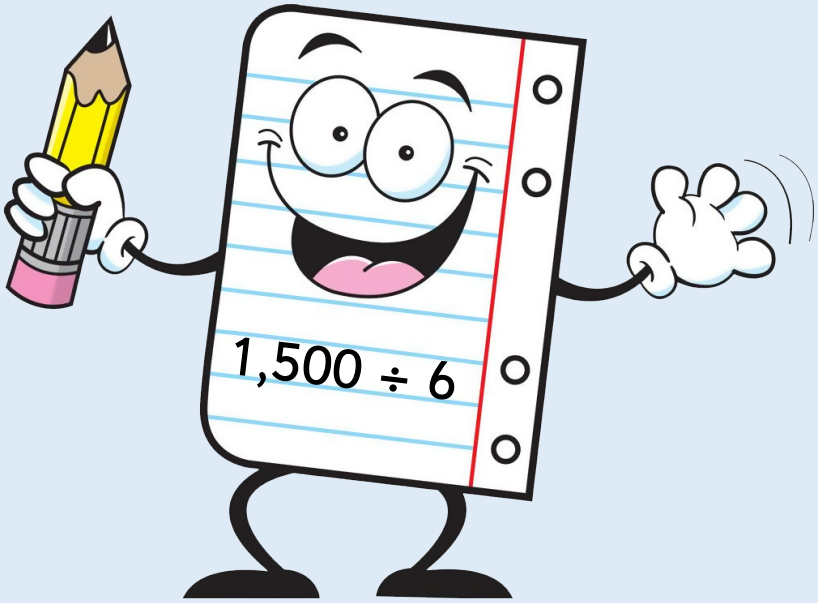
$6{,}705 \div 9 \quad < \quad 6{,}248 \div 8$

Reasoning 1

Divide Four Digits by One Digit

Esin is calculating.

She says you can't do it because 6 is larger than each digit in the number.



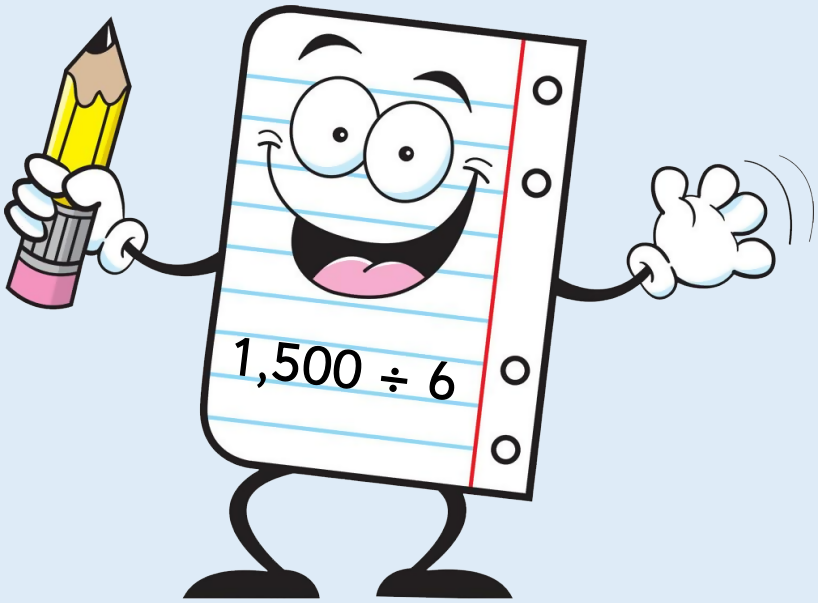
Do you agree with Esin?
Explain your answer.

Reasoning 1

Divide Four Digits by One Digit

Esin is calculating.

She says you can't do it because 6 is larger than each digit in the number.



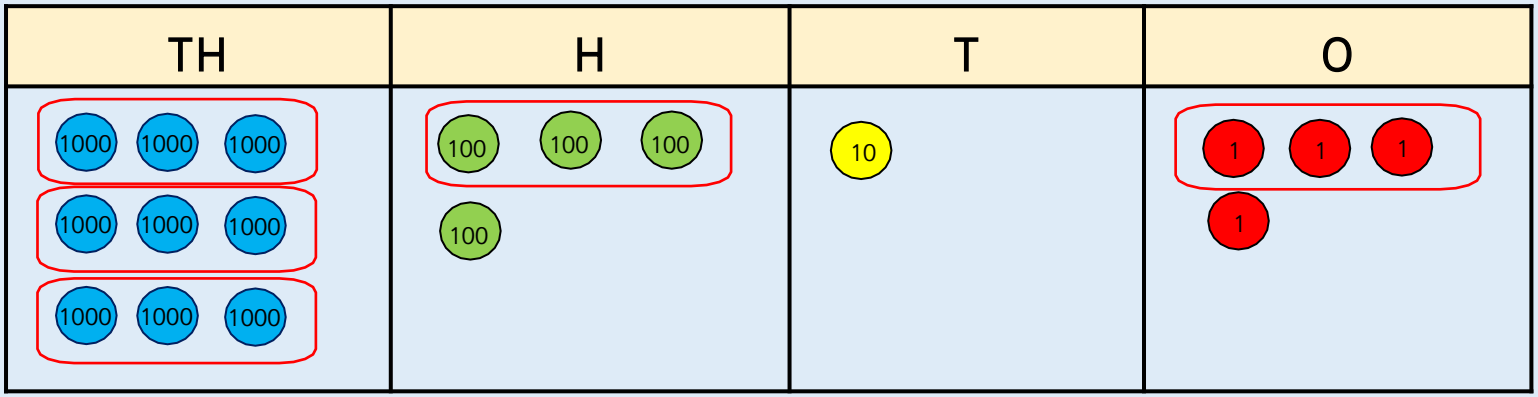
Do you agree with Esin?
Explain your answer.

Esin is incorrect.
You can exchange between columns.
You can't make a group of 6 thousand out of 1 thousand 2 hundred, but you can make groups of 6 hundred out of 15 hundreds.

The answer is 250.

Reasoning 2 Divide Four Digits by One Digit

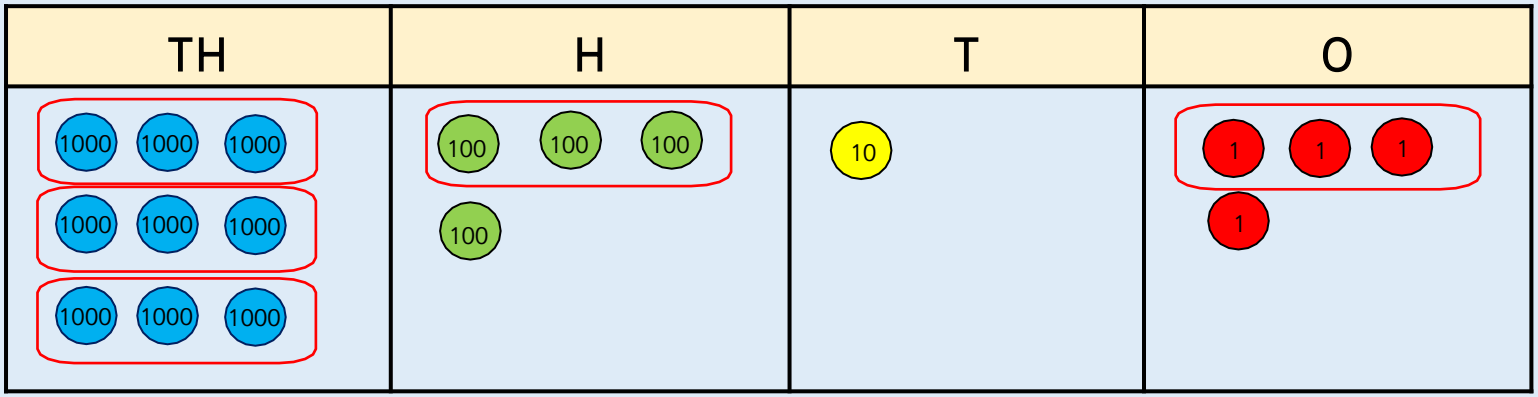
Explain and correct the working.



	3	1	0	1
3	9	4	1	4

Reasoning 2 Divide Four Digits by One Digit

Explain and correct the working.



	3	1	0	1
3	9	4	1	4

There was no exchanging between columns within the calculation.
The final answer should have been 3,138.

Discuss

Divide Four Digits by One Digit

How many groups of 4 thousands are there in 4 thousands?

How many groups of 4 hundreds are there in 8 hundreds?

How many groups of 4 tens are there in 9 tens?

What can we do with the remaining ten?

How many groups of 4 ones are there in 12 ones?

Do I need to solve both calculations to compare the divisions?

Divide with Remainders

5

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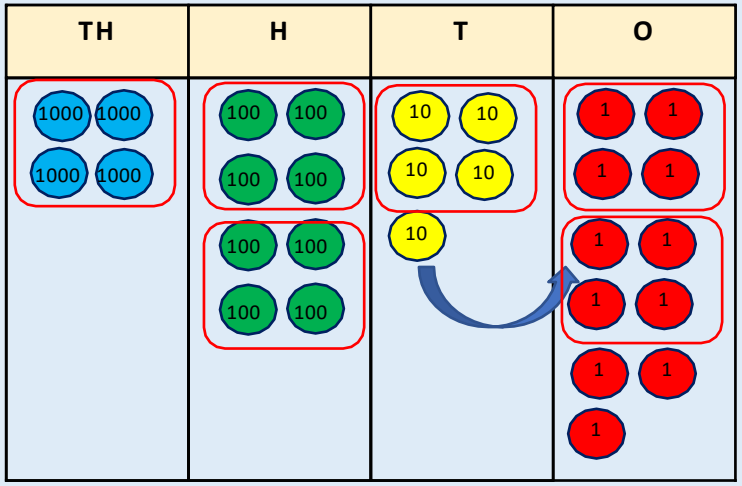
Activity 1 Divide with Remainders

Here is a method to solve 4,851 divided by 4 using place value counters and short division.



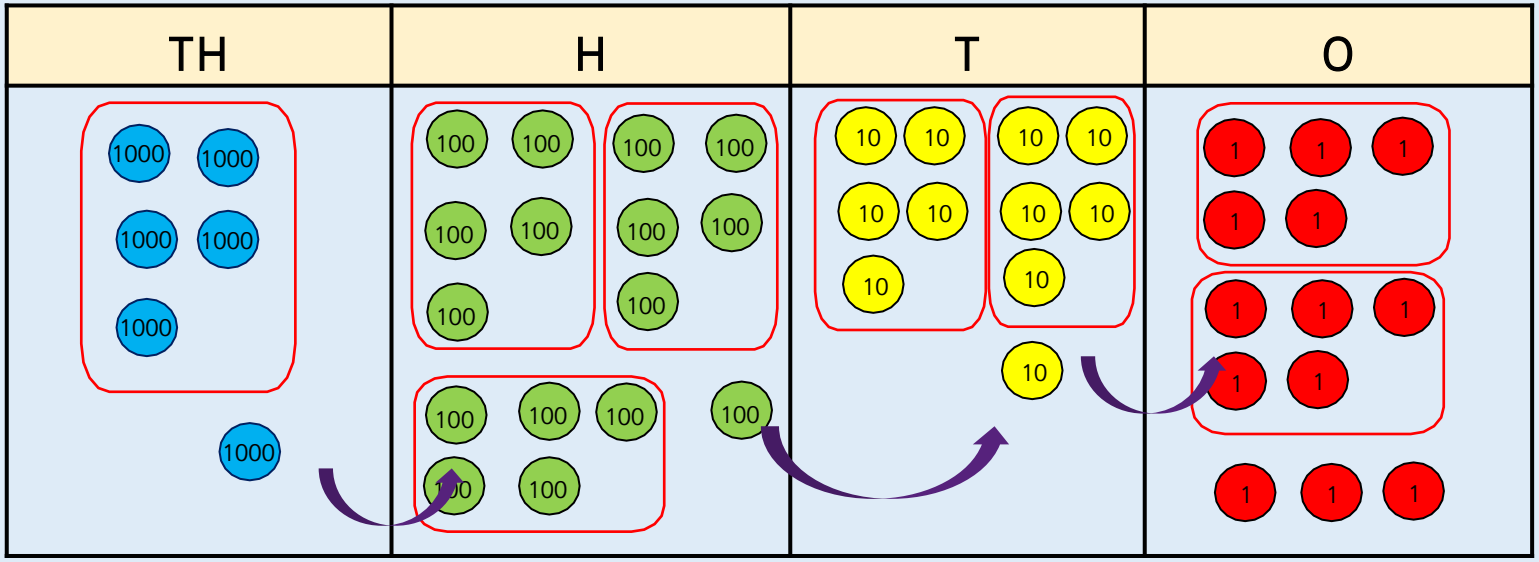
$$4 \overline{)\ 4851} \quad 1212 \text{ r } 3$$

Use the above method to solve:

6,613 ÷ 5 2,471 ÷ 3 9,363 ÷ 4

Activity 1 Divide with Remainders

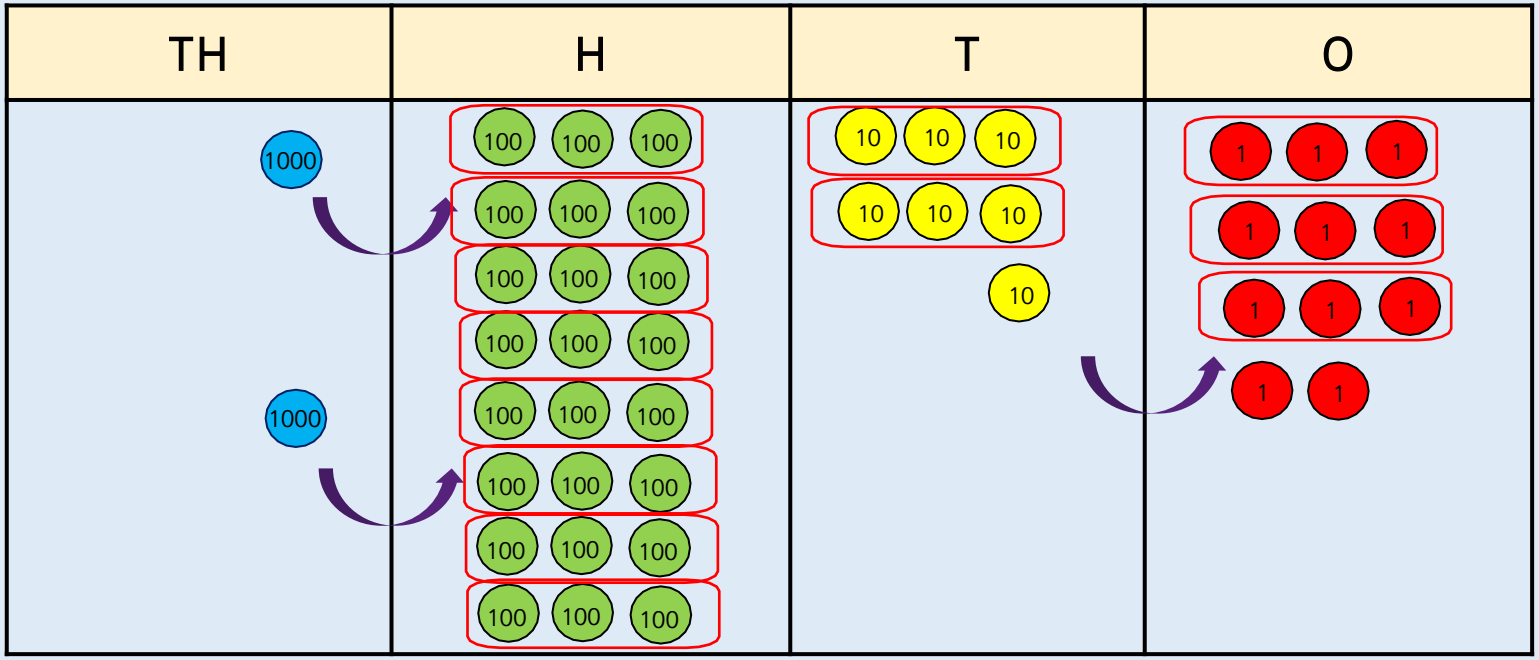
Here is a method to solve 6,613 divided by 5 using place value counters and short division.



$$5 \overline{)\,6613\,} \quad 1322 \text{ r } 3$$

Activity 1 Divide with Remainders

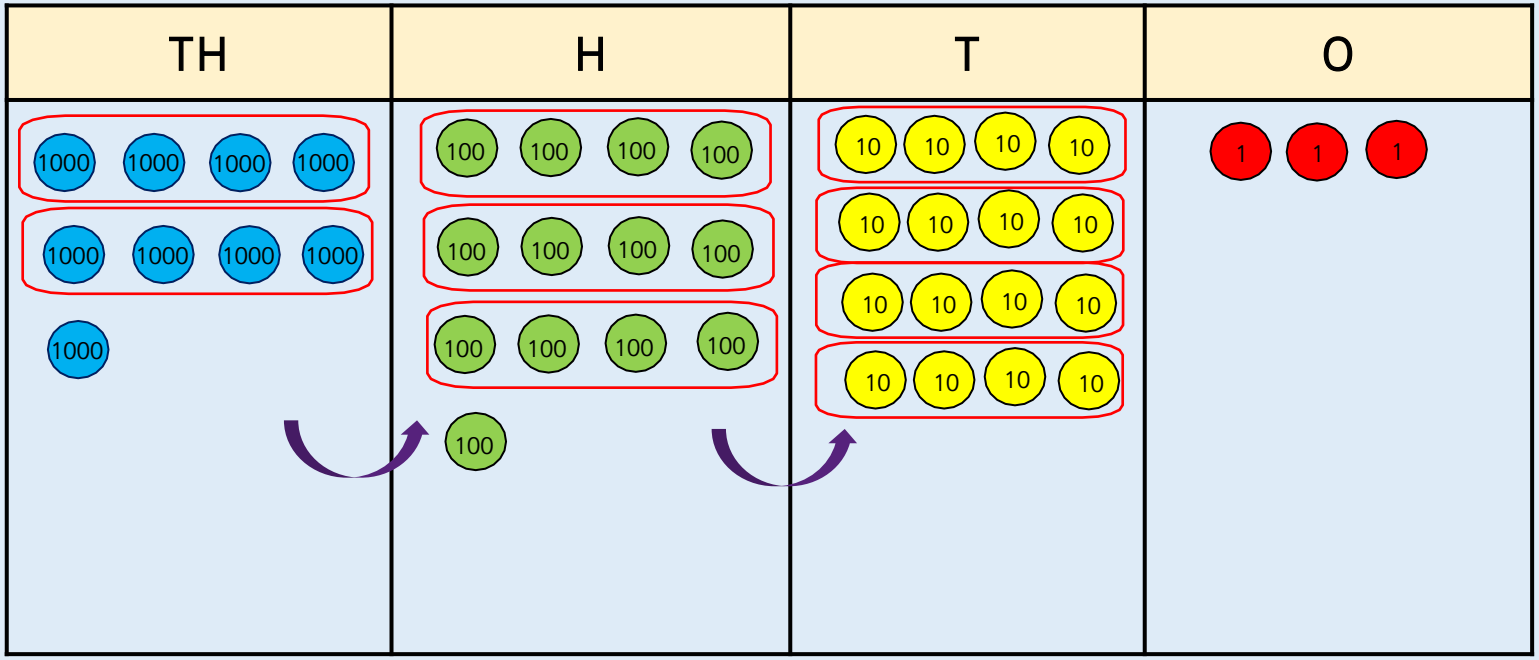
Here is a method to solve 2,471 divided by 3 using place value counters and short division.



$$\begin{array}{r} 823 \\ 3\overline{)\,2471\ \text{r}\ 2} \end{array}$$

Activity 1 Divide with Remainders

Here is a method to solve 9,363 divided by 4 using place value counters and short division.



$$
\begin{array}{r|l}
4 & 9363 \text{ r } 3 \\
\hline
\multicolumn{2}{r}{2340}
\end{array}
$$

Activity 2 Divide with Remainders

Doughnuts are placed on trays of six in a factory.

In one day the factory makes 5,366 doughnuts.

How many trays do they need per day?

How many full trays do they have at the end of the day?

Activity 2 Divide with Remainders

Doughnuts are placed on trays of six in a factory.

In one day the factory makes 5,366 doughnuts.

How many trays do they need per day? 895

How many full trays do they have at the end of the day?

894

Activity 3 Divide with Remainders

For the calculation:

8,035 ÷ 4, can you:

- write a number story where you have to round the remainder up and one where you round down?
- write a number story where you have to find the remainder?

Reasoning 1 Divide with Remainders

I am thinking of a three-digit number.

When it is divided by 9, the remainder is 3

When it is divided by 2, the remainder is 1

When it is divided by 5, the remainder is 4

What is my number?

Reasoning 1 Divide with Remainders

I am thinking of a three-digit number.

When it is divided by 9, the remainder is 3

When it is divided by 2, the remainder is 1

When it is divided by 5, the remainder is 4

What is my number?

Possible answers:

129	219
309	399
489	579
669	759
849	939

Reasoning 2 Divide with Remainders

Always, Sometimes, Never?

A three-digit number made of consecutive descending digits divided by the next descending digit always has a remainder of 1.

765 ÷ 4 = 191 remainder 1

How many possible examples can you find?

Reasoning 2 Divide with Remainders

Always, Sometimes, Never?

A three-digit number made of consecutive descending digits divided by the next descending digit always has a remainder of 1.

765 ÷ 4 = 191 remainder 1

Sometimes

Possible answers:

432 ÷ 1 = 432 r 0
543 ÷ 2 = 271 r 1
654 ÷ 3 = 218 r 0
765 ÷ 4 = 191 r 1
876 ÷ 5 = 175 r 1
987 ÷ 6 = 164 r 3

How many possible examples can you find?

Discuss

Divide with Remainders

If we can't make a group in this column, what do we do?

What happens if we can't group the ones equally?

In this number story, what does the remainder mean?

When would we round the remainder up or down?

In which context would we just focus on the remainder?