Spring Block 3

Decimals

Small steps

Step 1	Place value within 1
Step 2	Place value – integers and decimals
Step 3	Round decimals
Step 4	Add and subtract decimals
Step 5	Multiply by 10, 100 and 1,000
Step 6	Divide by 10, 100 and 1,000
Step 7	Multiply decimals by integers
Step 8	Divide decimals by integers

Small steps

Step 9 Multiply and divide decimals in context

Place value within 1

Notes and guidance

Children encountered numbers with up to 3 decimal places for the first time in Year 5. This understanding is recapped in this small step and built upon in the rest of the block.

Children represent numbers with up to 3 decimal places using counters and place value charts, identify the values of the digits in a decimal number and partition decimal numbers in a range of ways.

Children know the relationship between the different place value columns, for example hundredths are 10 times the size of thousandths and one-tenth the size of tenths.

In this step, numbers are kept within 1 to allow children to focus on the value of the decimal places. In the next step, they explore numbers greater than 1 with up to 3 decimal places.

Things to look out for

- Children may confuse the words "thousand" and "thousandth", "hundred" and "hundredth", and "ten" and "tenth".
- Children may use the incorrect number of placeholders, and so write the incorrect number.

Key questions

- What does each digit in a decimal number represent? How do you know?
- How many tenths/hundredths/thousandths are there in 1 whole?
- How many thousandths are there in 1 hundredth?
- What is the value of the digit _____ in the number _____?
- Which is greater, 0.3 or 0.14? How do you know?

Possible sentence stems

- There are _____ tenths, _____ hundredths and _____ thousandths.

  The number is _____
- There are _____ in _____
- _____ is 10 times/one-tenth the size of _____

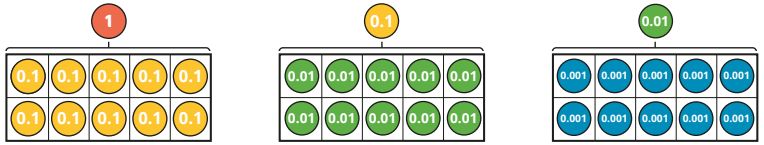
National Curriculum links

- Identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places

Place value within 1

Key learning

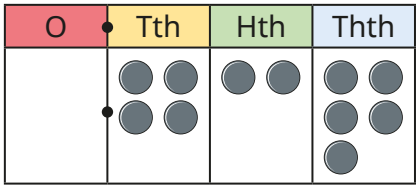
- Use the diagrams to complete the sentences in as many ways as possible.



_____ is one-tenth the size of _____

_____ is 10 times the size of _____

- Scott has made a number on a place value chart.



Complete the sentences to describe Scott's number.

There are _____ ones, _____ tenths, _____ hundredths and _____ thousandths.

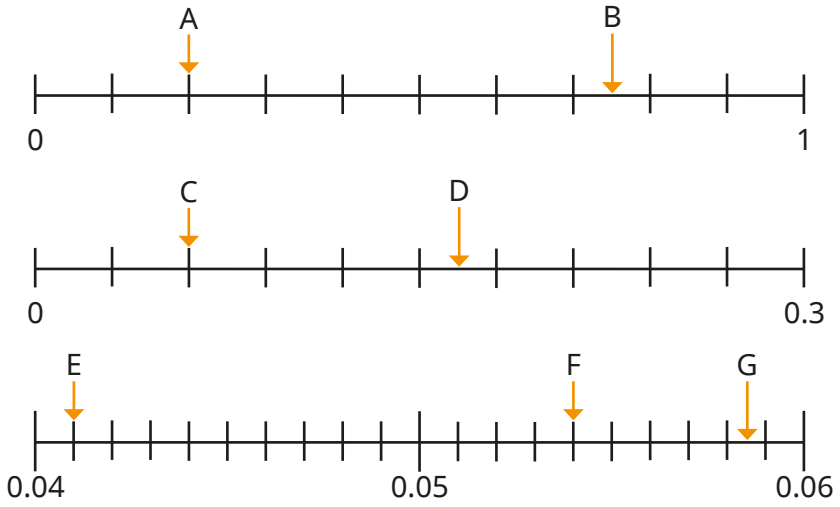
The number is _____

- Use a place value chart and plain counters to represent the numbers.

0.613	0.84	0.402	0.051

- Complete the number sentences.
  - 0.2 + 0.06 + 0.009 = _____
  - 0.4 + _____ + 0.001 = 0.451
  - _____ = 0.006 + 0.1 + 0.03
  - 0.6 + 0.003 = _____

- What decimal numbers are the arrows pointing to?



- Ron has partitioned 0.536

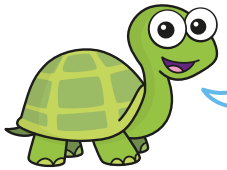
0.536 = 0.4 + 0.13 + 0.006

Use a place value chart to partition 0.536 a different way.

Compare answers with a partner.

Place value within 1

Reasoning and problem solving



The more decimal places a number has, the smaller the number is.

Do you agree with Tiny?

Explain your answer.

No

O	Tth	Hth	Thth

Use four counters to make a number less than 1

What is the value of each digit in your number?

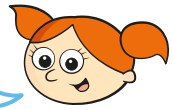
How many ways can you partition it?

multiple possible answers

0.454 | 0.44 | 0.445 | 0.345

The children are each thinking of a different decimal number.

Amir: My number has four hundredths.



Alex: My number is the smallest.

Dora: The sum of the digits in my number is 13

Dexter: The tenths and hundredths digits in my number are different.

Match each number to the correct child.

Amir: 0.44 Alex: 0.345 Dora: 0.445 Dexter: 0.454

Place value – integers and decimals

Notes and guidance

In this small step, children continue to explore numbers with 3 decimal places, now extending to numbers greater than 1

As in the previous step, children use counters and place value charts to represent numbers greater than 1 with up to 3 decimal places, identify the value of the digits in a decimal number and partition decimal numbers in a range of ways. They can describe the difference between integer and decimal parts of numbers, for example recognising 3 tens and 3 tenths.

Children understand the relationship between the different place value columns, for example knowing that tenths are 10 times the size of hundredths and one-tenth the size of ones ($0.01 \times 10 = 0.1$, $1 \div 10 = 0.1$). Number lines and thousand squares are helpful representations for exploring these relationships.

Things to look out for

- Children may confuse the words “thousand” and “thousandth”, “hundred” and “hundredth”, and “ten” and “tenth”.
- Children may use the incorrect number of placeholders, and so write the incorrect number.

Key questions

- What does a decimal number represent?
- How many tenths/hundredths/thousandths are there in 1 whole?
- How many thousandths are there in 1 hundredth?
- What digit is in the _____ column?
- What is the value of the digit _____ in the number _____?
- Which is greater, 1.897 or 3.1? How do you know?

Possible sentence stems

- There are _____ ones, _____ tenths, _____ hundredths and _____ thousandths.

  The number is _____
- There are _____ in _____
- _____ is 10/100/1,000 times the size of _____
- _____ is one-tenth/hundredth/thousandth the size of _____

National Curriculum links

- Identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places

Place value – integers and decimals

Key learning

- Use the cards to complete the sentences in as many ways as possible.

tens	ones	tenths	hundredths	thousandths

_____ are 10 times the size of _____

_____ are one-tenth the size of _____

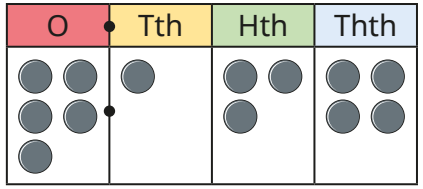
_____ are 100 times the size of _____

_____ are one-hundredth the size of _____

_____ are 1,000 times the size of _____

_____ are one-thousandth the size of _____

- Complete the sentences to describe the number.



There are _____ ones, _____ tenth, _____ hundredths and _____ thousandths.

The number is _____

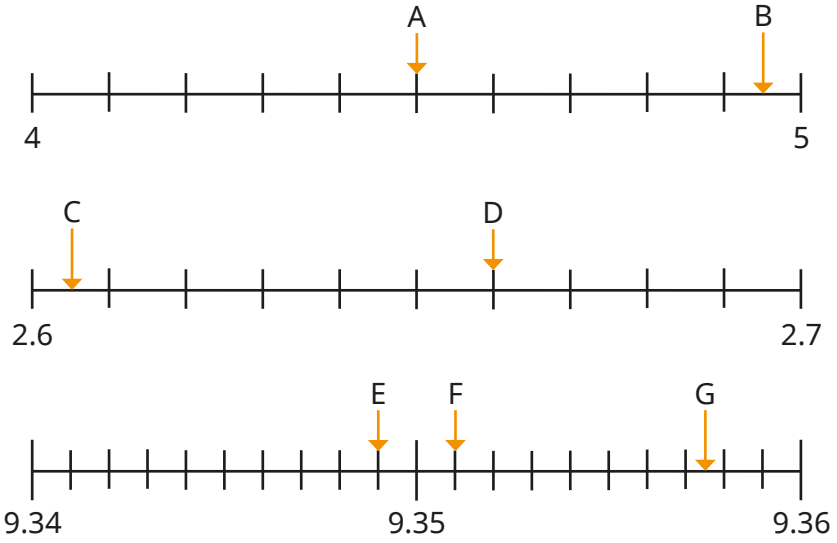
- Use a place value chart and plain counters to represent the numbers.

2.423	12.67	20.451	6.015	30.303

- What is the value of the 3 in each number?

1.34	31.4	11.403	4.13	103.414

- What decimal numbers are the arrows pointing to?



Place value – integers and decimals

Reasoning and problem solving

Which is the odd one out?

A 2 + 0.1 + 0.02 + 0.003

B 1 + 1.1 + 0.02 + 0.003

C 2 + 1.1 + 0.03

D 2 + 0.1 + 0.01 + 0.013

E 2 + 0.1 + 0.023

Explain your answer.

Create your own question like this for a partner.

C

C is 3.13, but all the other numbers are 2.123

O	Tth	Hth	Thth

Use five plain counters to make a number greater than 1

What is the value of each digit in your number?

How many ways can you partition it?

multiple possible answers

Is the statement always true, sometimes true or never true?

A number with 3 decimal places is greater than a number with only 1 decimal place.

Explain your answer.

sometimes true

Round decimals

Notes and guidance

In Year 5, children learnt to round numbers with up to 2 decimal places to the nearest integer and to 1 decimal place. It may be helpful to recap some of this learning before beginning this step. In this small step, children round numbers with up to 3 decimal places to the nearest integer and tenth (1 decimal place), as well as rounding to the nearest hundredth (2 decimal places) for the first time.

It is vital that children can identify the multiples of 1, 0.1 and 0.01 before and after any number with up to 3 decimal places. Children can then explore which multiple is closer, to help decide what a number should be rounded to. As with all rounding, the use of number lines can help with this process. Children recognise that when asked to round to a given degree of accuracy, they look at the place value column to the right; if the digit is 0 to 4, they round to the previous multiple and if it is 5 to 9, they round to the next multiple.

Things to look out for

- The phrase "round down" can lead children to round too low, for example rounding 6.923 down to 6.91 rather than 6.92

Key questions

- What is the next/previous integer/tenth/hundredth?
- Using the number line, which multiple of _____ is _____ closer to?
- If you are rounding to the nearest _____, which column do you need to look at to decide where to round to?
- If the digit in this column is between 0 and 4, which multiple should you round to?
- Which multiple should you round to if the digit is a 5?

Possible sentence stems

- The previous/next multiple of _____ is _____

  _____ is closer to _____ than _____

  So _____ rounded to the nearest _____ is _____

National Curriculum links

- Solve problems which require answers to be rounded to specified degrees of accuracy

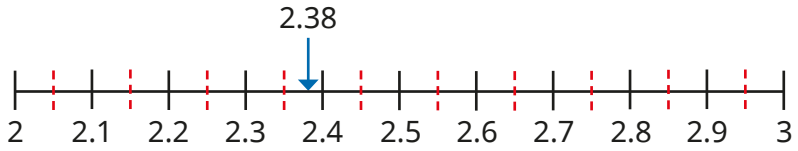
Round decimals

Key learning

- Complete the table.

Number	3.472	2.196	0.804
Previous integer	3		
Next integer	4		
Previous tenth	3.4		
Next tenth	3.5		
Previous hundredth	3.47		
Next hundredth	3.48		

- Use the number line to complete the sentences.



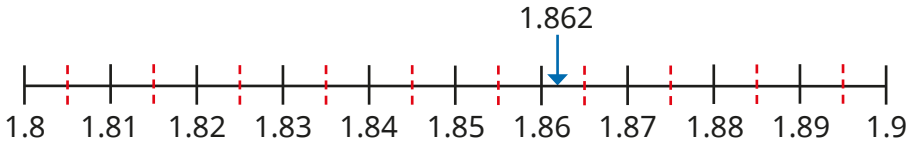
2.38 is closer to 2 than 3

2.38 rounded to the nearest integer is _____

2.38 is closer to 2.4 than 2.3

2.38 rounded to the nearest tenth is _____

- Use the number line to complete the sentences.



1.862 is closer to _____ than _____

1.862 rounded to the nearest hundredth is _____

- Complete the sentences to round 4.615 to different degrees of accuracy.
  - 4.615 is closer to _____ than _____

    4.615 rounded to the nearest hundredth is _____
  - 4.615 is closer to _____ than _____

    4.615 rounded to the nearest tenth is _____
  - 4.615 is closer to _____ than _____

    4.615 rounded to the nearest integer is _____

- Round the numbers to the nearest hundredth, tenth and integer.

2.473	10.185	7.084	19.987

Round decimals

Reasoning and problem solving

Here are some number cards.

4.545	4.544	5.445	5.444	4.455

Use each number once only to complete the sentences.

_____ rounded to the nearest tenth is 4.5

_____ rounded to the nearest integer is 4

_____ rounded to the nearest tenth is 5.4

_____ rounded to the nearest hundredth is 5.45

_____ rounded to the nearest hundredth is 4.54

4.545 4.455 5.444 5.445 4.544

Use the digit cards to make the statements correct.

4	5	6	7

You may use each card once only.

□.803 rounded to the nearest integer is 6

5.9□ rounded to the nearest tenth is 6

6.□ rounded to the nearest integer is 6

□.002 rounded to the nearest hundredth is 6

5.803 5.9**7** 6.**4** **6**.002

Add and subtract decimals

Notes and guidance

In Year 5, children added and subtracted numbers with up to 3 decimal places. In this small step, children revise the methods used for adding and subtracting numbers with different numbers of decimal places and numbers where exchanging between columns is needed.

Use place value counters in a place value chart alongside the formal written method to help children with their understanding. Begin with the smallest place value column when adding or subtracting, while at each stage asking: "Can you make an exchange?" Care must be taken when numbers have the same number of digits, but belong in different place value columns, for example 1.23 + 45.6. The use of zero placeholders can support with this. Bar models and part-whole models can be used alongside concrete resources to help children understand what calculation needs to take place.

Things to look out for

- Children may not line up digits in the correct place value columns.
- When an exchange is needed in addition, children may forget to add the exchanged number.
- Children may forget to put the decimal point in their answer.

Key questions

- How can you represent this question using place value counters?
- Do you have enough _____ to make an exchange?
- Do you need to exchange any _____?
- What are 10 tenths/10 hundredths/10 thousandths equal to?
- If there are not enough tenths/hundredths/thousandths for the subtraction, what do you need to do?

Possible sentence stems

- _____ added to _____ is equal to _____
- _____ subtract _____ is equal to _____
- _____ tenths added to _____ tenths is equal to _____ tenths.

  I do/do not need to make an exchange because ...

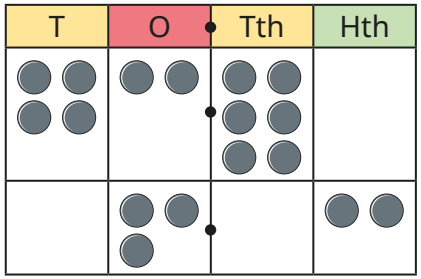
National Curriculum links

- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Add and subtract decimals

Key learning

- Whitney is working out 42.6 + 3.02 using a place value chart.

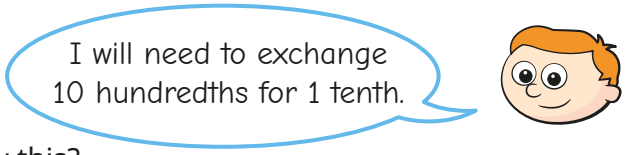


		4	2 •	6	0	
	+		3 •	0	2	
		4	5 •	6	2	

Use Whitney's method to work out the calculations.

503.6 + 25.35 | 56.95 – 32.8 | 31.67 + 1.319 | 249.45 – 18.3

- Ron is finding the total of 0.64 and 0.27



How does Ron know this?

Use a place value chart and counters to find the total of 0.64 and 0.27

- Use a place value chart and counters to complete the calculations.

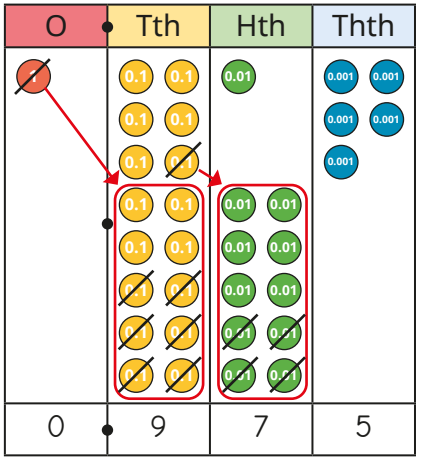
0.46 + 0.28 | 0.73 – 0.29 | 1.067 + 0.274 | 23.517 – 12.187

- Use place value counters to show that 1.035 + 0.18 = 1.215

- Use a place value chart to help work out the calculations.

0.468 + 1.25 | 5.687 + 0.97 | 15.027 + 9.58

- Esther uses place value counters to work out 1.615 – 0.64



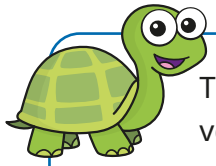
		$^{0}\cancel{1}\bullet^{15}\cancel{6}$		$^{1}1$	5	
	–	0 •	6	4		
		0 •	9	7	5	

Use Esther's method to work out the calculations.

0.468 – 0.28 | 5.71 – 0.815 | 16.904 – 7.85

Add and subtract decimals

Reasoning and problem solving



Tiny has represented 16.53 + 5.485 on a place value chart.

T	O	Tth	Hth	Thths
●	● ● ● ● ● ●	● ● ● ● ●	● ● ●	
● ● ● ●	● ● ● ●	● ● ● ● ● ● ● ●	● ● ● ●	

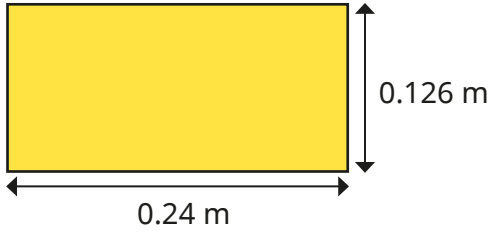
What mistake has Tiny made?

Represent the calculation correctly.

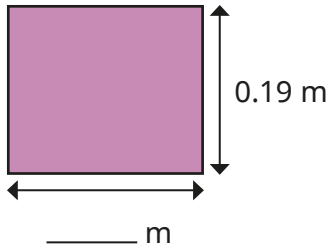
What is the correct answer?

22.015

Work out the perimeter of this shape.



This rectangle has a perimeter of 0.866 m.



Work out the missing length.

0.732 m

0.243 m

Multiply by 10, 100 and 1,000

Notes and guidance

In Year 5, children multiplied numbers with up to 2 decimal places by 10, 100 and 1,000. This small step extends to numbers with up to 3 decimal places.

Children use place value counters to represent multiplying a decimal number by 10, leading to an exchange being needed. Children see that when multiplying by 10, they exchange for a counter that goes in the place value column to the left. Children then explore how multiplying by 100 is the same as multiplying by 10 and then 10 again, so digits move two place value columns to the left. Finally, they look at multiplying by 1,000

A Gattegno chart and plain counters in a place value chart are also used to help children with their understanding.

Things to look out for

- Children may add a zero when multiplying a decimal number by 10, or two zeros when multiplying by 100, for example $5.13 \times 10 = 5.130$
- Children may think of the multiplication as moving the decimal point, but it is important to refer to the digits moving instead as they become, for example, 10 times greater.

Key questions

- How can you represent multiplying a decimal number with place value counters?
- What number is 10 times the size of _____?
- What number is 100 times the size of _____?
- What number is 1,000 times the size of _____?
- How can you multiply decimal numbers using a Gattegno chart?
- How can you use counters on a place value chart to multiply numbers by 10/100/1,000?

Possible sentence stems

- _____ is 10/100/1,000 times the size of _____
- _____ is one-tenth/hundredth/thousandth the size of _____
- To multiply by _____, I move the digits _____ places to the _____

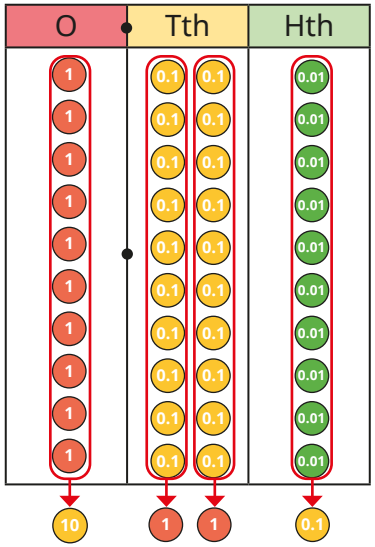
National Curriculum links

- Identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places

Multiply by 10, 100 and 1,000

Key learning

- Tommy uses place value counters to multiply 1.21 by 10



1.21 × 10 = 12.1
12.1 is 10 times the size of 1.21
1.21 is one-tenth the size of 12.1

Use Tommy's method to work out the calculations and complete the sentences for each one.

2.43 × 10	1.05 × 10	0.03 × 10	4.1 × 10

_____ × 10 = _____

_____ is 10 times the size of _____

_____ is one-tenth the size of _____

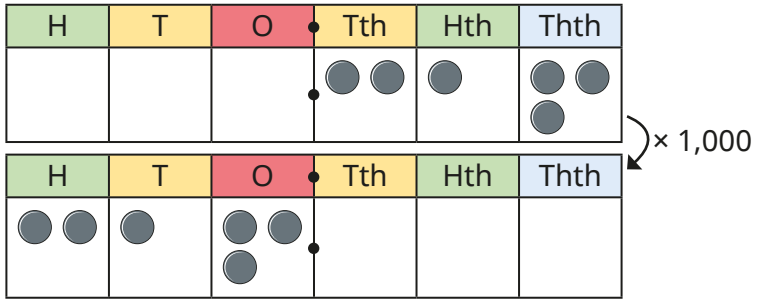
- Jack uses a Gattegno chart to work out that 0.46 × 100 = 46

10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

Use a Gattegno chart to work out the calculations.

- 0.19 × 100
- 2.05 × 100
- 1.513 × 100

- Nijah multiplies 0.213 by 1,000 using a place value chart.



0.213 × 1,000 = 213
213 is 1,000 times the size of 0.2130.123 is one-thousandth the size of 213

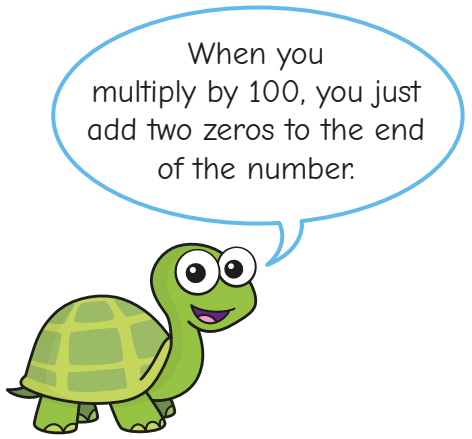
Use Nijah's method to work out the calculations.

0.32 × 1,000	0.298 × 1,000	1.045 × 1,000	5.407 × 1,000

Multiply by 10, 100 and 1,000

Reasoning and problem solving

Tiny is multiplying numbers by 100



Give an example of a calculation where Tiny's method works.

Give an example of a calculation where Tiny's method does **not** work.

What is a better way to explain how to multiply by 100?

Talk about it with a partner.

e.g. 3 × 100

e.g. 0.3 × 100

Fill in the missing numbers.

input				output
0.15	× 100		× 10	
	× 10	0.09	× 10	
0.365		3.65	× 1,000	
				5,490

15, 150

0.009, 0.9

× 10, 3,650

multiple possible answers, e.g. 0.549, × 10, 5.49, × 1,000

Divide by 10, 100 and 1,000

Notes and guidance

In the previous step, children multiplied numbers with up to 3 decimal places by 10, 100 and 1,000. In this small step, they divide whole and decimal numbers by 10, 100 and 1,000. The answers will never have more than 3 decimal places.

Children use place value counters to represent a decimal number being divided by 10. As with the previous step, using language such as "10 times the size" and "one-tenth of the size" will support children in their understanding.

Children recognise that dividing a number by 10 twice is the same as dividing the number by 100. They then use a place value chart with counters (and then digits) to divide a number by 10, 100 or 1,000 by moving the counters the correct number of places to the right. A Gattegno chart used in the same way as in the previous step will also help children understand what happens to numbers as they are divided by powers of 10

Things to look out for

- Children may try to remove a zero when dividing by 10, two zeros when dividing by 100 and so on.
- Children may move the decimal point as well as the digits. Encourage them to move digits to the right as they become, for example, one-tenth of the size.

Key questions

- How can you represent dividing a decimal number with place value counters?
- What is one-tenth the size of _____?
- What is one-hundredth the size of _____?
- What is one-thousandth the size of _____?
- How can you divide decimal numbers using a Gattegno chart?
- How can you use counters on a place value chart to divide numbers by 10/100/1,000?

Possible sentence stems

- _____ is 10/100/1,000 times the size of _____
- _____ is one-tenth/hundredth/thousandth the size of _____
- To divide by _____, I move the digits _____ places to the _____

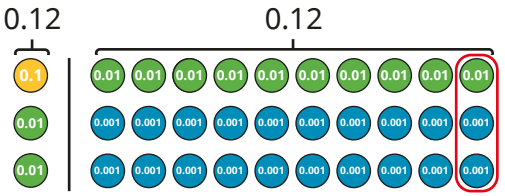
National Curriculum links

- Identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places

Divide by 10, 100 and 1,000

Key learning

- Alex divides 0.12 by 10 using place value counters.



1 tenth = 10 hundredths
1 hundredth = 10 thousandths
0.12 ÷ 10 = 0.012

Use Alex's method to work out the calculations and complete the sentences for each one.

2.43 ÷ 10	1.05 ÷ 10	0.03 ÷ 10	4.1 ÷ 10

_____ is 10 times the size of _____

_____ is one-tenth the size of _____

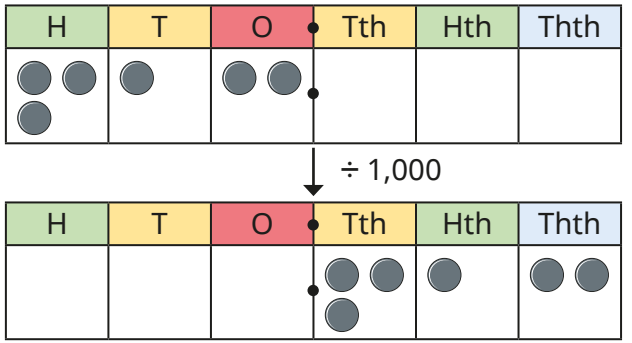
- Here are two division facts.

2.5 ÷ 10 = 0.25	0.25 ÷ 10 = 0.025

  - Explain why this means that 2.5 ÷ 100 = 0.025
  - Use this method to work out the divisions.

6.1 ÷ 100	0.8 ÷ 100	25.3 ÷ 100	7 ÷ 100

- Amir uses a place value chart to divide 312 by 1,000



312 ÷ 1,000 = 0.312
312 is 1,000 times the size of 0.312
0.312 is one-thousandth the size of 312

Use Amir's method to work out the divisions.

9 ÷ 1,000	45 ÷ 1,000	508 ÷ 1,000	2,060 ÷ 1,000

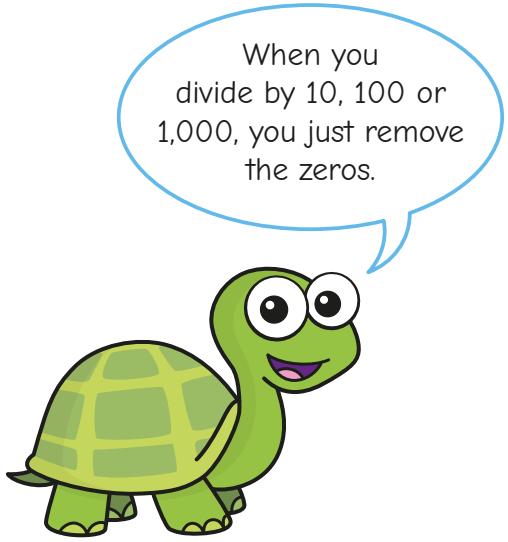
- Complete the table.

	30	3 kg			
÷ 10			0.9		
÷ 100					0.09
÷ 1,000				9	

Divide by 10, 100 and 1,000

Reasoning and problem solving

Tiny is dividing numbers by 10, 100 and 1,000



Do you agree with Tiny?

Explain your answer.

No

For example:
For 24 ÷ 10, there are no zeros to remove.

For 107 ÷ 10, you cannot just remove the zero to leave 17

Use the rules and the table to make 70 in as many ways as you can.

- Use a number from column A.
- Use an operation from column B.
- Use a number from column C.

A	B		C
7	×	÷	1
70			10
700			100
7,000			1,000

multiple possible answers, e.g.
7 × 10

Is the statement true or false?

> Dividing by 1,000 is the same as dividing by 10 three times.

Explain your answer.

True

Multiply decimals by integers

Notes and guidance

In this small step, children multiply numbers with up to 2 decimal places by integers other than 10, 100 and 1,000 for the first time.

Children look at related multiplication facts using concrete resources such as place value counters, exploring relationships such as $3 \times 2 = 6$ and $0.3 \times 2 = 0.6$, and $5 \times 5 = 25$ and $0.5 \times 5 = 2.5$. They then multiply numbers with up to 2 decimal places by 1-digit integers using rows of place value counters, exchanging when needed. This is a good opportunity to explore calculations with money.

Most of the learning focuses on multiplying by a 1-digit number, but it may be appropriate to explore methods for multiplying by a 2-digit number, for example partitioning the integer and using knowledge of multiplying by 10 to support the workings: $0.4 \times 14 = (0.4 \times 10) + (0.4 \times 4)$.

Things to look out for

- Children may make mistakes with exchanges where decimals are involved, for example thinking that $0.5 \times 3 = 0.15$
- When using related facts to multiply decimals, children may put the answer as 100 times smaller instead of 10 times smaller, for example $1.2 \times 3 = 0.36$

Key questions

- What is an integer?
- If you know $3 \times 2 = 6$, what else do you know?
- How can you show multiplying decimals by integers using counters?
- How is multiplying decimal numbers similar to/different from multiplying whole numbers?
- Do you have enough hundredths/tenths/ones to make an exchange?

Possible sentence stems

- I need to exchange 10 _____ for 1 _____
- I know that _____ × _____ = _____, so I also know that _____ × _____ = _____
- _____ multiplied by _____ is equal to _____

National Curriculum links

- Multiply 1-digit numbers with up to 2 decimal places by whole numbers

Multiply decimals by integers

Key learning

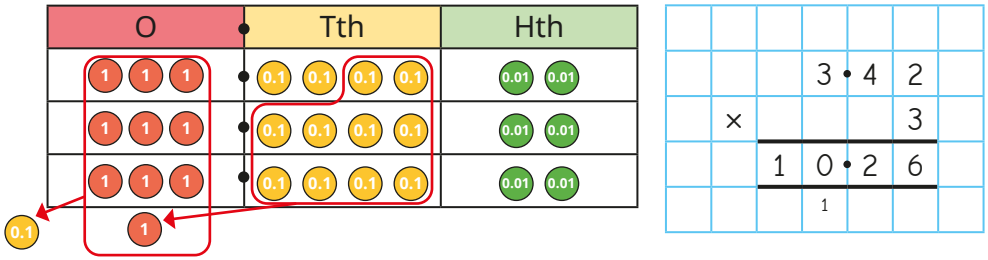
- Dora uses place value counters to show that 6 lots of 2 is 12, and 6 lots of 0.2 is 1.2

6 × 2 = 12 6 × 0.2 = 1.2

Use Dora's method to complete the calculations.

▶ 4 × 2	▶ 5 × 5	▶ 3 × 4	▶ 12 × 3
4 × 0.2	0.5 × 5	3 × 0.4	1.2 × 3

- Dexter uses place value counters to work out 3.42 × 3

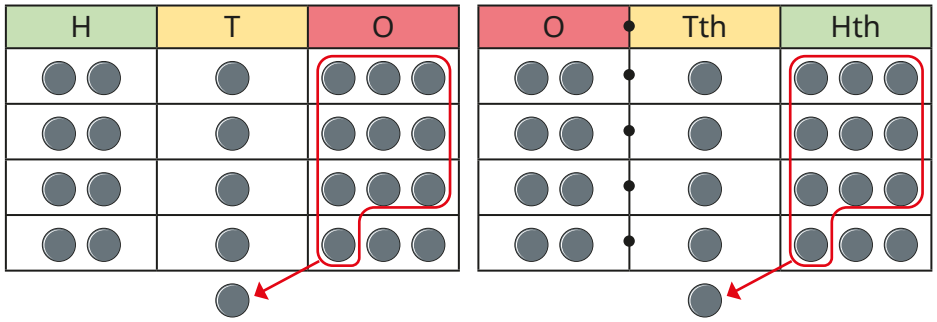


Use Dexter's method to work out the multiplications.

2.31 × 4	3.75 × 3	0.55 × 2	1.08 × 3

- Aisha and Filip are using counters to work out multiplications.

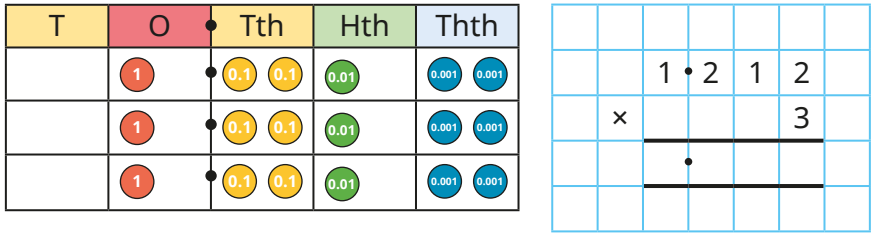
Aisha: 213 × 4 = 852 **Filip:** 2.13 × 4 = 852



What is the same and what is different about their calculations?

- Use the place value counters to multiply 1.212 by 3

Complete the calculation.

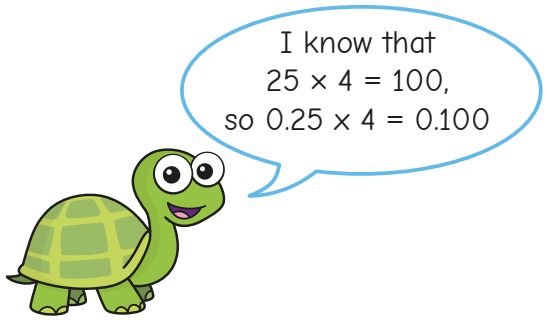


- Use place value counters and a formal written multiplication to work out the calculations.

2.121 × 4	0.613 × 5	4.056 × 3

Multiply decimals by integers

Reasoning and problem solving



Do you agree with Tiny?

Explain your answer.

No

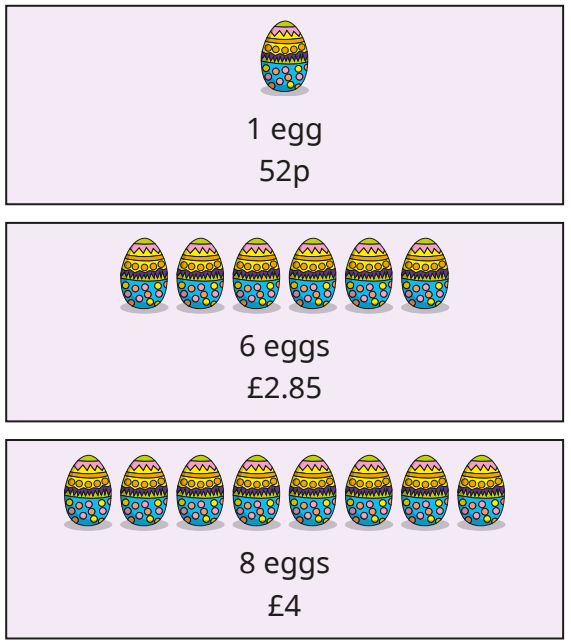
Is the statement always true, sometimes true or never true?

> When you multiply a number with 2 decimal places by an integer, the answer will have 2 decimal places.

Explain your answer.

sometimes true

Chocolate eggs can be bought individually, or in packs of 6 or 8



What is the cheapest way for Max to buy 25 chocolate eggs?

How much will he spend?

four packs of 6 plus an individual egg

£11.92

Divide decimals by integers

Notes and guidance

In this small step, children divide decimals by integers other than 10, 100 or 1,000 for the first time.

Children look at related division facts, such as 8 ÷ 2 = 4 therefore 0.8 ÷ 2 = 0.4 and 0.08 ÷ 2 = 0.04. Explore the pattern that as the number being divided becomes 10 or 100 times smaller, the answer becomes 10 or 100 times smaller, modelling this using place value counters in a place value chart.

Children explore a range of division facts using times-table knowledge, for example 144 ÷ 12 = 12, so 1.44 ÷ 12 = 0.12. Using place value counters, children put counters into groups, starting with the greatest place value column. They start with division where no exchanges are needed before moving on to calculations needing exchanges. They use the formal written method for division alongside the place value charts.

Things to look out for

- When using related facts, children may make the number being divided one-hundredth the size, but only make the answer one-tenth the size, for example 8 ÷ 2 = 4, so 0.08 ÷ 2 = 0.4
- When using the formal written method for division, children may forget to add the decimal point.

Key questions

- If you know that _____ ÷ _____ = _____, what else do you know?
- If you make the number being divided one-tenth the size, what must you do to the answer?
- How can you show this division using place value counters?
- How many groups of _____ can you make with _____?
- What happens to tenths or hundredths that you cannot group?

Possible sentence stems

- I know that _____ ÷ _____ is _____, so I also know that _____ ÷ _____ is _____
- If _____ ones divided by _____ is equal to _____, then _____ tenths/hundredths divided by _____ is equal to _____

National Curriculum links

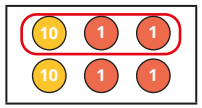
- Use written division methods in cases where the answer has up to 2 decimal places

Divide decimals by integers

Key learning

- Dani, Mo and Kim use place value counters to work out divisions.

Dani

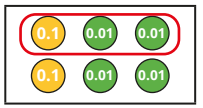


24 ÷ 2 = 12

Mo

2.4 ÷ 2 = 1.2

Kim



0.24 ÷ 2 = 0.12

What is the same about their divisions?

What is different about their divisions?

What do you notice?

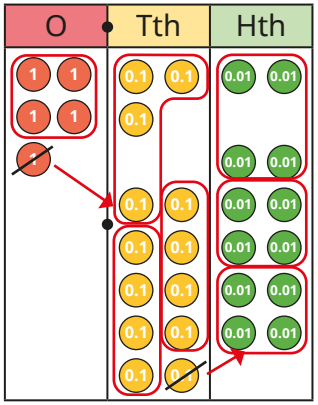
- Use place value counters to work out the divisions.
  - 4 ÷ 2
  - 9 ÷ 3
  - 36 ÷ 6
  - 15 ÷ 3
  - 0.4 ÷ 2
  - 0.09 ÷ 3
  - 3.6 ÷ 6
  - 0.15 ÷ 3

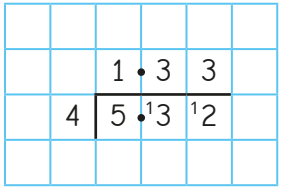
- Use counters and a place value chart to work out the divisions.

8.46 ÷ 2	0.84 ÷ 2	9.36 ÷ 3	9.03 ÷ 3

- Scott uses place value counters in a place value chart to work out 5.32 ÷ 4

He writes his calculation using the formal written method.





Use place value counters alongside the formal written method to work out the divisions.

3.12 ÷ 2	7.32 ÷ 3	6.05 ÷ 5

- Max has £7.48

He shares this money equally between him and 5 friends.

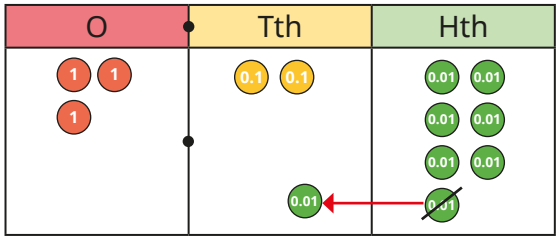
He puts the money left over in a pot.

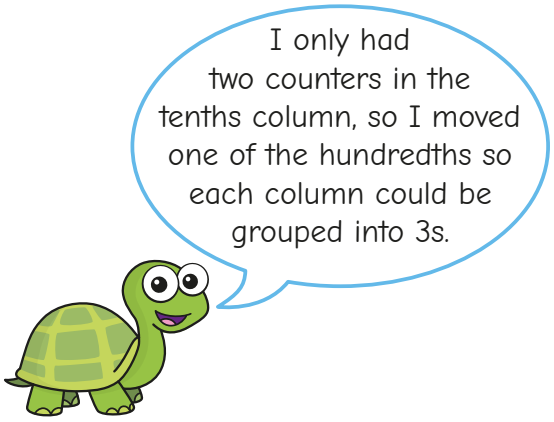
How much money does he put in the pot?

Divide decimals by integers

Reasoning and problem solving

Tiny uses place value counters to work out 3.27 ÷ 3





Explain why Tiny is incorrect.

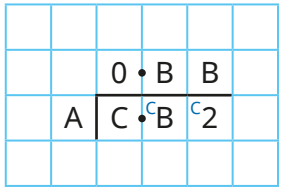
What is the correct answer?

1.09

C is $\frac{1}{4}$ of A

$B = C + 2$

Use this information to complete the division.



A = 4

B = 3

C = 1

Compare methods with a partner.

How did you work it out?

Create your own question like this for someone else to solve.

Multiply and divide decimals in context

Notes and guidance

This small step takes the skills explored in the previous two steps and applies them in a variety of contexts and problems.

Children recap the formal written methods for both multiplication and division alongside place value counters. They can use the same method with coins, with £1 coins replacing the ones, 10p coins replacing the tenths and 1p coins replacing the hundredths. Children then use these skills in a variety of contexts to solve problems.

Encourage children to use bar models to help them to identify what operation is needed and in what order steps should be taken.

It may be useful to recap conversions of units of measure from earlier in the year before beginning this step.

Things to look out for

- Children may be unsure which operation is needed to solve a problem.
- When solving questions in context, children may forget the units of measure.
- If a unit conversion is needed, for example kilograms to grams, children may multiply or divide by the incorrect amount.

Key questions

- How can you tell what operation you need to perform to answer this question?
- How can you represent this question using place value counters?
- What do you need to work out?
- How can you draw a bar model to represent this problem?
- Do you need to convert any units of measure to answer this question?

Possible sentence stems

- _____ multiplied by _____ is _____
- _____ divided by _____ is _____

National Curriculum links

- Multiply 1-digit numbers with up to 2 decimal places by whole numbers
- Use written division methods in cases where the answer has up to 2 decimal places
- Solve problems involving addition, subtraction, multiplication and division

Multiply and divide decimals in context

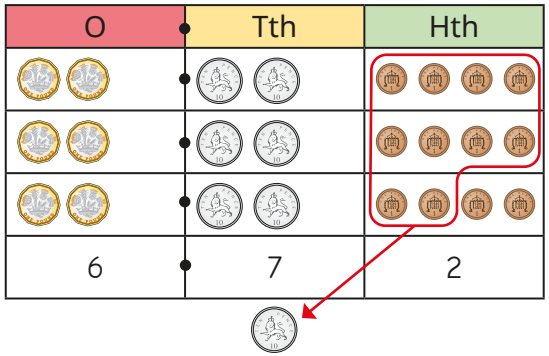
Key learning

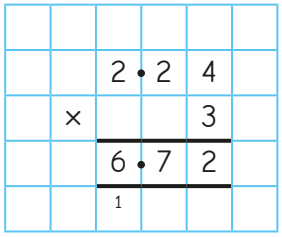
- The table shows the prices of items in a shop.

Item	Cost
Magazine	£2.24
Book	£5.25
CD	£3.49
DVD	£4.75

Esther wants to buy three magazines.

She uses coins in a place value chart alongside the formal written method to work out the total cost.



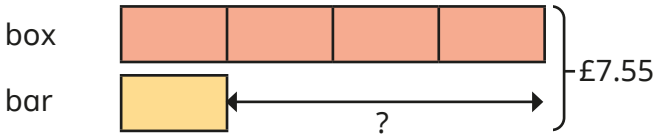


Use Esther's method to work out the costs of these items.

4 books | 3 CDs | 5 DVDs and 6 books

- A box of chocolates costs 4 times as much as a chocolate bar.

Together they cost £7.55



How much more does the box of chocolates cost than the chocolate bar?

- Modelling clay is sold in two different shops.
  - Shop A sells 4 pots of clay for £7.68
  - Shop B sells 3 pots of clay for £5.79

Which shop has the better deal?

Explain your answer.

- Huan has 9.6 litres of juice.

He fills 8 identical jugs with the juice.

How many millilitres of juice does each jug hold?

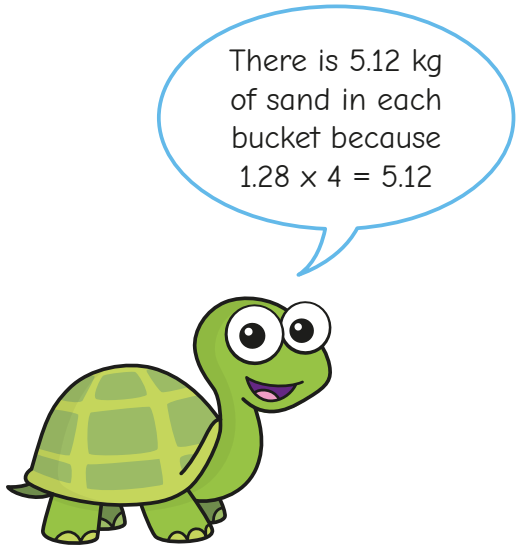
- A square has a perimeter of 0.824 m.

How long is each side?

Multiply and divide decimals in context

Reasoning and problem solving

1.28 kg of sand is shared equally between 4 buckets.



Explain the mistake that Tiny has made.

What is the mass of sand in each bucket?

0.32 kg

Annie has some money.

- She gives $\frac{2}{3}$ of her money to charity.
- She then buys three footballs costing £6.45 each.
- Her mum gives her and her two sisters £9.75 to share equally between them.

How much money did Annie have to start with?

£79.80