Summer Block 1

Decimals B

Small steps

Step 1	Make a whole with tenths
Step 2	Make a whole with hundredths
Step 3	Partition decimals
Step 4	Flexibly partition decimals
Step 5	Compare decimals
Step 6	Order decimals
Step 7	Round to the nearest whole number
Step 8	Halves and quarters as decimals

Make a whole with tenths

Notes and guidance

In this small step, children explore different ways of making 1 whole by combining tenths. Encourage children to use number bonds to 10 to support them, for example using 6 + 4 when finding the missing number in 0.6 + _____ = 1

Representations such as ten frames, place value counters, double-sided counters, hundred squares, bead strings and Rekenreks support children to visually see the connections to 1 whole. Part-whole models and bar models can also be used.

It is important that children recognise that, for example, $\frac{2}{10}$ is equal to 0.2, so they can write $\frac{2}{10} + \frac{8}{10}$ or $\frac{2}{10} + 0.8$. They could be challenged to find the whole from more than two parts, for example 1 = 0.3 + 0.4 + 0.3

Things to look out for

- When finding 1 whole, children may confuse tenths and hundredths by incorrectly using a zero as a placeholder, for example 0.06 + 0.04 = 1
- Children may not realise that it is possible to make 1 whole by adding a fraction and a decimal, for example $\frac{1}{10} + 0.9 = 1$

Key questions

- How many tenths make 1 whole?
- How many equal parts is 1 whole split into for one tenth to be one of the parts?
- What is the number bond of _____ to 10?
- What is the number bond of _____ tenths to 1 whole?
- What is the same/different about 7 + 3 and 7 tenths + 3 tenths?
- If you have _____ tenths, how many more tenths do you need to make 1 whole?

Possible sentence stems

- _____ + _____ = 10,

  so _____ tenths + _____ tenths = 1 whole
- $\frac{\square}{10}$ = 0._____

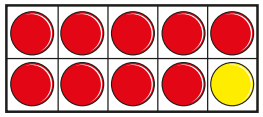
National Curriculum links

- Recognise and write decimal equivalents of any number of tenths or hundredths
- Solve simple measure and money problems involving fractions and decimals to 2 decimal places

Make a whole with tenths

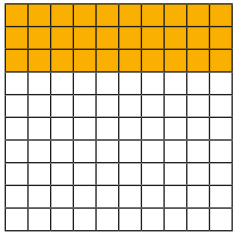
Key learning

- Aisha uses a ten frame and counters to show the addition
  0.9 + 0.1 = 1



  Use a ten frame and counters to find different ways to make 1 whole.

- The hundred square represents 1 whole.



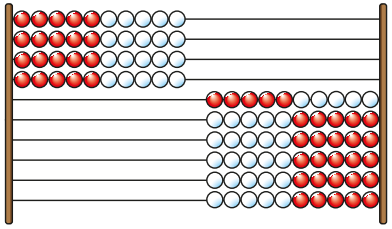
  How many tenths are shaded?

  How many more tenths need to be shaded so that the whole hundred square is shaded?

  _____ tenths + _____ tenths = 1 whole

- Here is a Rekenrek with 100 beads.

  Each row of beads is equal to one tenth of the whole.

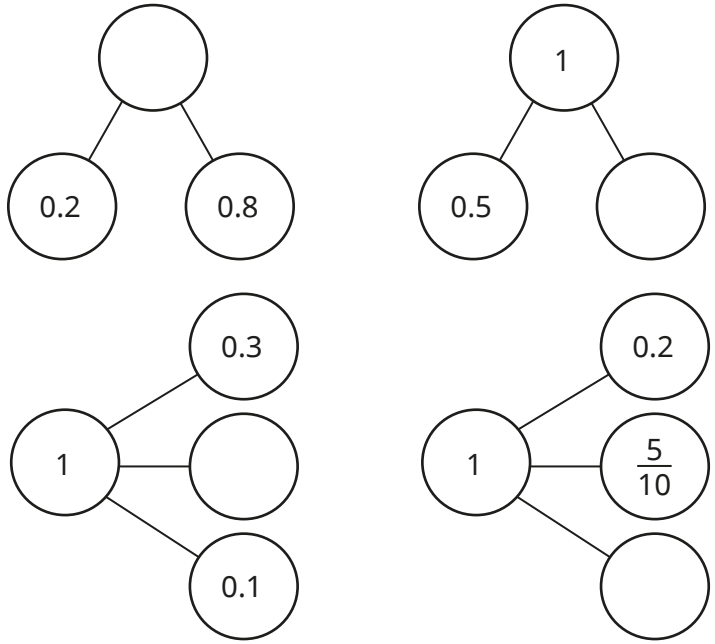


  _____ tenths are on the left.

  _____ tenths are on the right.

  _____ + _____ = 1 whole

- Complete the part-whole models.



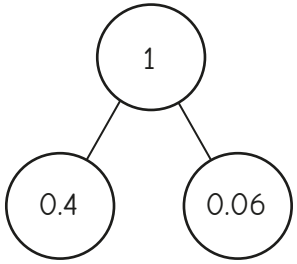
- Complete the number sentences.

  - 0.1 + _____ = 1
  - 0.7 + 0.3 = _____
  - $\frac{2}{10}$ + 0.8 = _____
  - 1 = _____ + 0.5 + 0.1
  - 1 = 0.2 + _____
  - _____ + 0.5 = 1
  - 1 = $\frac{6}{10}$ + _____
  - $\frac{3}{10}$ + 0.4 + _____ = 1

Make a whole with tenths

Reasoning and problem solving

Tiny draws a part-whole model.



Is Tiny's part-whole model correct?

Explain how you know.

No

Which calculation is the odd one out?

0.5 + 0.5	0.3 + 0.5 + 0.2
0.08 + 0.02	0.1 + 0.9

Explain your answer.

any with correct justification, e.g. 0.08 + 0.02 is not a bond to 1

Sam has some 0.1 counters and some $\frac{1}{10}$ counters.

The total of my counters is 1 whole.

She gives 3 of her 0.1 counters to Ron.

She gives 2 of her $\frac{1}{10}$ counters to Dora.

What counters could she have left?

How many answers can you find?

multiple possible answers, e.g.

1×0.1 and $4 \times \frac{1}{10}$

Find four different ways to complete the number sentence.

$\square + 0.1 + \square = 1$

0.1 and 0.8, 0.2 and 0.7, 0.3 and 0.6, 0.4 and 0.5

The numbers can be either way round.

Make a whole with hundredths

Notes and guidance

This small step builds on the previous step, as children now explore different ways of making 1 whole from hundredths.

This step requires children to use their number bonds to 100. Initially, they may need to practise finding number bonds to 100 that are multiples of 10, such as 60 + _____ = 100. Then they can move on to the number bond to 100 for any 2-digit number, such as 63 + _____ = 100

Using a familiar context, such as measurements involving centimetres and metres, can support children to make a whole from hundredths, using the fact that 1 cm = $\frac{1}{100}$ m.

Things to look out for

- If number bonds to 100 are not secure, children may make bridging errors such as
  74 hundredths + 36 hundredths = 1 whole.
- When finding a whole, children may confuse tenths and hundredths, for example 0.09 + 0.01 = 1
- Children may not realise that it is possible to make 1 whole by adding a fraction and a decimal, for example $\frac{34}{100}$ + 0.66 = 1

Key questions

- How many hundredths make 1 whole?
- How many equal parts is 1 whole split into for one hundredth to be one of the parts?
- What is the number bond of _____ to 100?
- What is the number bond of _____ hundredths to 1 whole?
- What is the same/different about 4 + 6, 4 tenths + 6 tenths and 40 hundredths + 60 hundredths?
- If you have _____ hundredths, how many more do you need to make 1 whole?

Possible sentence stems

- _____ + _____ = 100,
  so _____ hundredths + _____ hundredths = 1 whole
- $\frac{\square}{100}$ = 0._____

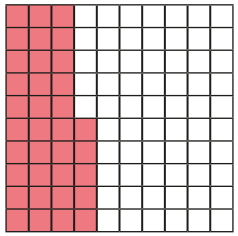
National Curriculum links

- Recognise and write decimal equivalents of any number of tenths or hundredths
- Solve simple measure and money problems involving fractions and decimals to 2 decimal places

Make a whole with hundredths

Key learning

- The hundred square represents 1 whole.



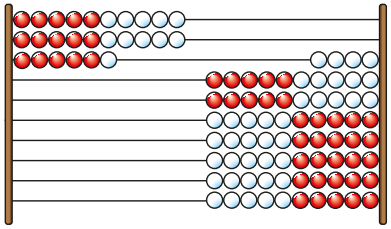
How many hundredths are shaded?

How many more hundredths need to be shaded so that the whole hundred square is shaded?

_____ hundredths + _____ hundredths = 1 whole

- Here is a Rekenrek with 100 beads.

Each bead is one hundredth of the whole.

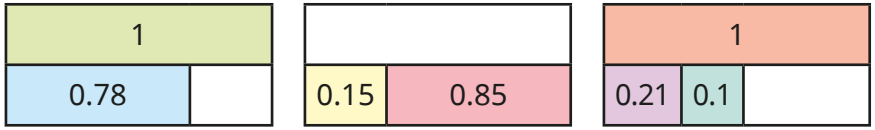


_____ hundredths are on the left.

_____ hundredths are on the right.

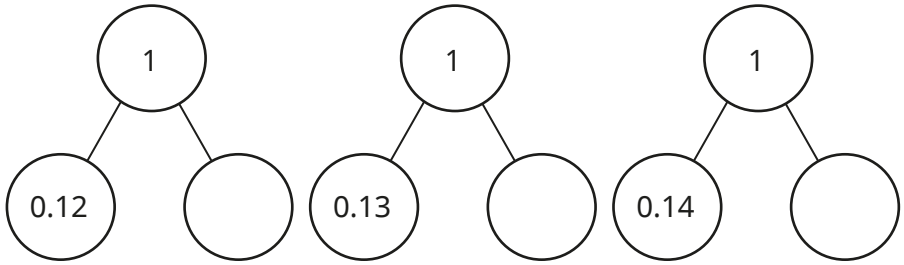
_____ + _____ = 1 whole

- Complete the bar models.



- Complete the number sentences.
  - 4 hundredths + _____ hundredths = 1
  - _____ hundredths + 83 hundredths = 1
  - _____ hundredths + 13 hundredths = 1
  - 24 hundredths + _____ hundredths + 6 tenths = 1

- Complete the part-whole models.



What do you notice?

- Which calculations **do not** sum to 1?

0.54 + 0.56	0.54 + 0.46	0.54 + 0.54
0.3 + 0.7	0.03 + 0.7	0.03 + 0.07

Make a whole with hundredths

Reasoning and problem solving

Tommy has a piece of ribbon that is less than 0.6 m long.

Rosie has a piece of ribbon that is less than 0.45 m long.

Altogether, could they have enough ribbon to measure exactly 1 m?

Explain your reasoning.

Yes

multiple possible answers, e.g.

0.56 m + 0.44 m

0.57 m + 0.43 m

Each row and column in the square sum to 1 whole.

Complete the grid.

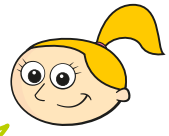
0.44	0.45	
	0.35	
0.16		0.64

0.44	0.45	**0.11**
0.40	0.35	**0.25**
0.16	**0.20**	0.64

Whitney, Eva and Jack are growing flowers.

Whitney: My flower is exactly 1 m tall.

My flower is 11 cm shorter than Whitney's flower.



Eva

Jack: My flower is taller than Eva's flower, but shorter than Whitney's flower.

How tall is Eva's flower in metres?

How tall could Jack's flower be in metres?

0.89 m

taller than 0.89 m and shorter than 1 m, e.g. 0.94 m

Partition decimals

Notes and guidance

In this small step, children partition numbers with up to 2 decimal places into their place value parts.

Using place value counters and place value charts supports children in recognising the place value of each digit in a number. Part-whole models are used to partition the numbers using the children's understanding of place value.

In this step, children focus on partitioning into the ones part, the tenths part and the hundredths part. More flexible partitioning is the focus of the next step.

Discuss with children the role of zero as a placeholder. Encourage them to verbalise each place value column of a number, for example "zero tenths" in the number 3.09

Things to look out for

- Children may write decimal numbers incorrectly if they are unable to use zero as a placeholder, for example writing 7 hundredths as 0.7
- When writing a number that requires zero as a placeholder, children may not include the zero, for example 8 + 0.06 = 8.6

Key questions

- How many ones/tenths/hundredths are there in the number?
- How do you write this number as a decimal?
- How would you read the number out loud?
- How would you partition the number into ones, tenths and hundredths?
- What is the value of _____ in the number _____?
- What is the role of zero in the number 4.06?

Possible sentence stems

- There are _____ ones, _____ tenths and _____ hundredths. The number is _____
- There are _____ ones, _____ tenths and _____ hundredths, so _____ = _____ + _____ + _____

National Curriculum links

- Recognise and write decimal equivalents of any number of tenths or hundredths
- Solve simple measure and money problems involving fractions and decimals to 2 decimal places

Partition decimals

Key learning

- Complete the sentences to describe the numbers shown in the place value charts.

  There are _____ ones, _____ tenths and _____ hundredths.

  The number is _____

Ones	Tenths	Hundredths
1 1	0.1 0.1 0.1 0.1	0.01 0.01 0.01

Ones	Tenths	Hundredths
	0.1 0.1 0.1 0.1 0.1	0.01 0.01

Ones	Tenths	Hundredths
1 1 1 1		0.01 0.01 0.01 0.01

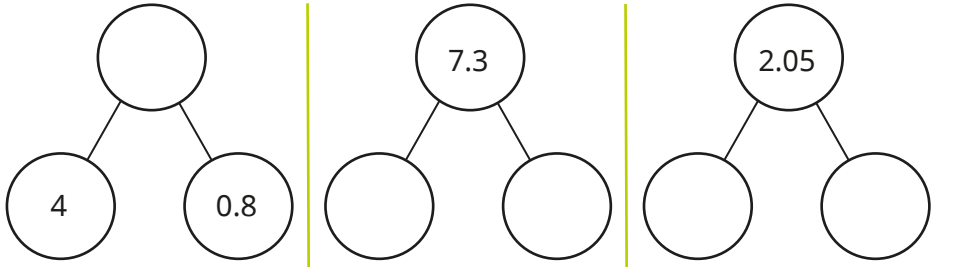
Ones	Tenths	Hundredths
1 1 1 1 1	0.1 0.1 0.1	

- Use place value counters to make the numbers.

  Partition each number into ones, tenths and hundredths.

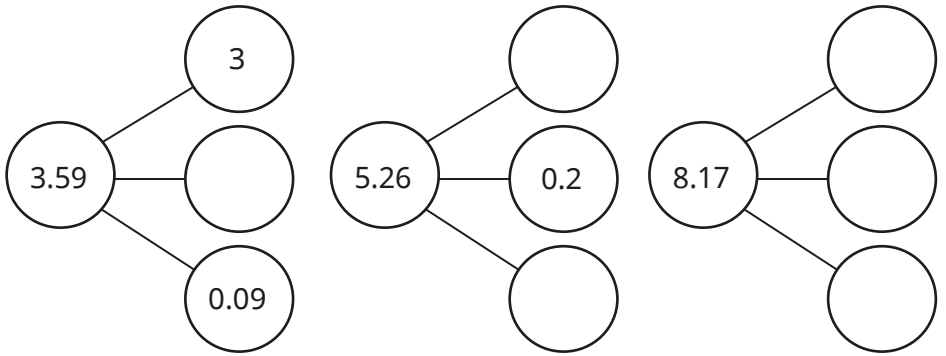
1.56	2.71	3.09	6.8

- Complete the part-whole models and the number sentences.



_____ = 4 + 0.8 | 7.3 = _____ + _____ | 2.05 = _____ + _____

- Complete the part-whole models.



- Make each number on a place value chart.

  Write the value of the underlined digit.

25.<u>9</u>1	0.0<u>5</u>	1.<u>4</u>2	1<u>8</u>.37

Partition decimals

Reasoning and problem solving

Scott is counting up in hundredths using counters in a place value chart.

He counts up to 10 hundredths.

Ones	Tenths	Hundredths
		●●●● ●●●● ●●

He writes the decimal as 0.010

Is Scott correct?

Explain your answer.

No

10 hundredths should be exchanged for 1 tenth.

10 hundredths or 1 tenth is written as 0.1

Ones	Tenths	Hundredths
●●		●●

Dani thinks that the number shown in the place value chart is 2.2

Do you agree with Dani?

Explain your answer.

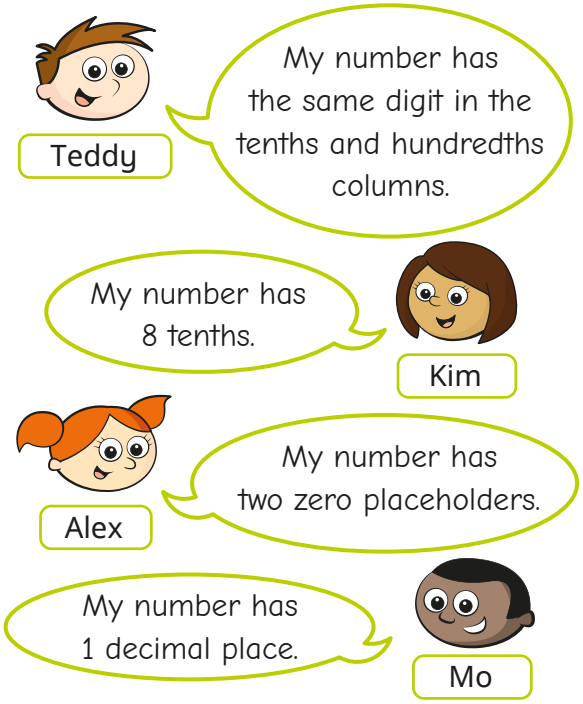
No

Dani has not included zero as the placeholder.

The number is 2.02

Each child chooses one of these numbers.

0.87	1.7	0.08	1.77



Which child chose which number?

How do you know?

Teddy: 1.77

Kim: 0.87

Alex: 0.08

Mo: 1.7

Flexibly partition decimals

Notes and guidance

In this small step, children carry on partitioning numbers with decimals up to 2 decimal places, with the learning from the previous step being extended to include flexible partitioning.

Flexible partitioning requires secure place value knowledge, as children are expected to partition numbers in non-standard ways. They should be able to explain that, for example, 0.12 can be made up of 12 hundredths and also 1 tenth and 2 hundredths. Children also continue to explore the role of zero as a placeholder.

Place value counters, place value charts and part-whole models are still good representations to support their understanding.

Discuss whether a number can be partitioned into more or fewer parts than its number of digits.

Things to look out for

- Children may think that numbers can only be partitioned into place value columns. For example, 3.49 can only be partitioned as 3 + 0.4 + 0.09
- When writing a number that requires zero as a placeholder, children may not take into account the place value position of each digit, for example 8 + 0.06 + 0.1 = 8.106

Key questions

- How many ones/tenths/hundredths are there in the number?
- How do you write this number as a decimal?
- How could you partition the number into ones, tenths and hundredths?
- How many other ways can you partition the number?
- What is the role of zero in the number 3.06?

Possible sentence stems

- The number is _____
  There are _____ ones, _____ tenths and _____ hundredths.
  This could be partitioned into _____ ones, _____ tenths and _____ hundredths.
- _____ = _____ + _____ + _____

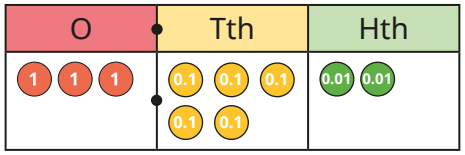
National Curriculum links

- Recognise and write decimal equivalents of any number of tenths or hundredths
- Solve simple measure and money problems involving fractions and decimals to 2 decimal places

Flexibly partition decimals

Key learning

- Esther represents the number 3.52 on a place value chart.

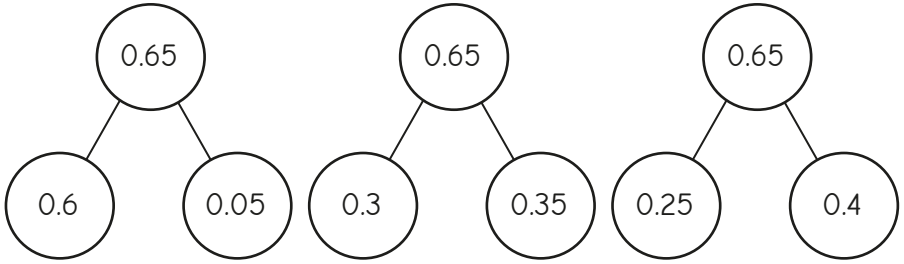


3 + 0.5 + 0.02 = 3.52
2 + 1.5 + 0.02 = 3.52
3.02 + 0.5 = 3.52

Make a different decimal number on a place value chart.

Partition your number in three different ways.

- Filip uses part-whole models to partition 0.65 in three different ways.



Use a part-whole model to partition 0.49 in three different ways.

Compare answers with a partner.

- The place value counters show 3.65

Use place value counters to partition 3.65 in three different ways.

Complete the number sentence for each way.

3.65 = _____ + _____ + _____

Compare answers with a partner.

- Brett has created a number on a Gattegno chart.

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

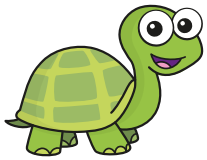
  - What is Brett's number?
  - Partition his number in three different ways.

- Complete the number sentences.
  - 3 + 0.08 + 0.4 = _____
  - 0.7 + 0.04 + 30 = _____
  - 5 + _____ + 0.3 = 5.36
  - 5 + _____ + 0.2 = 5.36
  - 7 + _____ + 0.1 = 7.34
  - 7.1 + _____ + 0.02 = 7.34

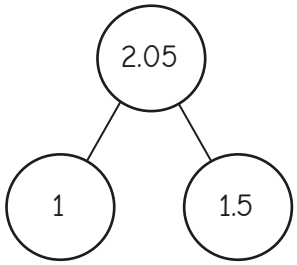
Flexibly partition decimals

Reasoning and problem solving

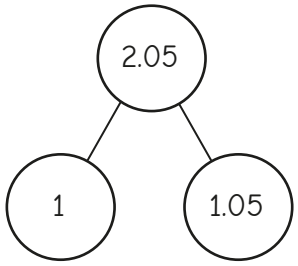
Tiny and Whitney are partitioning 2.05



Tiny



Whitney



Who is correct?

Explain your answer.

Whitney

In Tiny's model,
1 + 1.5 = 2.5,
not 2.05

Annie and Max are each shading a hundred square.

Annie

I have shaded 4 tenths of the hundred square in red and 26 hundredths of the hundred square in blue.

In total, I have shaded 4 fewer hundredths than Annie.

Max

How much of the hundred square has Max shaded?

Give your answer as a decimal.

Partition the decimal in three different ways.

0.62

multiple possible answers, e.g.
0.62 = 0.5 + 0.12

Compare decimals

Notes and guidance

In this small step, children compare decimal numbers with up to 2 decimal places.

It is important that children consider the values of the digits in place value order, comparing digits in the greatest place value column first. Discuss whether all the place value columns need to be compared. For example, when comparing 6.73 and 2.98, only the ones need to be compared; but when comparing 5.37 and 5.39, all the places need to be compared.

Representing the numbers in place value charts supports children in recognising the value of each digit, for instance that 0.5 is less than 0.72. It is also important that children read numbers such as 0.32 as "zero point three two" rather than "zero point thirty-two".

Things to look out for

- Children may think that a number such as 0.16 is greater than 0.3, because 16 is greater than 3
- Children may not realise that, for example, 0.4 = 0.40
- Children may only compare the digits after the decimal point, ignoring digits to the left of the decimal point, for example 1.47 < 0.76

Key questions

- Which place value column do you compare first? Why?
- How many ones/tenths/hundredths does the number have?
- Which number is greater/smaller? How do you know?
- How can you represent the decimal number on a place value chart?
- What is the same/different about the ones/tenths/hundredths?
- Do you need to compare every column when comparing the two numbers?

Possible sentence stems

- To compare numbers, I need to start by comparing the digits in the _____ place value column.
- _____._____ _____ is greater/less than _____._____ _____, because _____ is greater/less than _____

National Curriculum links

- Recognise and write decimal equivalents of any number of tenths or hundredths
- Compare numbers with the same number of decimal places up to 2 decimal places

Compare decimals

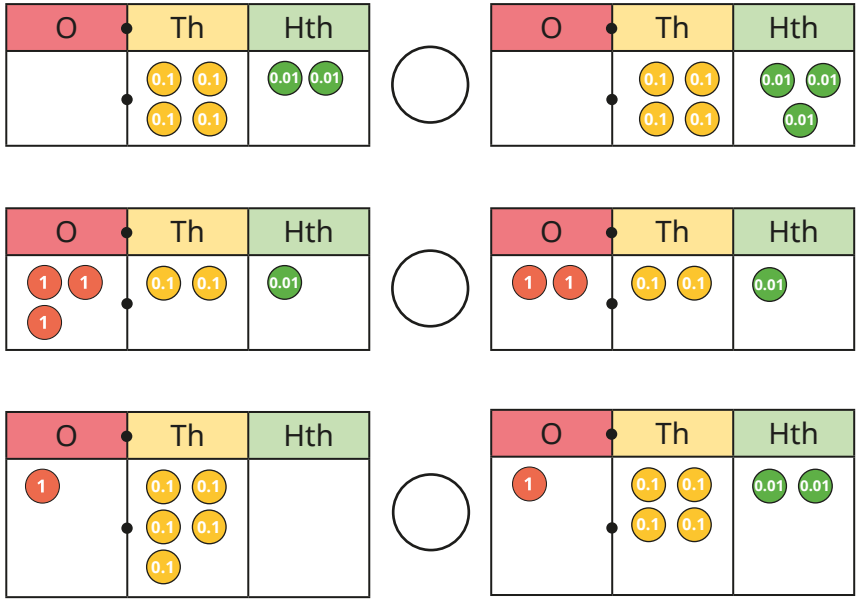
Key learning

- Use place value counters to make the numbers 8.4 and 4.8

  Which number is greater? How do you know?

- Which is the greater of each pair of numbers?
  - 9.4 and 13.8
  - 6.3 and 5.7
  - 46.2 and 38.7

- Write < or > to compare the numbers.



Did you have to compare all the columns for each question?

- Write < or > to compare the numbers.

5.8 ◯ 5.3 7.04 ◯ 7.09 0.43 ◯ 0.6

3.79 ◯ 3.71 0.9 ◯ 0.10 8.55 ◯ 8.3

- Fill in the missing digits to make the statements correct.
  - 4.5___ > 4.53
  - 0.7___ < 0.7___
  - 0.8___ < 0.89
  - ___.56 < ___.56
  - 3.39 > 3.___9
  - 2.3___ > 2.1___
  - 4.___8 > 4.___3
  - 4.09 > 4.01 + 0.0___

- Draw exactly nine counters in the chart to represent a number that matches the description.

a number between 3.04 and 3.19

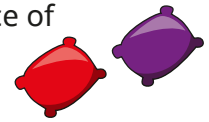
Ones	Tenths	Hundredths

Compare answers with a partner.

Compare decimals

Reasoning and problem solving

Ron and Dexter each throw a bean bag and measure the distance of their throw.



I threw the bean bag further because it landed 1.5 m away.

Ron

I threw the bean bag further because it landed 1.39 m away.

Dexter

Who is correct?

Explain your reasoning.

Ron

1.5 m is further than 1.39 m.

Use each digit card once to make the statement correct.

0	1	2	4	5

3	•			>			

Find as many ways as you can.

multiple possible answers, e.g.

3.12 > 0.45

3.24 > 1.05

3.05 > 2.41

Tiny is comparing decimals.

0.28 is greater than 0.7 because 28 is greater than 7

Do you agree with Tiny?

Explain your reasoning.

No

Order decimals

Notes and guidance

Building on the previous step, in this small step children order decimal numbers with up to 2 decimal places. They only order numbers that have the same number of decimal places.

A wide variety of representations can be used to support ordering, including place value counters, place value charts and number lines. The learning builds on children's understanding of ordering integers in the Autumn term. Highlight the importance of looking at the values of the digits in the greatest place value column first, before moving to the next place value columns in turn.

Challenge children to order numbers that have the same digits arranged differently, to ensure that they can recognise the place value of each digit, for example $1.67 < 1.76 < 6.17 < 6.71$

Children may need reminding of the meaning of the words "ascending" and "descending".

Things to look out for

- When comparing numbers, children may order numbers using the smallest place value column first, instead of the greatest.
- Children may only compare the digits after the decimal point, ignoring digits to the left of the decimal point, for example $1.47 < 0.76$

Key questions

- Which number is the greatest/smallest? How do you know?
- Which place value column did you compare first? Why?
- How many tens/ones/tenths/hundredths does the number have?
- How can you represent the number on a place value chart?
- What is the same/different about the digits of the numbers?
- Why have you chosen to order the decimal numbers this way?
- Did you look at every place value column when ordering these numbers? Why or why not?

Possible sentence stems

- There are _____ ones, _____ tenths and _____ hundredths.
- The digit in the _____ column is _____ than the other numbers. This number is the _____

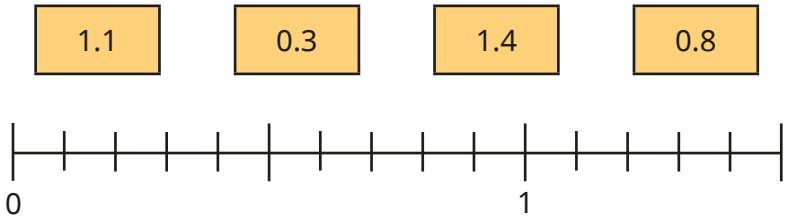
National Curriculum links

- Recognise and write decimal equivalents of any number of tenths or hundredths
- Compare numbers with the same number of decimal places up to 2 decimal places

Order decimals

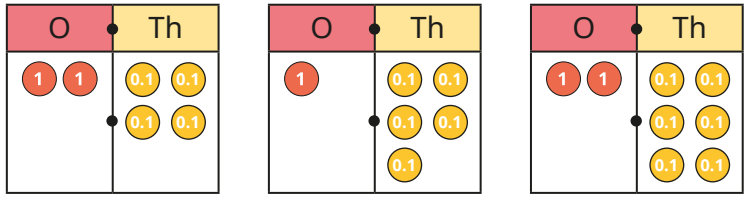
Key learning

- Label the numbers on the number line.



Write the numbers in order of size, starting with the smallest.

- Aisha has made three numbers on place value charts.



Write Aisha's numbers in order of size, starting with the greatest.

- Huan has written four numbers on place value charts.

O	Th	Hth
3	2	4

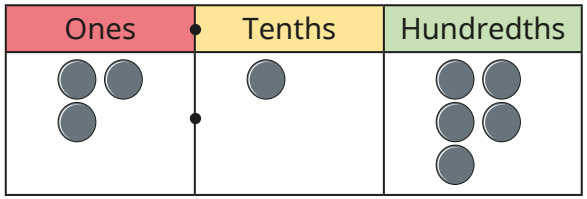
O	Th	Hth
2	4	3

O	Th	Hth
2	0	5

O	Th	Hth
2	3	4

Write Huan's numbers in ascending order.

- Sam uses nine plain counters to make a number on a place value chart.



  - Rearrange the counters to make a number that is less than Sam's number.
  - Rearrange the counters to make a number that is greater than Sam's number.

Compare answers with a partner.

- Write the numbers in order, from smallest to greatest.
  - 7.2 5.7 6.1 6.7
  - 3.65 6.53 3.56 5.63
  - 24.9 29.4 24.7 22.5

- The numbers are in ascending order.

3.5___ 3.5___ 3.5___ 3.5___

What could the missing digits be?

Compare answers with a partner.

Order decimals

Reasoning and problem solving

Some children planted sunflowers and measured their heights.

Child	Height
Amir	1.23 m
Tommy	0.95 m
Rosie	1.02 m
Jack	1.21 m
Eva	0.99 m

Order the children based on the heights of their sunflowers, starting with the shortest.

Tommy, Eva, Rosie, Jack, Amir

Tiny has put some numbers in order, starting with the smallest.

$0.07 < 0.36 < 1.56 < 0.98$

What mistake has Tiny made?

Put the numbers in the correct order.

$0.07 < 0.36 < 0.98 < 1.56$

The numbers are in ascending order.

$3.\_\_6 < \_\_.83 < 5.9\_\_$

The same digit is missing in each number.

What could the missing digit be?

Find as many ways as you can.

3, 4 or 5

Round to the nearest whole number

Notes and guidance

In this small step, children round decimals with 1 decimal place to the nearest whole number. They should be able to use the word "integer" as an alternative to "whole number".

Children can make links to rounding to the nearest 10, 100 and 1,000 studied in the Autumn term. Again, using a number line will help children to see which whole numbers a decimal number lies between. They then consider which whole number the decimal number is nearer to, by looking at the digit in the tenths column. Using the same convention as in their earlier rounding, a number with a 5 in the tenths column, although exactly halfway between integers, rounds to the greater integer.

Children should recognise that a decimal number rounded to the nearest whole number can round to zero.

Things to look out for

- Children may be confused by language such as "round down", rounding a number such as 5.2 to 4 instead of 5
- Children may incorrectly give answers in the form 7.0 rather than 7
- Children may round numbers such as 42.7 to the nearest 10 instead of the nearest integer.

Key questions

- Which whole numbers does _____ lie between?
- Using the number line, which whole number is _____ nearer to?
- When rounding to the nearest whole number, which place value column should you look at?
- The number has a _____ in the tenths column. When rounded to the nearest whole number, will it round to _____ or _____?
- What is the same/different about rounding to the nearest whole number and rounding to the nearest ten?

Possible sentence stems

- _____ lies between _____ and _____
- _____ is closer to _____ than _____
- _____ rounds to _____ to the nearest whole number.

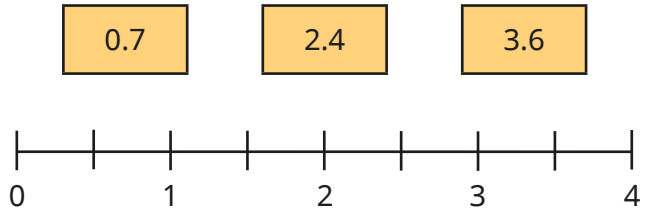
National Curriculum links

- Recognise and write decimal equivalents of any number of tenths or hundredths
- Round decimals with 1 decimal place to the nearest whole number

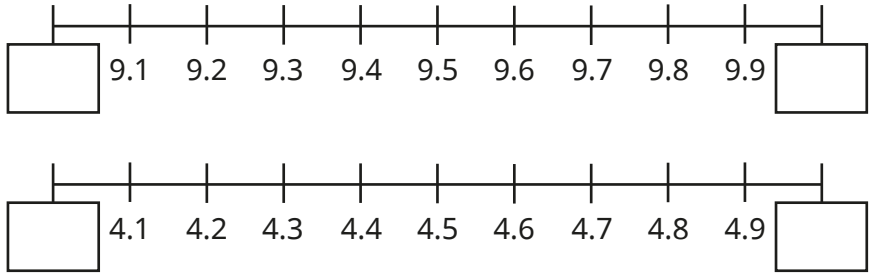
Round to the nearest whole number

Key learning

- Draw arrows to estimate the positions of the numbers on the number line.

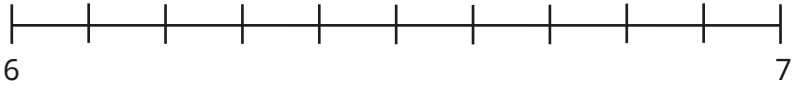


- Fill in the integers on the number lines.



- Which integers do the numbers lie between?
  - 1.7 lies between _____ and _____
  - 5.1 lies between _____ and _____
  - 8.3 lies between _____ and _____
  - 7.5 lies between _____ and _____

- Label 6.2 on the number line.

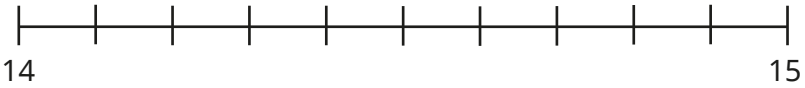


Is 6.2 closer to 6 or 7?

Complete the sentence.

_____ rounded to the nearest whole number is _____

- Label 14.7 on the number line.

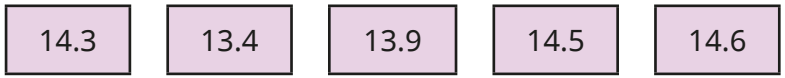


Complete the sentence.

_____ rounded to the nearest whole number is _____

- Round the numbers to the nearest whole number.

- Which numbers round to 14, when rounded to the nearest whole number?



Round to the nearest whole number

Reasoning and problem solving

When a number with 1 decimal place is rounded to the nearest whole number, the answer is 64

Could the number be 63.5?

Could the number be 64.5?

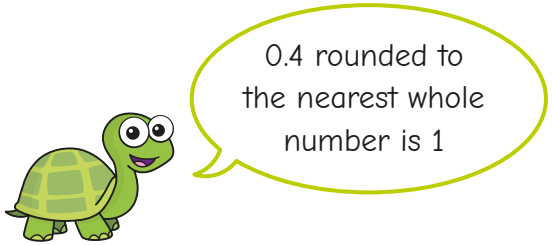
What could the number be?

Yes

No

63.5, 63.6, 63.7, 63.8, 63.9, 64.0, 64.1, 64.2, 64.3, 64.4

Tiny is rounding 0.4 to the nearest whole number.



Do you agree with Tiny?

Explain your answer.

No

Use the digit cards to complete the sentences.

You may use a digit card once only in each set of sentences.

1	2	3	4	5
6	7	8	9	

_____._____ rounded to the nearest whole number is 4

_____._____ rounded to the nearest whole number is 6

_____._____ rounded to the nearest whole number is 9

Find as many ways as you can.

multiple possible answers, e.g.

3.8, 4.2, 3.6

5.6, 6.1, 5.9

9.4, 8.9, 8.7

Halves and quarters as decimals

Notes and guidance

In this small step, children apply their knowledge of decimal equivalents of hundredths and tenths to recognise and write $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ as decimals.

A blank hundred square, a number line or a Rekenrek are all useful representations to support conversion between these fractions and decimals, as children can see how many hundredths each fraction is worth and then apply their knowledge from previous steps. They can also use a place value chart and place value counters to represent $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ as decimals.

Extend children's understanding by considering decimal equivalents to fractions that are equivalent fractions to $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$

Things to look out for

- Children may incorrectly use the denominator and numerator as a reference, for example $\frac{1}{2} = 0.2$ or 1.2, $\frac{1}{4} = 0.4$ or 1.4, $\frac{3}{4} = 0.34$ or 3.4
- Children may think $0.5 < 0.25$ because $5 < 25$

Key questions

- How can you show one quarter/one half/three-quarters on a hundred square?
- How many hundredths are the same as $\frac{1}{4}$ / $\frac{1}{2}$ / $\frac{3}{4}$?
- What is the decimal equivalent of $\frac{1}{4}$ / $\frac{1}{2}$ / $\frac{3}{4}$?
- How would you write the fraction as a decimal?
- Are _____ and _____ equivalent fractions? How do you know?

Possible sentence stems

- $\frac{1}{2} = \frac{\square}{100} = 0.\_\_\_\_\_$
- $\frac{1}{4} = \frac{\square}{100} = 0.\_\_\_\_\_$
- $\frac{3}{4} = \frac{\square}{100} = 0.\_\_\_\_\_$

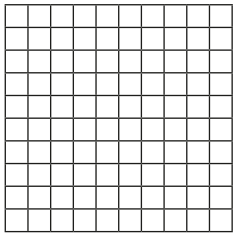
National Curriculum links

- Recognise and write decimal equivalents of any number of tenths or hundredths
- Recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$

Halves and quarters as decimals

Key learning

- Here is a blank hundred square.



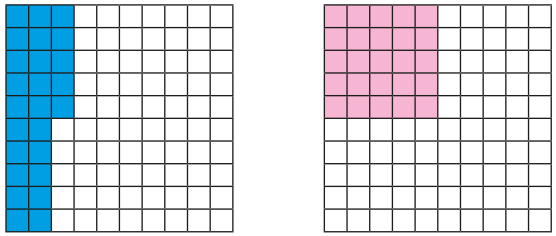
Shade half of the hundred square.

How many squares are shaded?

Complete the equivalent fraction. $\frac{\square}{2} = \frac{\square}{100}$

Write $\frac{1}{2}$ as a decimal.

- $\frac{1}{4}$ has been shaded on both hundred squares.



What do you notice?

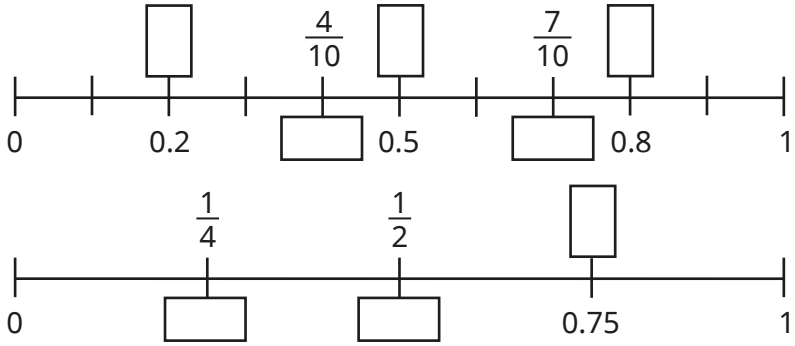
How many hundredths are shaded?

Write $\frac{1}{4}$ as a decimal.

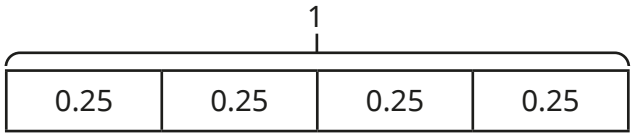
- Draw place value counters to show the decimal equivalent of $\frac{3}{4}$

Ones	Tenths	Hundredths

- Fill in the missing fractions and decimals on the number lines.



- Shade three-quarters of the bar model and complete the sentence.



$\frac{3}{4} = 0.\_\_\_\_$

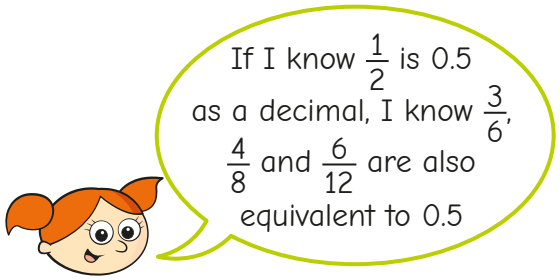
- Match the fractions to their decimal equivalents.

$\frac{1}{2}$	$\frac{1}{10}$	$\frac{1}{4}$	$\frac{1}{100}$	$\frac{3}{4}$
0.25	0.1	0.75	0.5	0.01

Halves and quarters as decimals

Reasoning and problem solving

Alex is converting fractions to decimals.



Explain Alex's thinking.

$\frac{3}{6}$, $\frac{4}{8}$ and $\frac{6}{12}$ are equivalent fractions to $\frac{1}{2}$, so they are all equivalent to 0.5

Which is the odd one out?

$\frac{75}{100}$ $\frac{3}{4}$ 0.75 $\frac{7}{10}$ $\frac{15}{20}$

Explain your reasoning.

$\frac{7}{10}$, because

$\frac{75}{100} = \frac{3}{4} = 0.75 = \frac{15}{20}$

Teddy is converting fractions to decimals.

$\frac{1}{2} = 1.2$ $\frac{1}{4} = 1.4$ $\frac{3}{4} = 3.4$

Do you agree with Teddy?

Explain your reasoning.

No

Kim writes fractions as decimals using a place value chart.

She represents $\frac{5}{10}$ like this.

Ones	Tenths
0	5

She represents $\frac{1}{2}$ like this.

Ones	Tenths
0	2

Do you agree with Kim?

Explain your reasoning.

No

Kim has correctly converted $\frac{5}{10}$ to a decimal, but $\frac{1}{2}$ is equivalent to $\frac{5}{10}$, so $\frac{1}{2} = 0.5$

Summer Block 2

Money

Small steps

Step 1	Write money using decimals
Step 2	Convert between pounds and pence
Step 3	Compare amounts of money
Step 4	Estimate with money
Step 5	Calculate with money
Step 6	Solve problems with money

Write money using decimals

Notes and guidance

Children have previously explored the values of coins and notes, and added and subtracted amounts of money within the same denomination. In Year 3, amounts of money in pounds and pence were presented as, for example, "£4 and 25p". In this small step, children are introduced to decimal notation for the first time, for example £4.25. The focus of the step is the ability to write a given amount in decimal notation and to represent amounts that are given in decimal notation.

Children explore the use of pounds and pence notation and develop the understanding that the digits following the decimal point represent part of a pound. They should link to their earlier learning that £1 = 100p and 1 whole = 100 hundredths.

Converting between pounds and pence is covered in the next step.

Things to look out for

- Children may omit zeros, for example writing both £2 and 50p and £2 and 5p as £2.5
- Unfamiliarity with the use of the pound and pence notation may lead to incorrect notation, such as £4.25p or 4.25p

Key questions

- How many pounds are there?
  How many pence are there?
- How many pence are there in £1?
  How many hundredths are there in 1 one?
- How do you write the amount as a decimal?
- How do you write £_____ and _____p as a decimal?
- How do you write £2 and 50p/£2 and 5p in decimal form?
- What is the same and what is different about the ways of writing the amount of money? Which is easier to understand?

Possible sentence stems

- There are _____ pence in £1

  There are _____ hundredths in 1 one.
- _____ pounds and _____ pence = £_____._____

National Curriculum links

- Estimate, compare and calculate different measures, including money in pounds and pence

Write money using decimals

Key learning

- Complete the sentences to show how much money is in each box.

There is _____ pounds.

There is _____ pence.

There is £_____ and _____p.

There is £_____._____

- How much money is there?

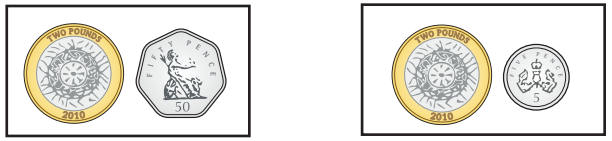
Write your answer as a decimal.

- Draw coins or notes to show each amount.
  - £2.43
  - £6.95
  - £12.59
  - £0.87

Compare answers with a partner.

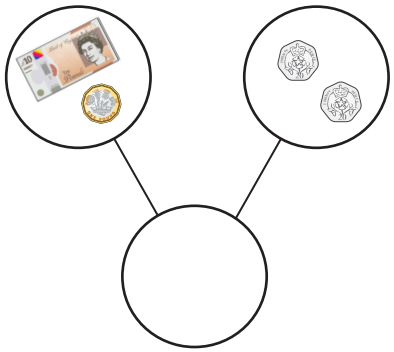
- How much money is there?

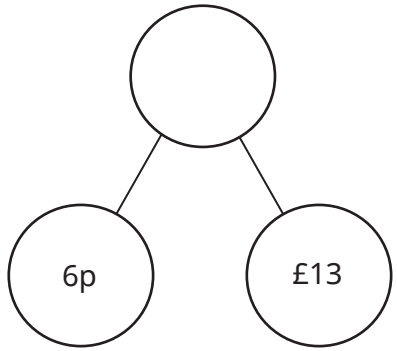
Write the amounts as decimals.



What is the same? What is different?

- Complete the part-whole models.





- Dani has £3

Nijah has 75p

Huan has £2 and 20p

How much money do they have altogether?

Write your answer as a decimal.

Write money using decimals

Reasoning and problem solving

Tiny has three £1 coins, four 10p coins and one 5p coin.

Tiny writes the total amount of money as 3.45p.

Is Tiny correct?

Explain your answer.

No

Filip has an amount of money less than £10

- He only has £1 and 10p coins.
- He has an odd number of 10p coins.
- He has twice as many £1 coins as 10p coins.

How much money could Filip have?

£2.10 or £6.30

Scott has these coins.

He picks three coins at a time.

Decide if the statements are true or false.

He can make a total that has a final digit of 2	False
He can make an odd number of pence.	True
He can make an amount greater than £4.50	True
He can make a total that is less than £1.20	True

Explain your answers to a partner.

Convert between pounds and pence

Notes and guidance

In this small step, children move from reading and writing money using decimal notation to converting between different types of notation and between different units of money.

Children use the fact that £1 = 100p to convert from pounds and pence in decimal notation to pence, and vice versa. They could use a part-whole model to express the total amount partitioned into pounds and pence and then convert each of the pounds to 100 pence. They should also be confident in converting amounts less than one pound, especially noting the difference between, for example, £0.80 and £0.08. This is also a good opportunity to reinforce the value of each coin and how its value can be written in decimal form.

This step provides a foundation for comparing amounts of money expressed in different formats.

Things to look out for

- Children may make errors with placeholders, for example thinking £4.20 is equal to 42 pence.
- Children may make errors with place value, for example writing 425p as £42.5 or £0.425
- Children may use the pound and pence notation incorrectly, for example £425p, £4.25p or 4.25p.

Key questions

- How many pounds are there?
- How many pence are there?
- How many pence are there in £1/£2/£10?
- How do you write 343p using a pound sign?
- How can you partition the amount into pounds and pence?
- How can you convert the amounts into pounds and pence?

Possible sentence stems

- There are _____ pence in _____ pounds.
- _____ pence = _____ pounds and _____ pence = £_____._____
- £_____._____ = _____ pounds and _____ pence = _____ pence

National Curriculum links

- Estimate, compare and calculate different measures, including money in pounds and pence

Convert between pounds and pence

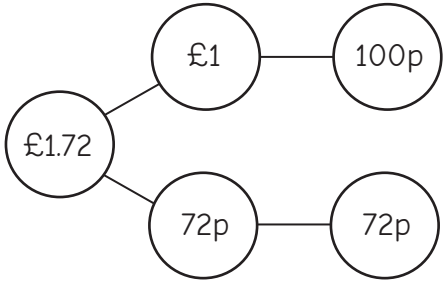
Key learning

- Use the fact to help you work out the missing numbers.

£1 = 100p

  - £2 = _____p
  - £6 = _____p
  - £_____ = 300p

- Eva converts £1.72 into pence by partitioning.



£1.72 = 172p

Use Eva's method to write the amounts in pence.

£1.48 £2.37 £6.45 £10.12 £8.02

- Max converts 415p into pounds and pence as a decimal.

415p = 400p + 15p
= £4 and 15p
= £4.15

Use Max's method to convert the amounts to pounds and pence as decimals.

185p 340p 240p 204p 959p

- Match the equal amounts.

£5.70 £0.75 £5.07 £0.57 £7.50

750p 570p 57p 507p 75p

- Which amount is 2 pounds more than £3.46?

£3.48 £3.66 £5.46 £23.46

Which amount is 2 pence more than £3.46?

£3.48 £3.66 £5.46 £23.46

- Annie has £4.23

She buys a sticker for 20p.

How much money does she have left?

Write your answer in pence only.

Convert between pounds and pence

Reasoning and problem solving

Whitney, Jo and Teddy are converting 1206p into pounds.

Whitney: 1206p = £12.6

Jo: 1206p = £12.06

Teddy: 1206p = £120.6

Who is correct?

What have the other children done wrong?

Jo

Is the statement true or false?

> When writing money in decimal notation, there are always two digits after the decimal point.

Explain your answer.

True

Mo has four different coins.

How much money could Mo have?

Write the amounts in decimal form.

Convert your amounts to pence.

Compare answers with a partner.

multiple possible answers, e.g.
£2.13, 213p
£1.65, 165p

Compare amounts of money

Notes and guidance

In this small step, children use the fact that £1 = 100p to compare amounts of money.

Children begin by comparing amounts represented in the same format, for example 4,562p and 3,750p or £45.62 and £37.50, and make their choices based on their knowledge of place value. They then compare amounts written in different formats, using their learning from the previous two steps to convert to a common format. Discuss the range of possible formats children can choose between and which they find easier to compare. The physical or pictorial representation of notes and coins, as well as number lines, can support children's visualisation and understanding of place value.

Once children are comfortable comparing two amounts in different formats they can begin to order a set of amounts.

Things to look out for

- Children may need reminding of the meaning of "ascending" and "descending".
- Children may ignore the units and only consider the numbers, for example 347p > £18 or £4.26 < 5p.
- Children may make mistakes when converting amounts given in different formats.

Key questions

- What is the value of each digit in the number?
- What place value column is the _____ in?
- How many pounds and pence are there?
- Which digit tells you which amount is greater?
- What amount could go in between these amounts?
- What does "ascending"/"descending" mean?
- Are the amounts in the same units? Why does this matter?

Possible sentence stems

- There are _____ pounds and _____ pence.

  This is greater/less than _____ pounds and _____ pence.
- To convert from _____ to _____, I need to ...

National Curriculum links

- Estimate, compare and calculate different measures, including money in pounds and pence

Compare amounts of money

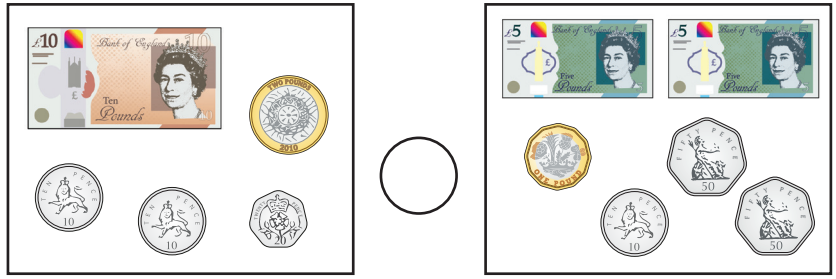
Key learning

- Two classes save their pennies for a year.
  - Class A saves 3,589 pennies.
  - Class B saves 3,859 pennies.

  Which class saves the most money?

  Explain your answer to a partner.

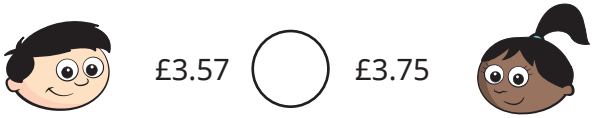
- Write <, > or = to compare the amounts.

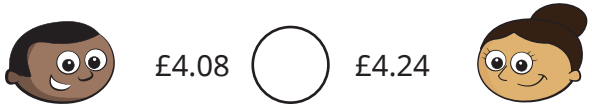


  Compare methods with a partner.

- Four children spend money in a shop.

  Write <, > or = to compare how much the children spend.





- Write the amounts as pence, then compare using <, > or =.

6,209p ◯ £60.09 £0.54 ◯ 54p

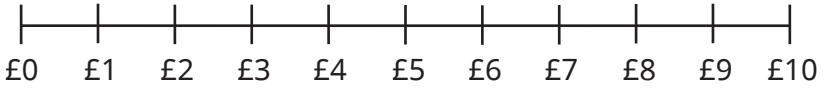
Write the amounts as pounds, then compare using <, > or =.

62p ◯ £6.02 £5,010 ◯ 5,010p

- Estimate the position of each amount on the number line.

£3.50 750p 99p

8 pounds and 20 pence 999p



Order the amounts, starting with the greatest amount.

- Write the amounts in ascending order.

130p £0.32 132p £13.20

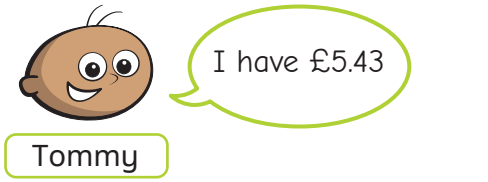
Write the amounts in descending order.

257p £2.50 2,057p £25.07

Compare amounts of money

Reasoning and problem solving

Tommy, Alex and Jack each have some money.



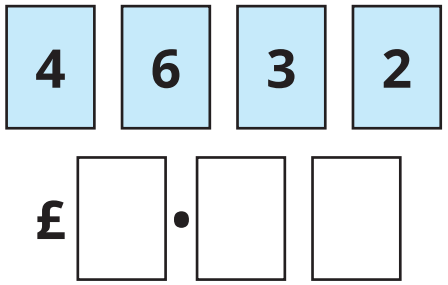
What is the least amount of money that Jack could have?

What is the greatest amount of money that Jack could have?

£5.35 or 535p

£5.42 or 542p

Tom uses the digit cards to make an amount of money.



He makes a total that is more than £3, but less than £6

Find all the amounts that Tom can make.

Write them in ascending order.

£3.24, £3.26, £3.42, £3.46, £3.62, £3.64, £4.23, £4.26, £4.32, £4.36, £4.62, £4.63

Which is the greater amount of money, three £1 coins or fifteen 20p coins?

Explain your answer.

They are equal.

£3 = 300p

Estimate with money

Notes and guidance

In this small step, children use their previous learning on estimating to estimate with money.

Recap rounding to the nearest 10, covered in Autumn Block 1, and use this to round amounts to the nearest 10p to estimate totals or differences. Although it is beyond Year 4 requirements to formally round numbers with 2 decimal places, children can make estimates for calculations such as £3.99 + £7.02 by considering the number of pence represented in the amounts and how close they are to whole numbers of pounds. Alternatively, they could convert both amounts to pence and revisit rounding to the nearest 100

Number lines are an important representation to support children with estimation. For example, children can position the amount on a number line between the whole numbers of pounds that come before and after the amount they are working with.

Things to look out for

- Children may use the wrong place value column, for example £2.19 is closer to £3 because of the digit 9
- Children may be unsure which whole numbers of pounds the given amount is between.

Key questions

- What is the multiple of 10p before _____p?
  What is the multiple of 10p after _____p?
  Which multiple of 10p is it nearer to?
- What does "estimate" mean?
- What does "approximately" mean?
- What is £_____._____ in pounds and pence?
  Which whole number of pounds is it closer to?
- How can you use a number line to help estimate?

Possible sentence stems

- _____p is closer to _____p than _____p.
- The approximate total cost is _____p + _____p = _____p.
- £_____._____ is closer to £_____ than £_____

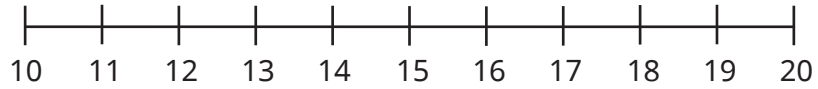
National Curriculum links

- Estimate, compare and calculate different measures, including money in pounds and pence

Estimate with money

Key learning

- Use the number line to work out which multiple of 10p each amount is closer to.



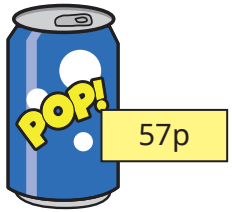
  - 18p is closer to _____p than _____p.
  - 14p is closer to _____p than _____p.

- Round the amounts to the nearest 10p.

47p	32p	89p	64p	75p	142p

How else can 142p be written?

- Dani buys a chocolate bar and a drink.



Estimate the total cost of the chocolate bar and the drink.

Will the actual total cost be more or less than your estimate?

- Estimate the position of each amount on the number line.

£3.20	£2.70	£1.86	90p	490p

Complete the sentence for each amount.

£_____._____ is closer to £_____ than £_____

- Amir is estimating the total of £3.96 and £2.05

How did Amir make his estimates?

- Estimate the total cost of the water and the eggs.

Estimate with money

Reasoning and problem solving

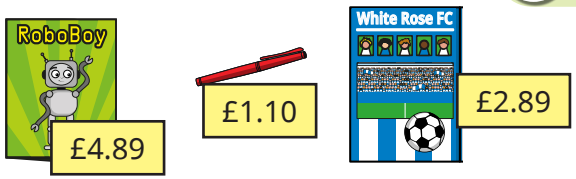
Tiny is rounding money.

Do you agree with Tiny?

Explain your answer.

No

Scott has 775p.



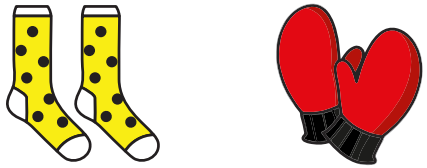
Use estimation to show that Scott cannot afford to buy all three items.

Which items can he afford?

£5 + £1 + £3 = £9

Scott only has £7.75, which is less than £9

Max buys some socks and mittens.

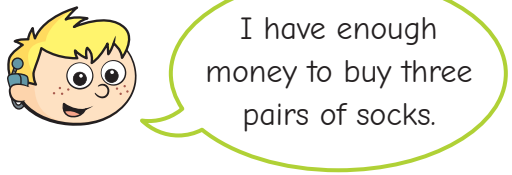


He estimates how much he will spend.

£4 + £5 = £9

What could the actual price of the socks and mittens be?

Max has £12



Do you agree with Max?

Explain your answer.

socks: between £3.50 and £4.49

mittens: between £4.50 and £5.49

It depends on the actual price of the socks.

Calculate with money

Notes and guidance

In Year 3, children learnt to add and subtract money. In this small step, they extend their learning to include multiplying and dividing with money, which is developed further in the next step.

Although children are not expected to formally add and subtract decimals in Year 4, informal methods such as partitioning and number lines can be used to support them when calculating with money. A part-whole model allows them to partition an amount into pounds and pence and then add the pounds and pence separately. A number line is a useful representation for children to count on, or to count back, in order to calculate the difference between two amounts.

Encourage children to use their estimating skills from the previous step to check their answers.

Things to look out for

- Children may not exchange 100p for £1 when adding the pounds and pence separately, for example £3.40 + £4.80 = £7.120
- When subtracting the pence separately, children may always subtract the smaller amount from the larger amount instead of exchanging from the pounds when necessary, for example £4.20 – £1.50 = £3.30

Key questions

- How many pounds are there altogether?
- How many pence are there altogether?
- How can you use partitioning to help with the calculation?
- How can a number line help you to add/subtract the amounts?
- Are you going to count on or count back on the number line? Does it matter which method you use?
- Do you need to exchange any pounds for pence?
- How can you use estimation to check your calculation?

Possible sentence stems

- I can partition £_____._____ into _____ pounds and _____ pence.
- _____ pounds +/– _____ pounds = _____ pounds and _____ pence +/– _____ pence = _____ pence, so the total/difference is _____ pounds and _____ pence.

National Curriculum links

- Estimate, compare and calculate different measures, including money in pounds and pence

Calculate with money

Key learning

- Complete the workings to find the total cost of a hat and a scarf.

£2 + £3 = £_____

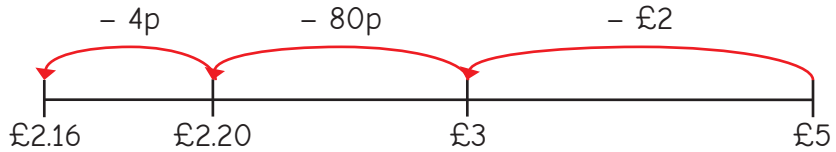
45p + 25p = _____p

£_____ + _____p = £_____._____

Use this method to work out the cost of:

- a pair of mittens and a hat
- a scarf and a pair of mittens

- Nijah uses a number line to work out £5 – £2.84

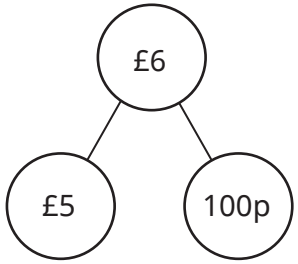


£5 – £2.84 = £2.16

Use Nijah's method to work out the subtractions.

£5 – £3.24	£10 – £6.47	£8.56 – £7.21	£9.53 – £2.46

- Esther uses partitioning to work out £6 – £3.26



£5 – £3 = £2
100p – 26p = 74p
£6 – £3.26 = £2.74

Use Esther's method to work out the subtractions.

£5 – £1.89	£10 – £8.43	£6 – £2.75	£9 – £2.46

- Huan pays for a bag with £7

He gets this change.

How much does the bag cost?

- Work out the calculations.
  - £20 × 3 = £_____
  - 40p × 4 = _____p
  - 5p × 12 = _____p
  - 80p ÷ 2 = _____p
  - 40p ÷ 4 = _____p
  - £1 ÷ 5 = _____p

- Four children share £1.20 equally between them.

How much do they each get?

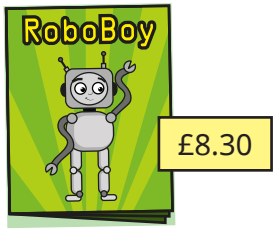
Calculate with money

Reasoning and problem solving

Eva has £10

Has she got enough to buy a book and a teddy?

Explain your answer.



£8.30

£3.60

£1.75

What combinations of items could Eva buy with £10?

No

---

teddy and boat

2 teddies and boat

3 teddies and boat

2, 3, 4 or 5 teddies

2 boats

Tiny is working out £12.50 – £6.80 by partitioning into pounds and pence.

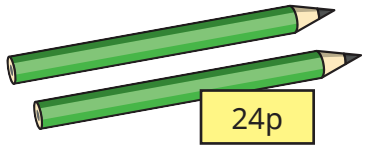
£12 – £6 = £6
80p – 50p = 30p
£12.50 – £6.80 = £6.30

What mistake has Tiny made?

What is the correct answer?

£5.70

Two pencils cost 24p.



24p

Mo has £1

How many pencils can he buy?

8

Solve problems with money

Notes and guidance

In this small step, children apply their calculating skills with money to solve problems using all four operations in real-life contexts, including multi-step problems. At this stage, children are not expected to use formal methods to calculate with decimals, but they could use methods such as partitioning for addition and subtraction, as explored in the previous step.

Children draw on their knowledge from earlier steps to help them to convert between amounts of money expressed in different formats, and to use decimal notation accurately. Bar models, part-whole models and number lines are all useful ways to represent the calculations. Place value charts and counters could also be used, particularly when children need to make exchanges between pounds and pence.

Things to look out for

- Children may need support to identify the correct operation(s).
- Children may need further support when they are required to convert between amounts of money expressed in different formats.
- Children may not see that they can exchange 100p for £1 or £1 for 100p to support them when calculating.

Key questions

- How many pounds are there? How many pence are there?
- Is it helpful to partition the amount into pounds and pence?
- Do you need to make an exchange between the pounds and pence?
- How could you use estimation to check your calculation?
- How could you use a number line/bar model to represent the calculation?
- Which operation do you need to use to answer the question?

Possible sentence stems

- To convert from pounds and pence to just pence, I need to ...
- To convert from pence to pounds and pence, I need to ...
- First I need to ...

  Then I need to ...

National Curriculum links

- Estimate, compare and calculate different measures, including money in pounds and pence

Solve problems with money

Key learning

- Sam buys an apple for 24p and a pear for 39p.

  She pays with a £1 coin.

  How much change does she get?

- The table shows the prices of train tickets.

Tickets	Peak	Off-peak
Adult	£8	£6
Child	£5.30	£4.20

  Work out the cost for:

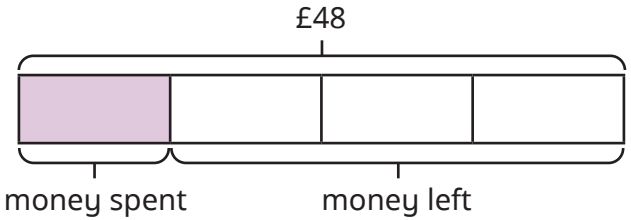
  - one child and one adult at peak time
  - one adult and two children at off-peak time

- Ron has £48

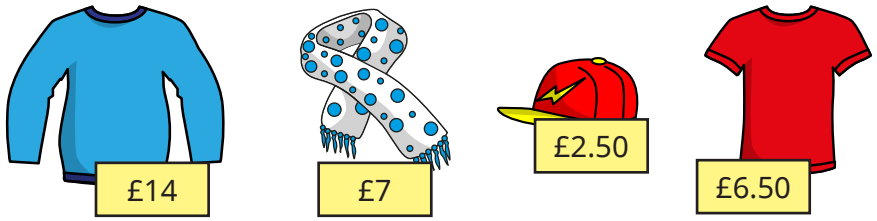
  He spends one quarter of his money.

  How much money does he have left?

  Use the bar model to help you.



- The clothes are put in a half-price sale.



  What is the new cost of each item?

  Teddy buys one of each item in the sale.

  How much does Teddy spend?

  Work out the total cost of three caps and two scarves in the sale.

- Whitney has £4.50, Mo has £3.65 and Brett has £3.85

  They put their money together, then share it out equally.

  How much money do they each have now?

- Jo is buying sweets that cost 7p each.

  She has 97p.

  How many sweets can she buy?

  How much money does she have left?

Solve problems with money

Reasoning and problem solving

Tommy has 20p more than Sam.

Sam has twice as much money as Alex.

Altogether, the children have £5.20

How much money does Tommy have?

£2.20

Mrs Smith spends £100 on books for her class.

Book prices

Hardback	£8
Paperback	£4

How many hardback and paperback books could she have bought?

Is there more than one possible answer?

multiple possible answers, e.g.

0 HB and 25 PB

2 HB and 21 PB

12 HB and 1 PB

Dora buys lunch.

Use the information to complete Dora's receipt.

- The sandwich costs £2.15 more than the crisps.
- The orange juice is the same price as the total price of the crisps and banana.
- The banana is half the price of the crisps.

Receipt	
Sandwich	
Orange juice	
Crisps	60p
Banana	
Total	

sandwich: £2.75

orange juice: 90p

banana: 30p

total: £4.55

Summer Block 3

Time

Small steps

Step 1	Years, months, weeks and days
Step 2	Hours, minutes and seconds
Step 3	Convert between analogue and digital times
Step 4	Convert to the 24-hour clock
Step 5	Convert from the 24-hour clock

Years, months, weeks and days

Notes and guidance

In this small step, children recap the relationships between a year, a month, a week and a day from Year 3

Children should explore how a year can be represented on a calendar, which shows the number of days in each month. As a class, to help them to remember this key knowledge, practise rhymes, songs or other memory strategies about the numbers of days in each month.

Children use multiplicative reasoning and related number facts to convert and compare the different units of time. By the end of this step, they will recognise how often a leap year occurs and be able to calculate future leap years. They should recognise that there are approximately 4 weeks in a month, although most months are slightly longer than this.

Things to look out for

- Children may think that there are always exactly 4 weeks in a month.
- Children may need to revisit the number of days in each month regularly before these facts are secure.
- When converting units of time, children may rely on additive reasoning, rather than multiplicative reasoning.

Key questions

- How many days are there in a week?
- How many days are there in the month of _____?
- How many days/weeks/months are there in a year?
- What do you need to do to convert _____ to _____?
- How are leap years different from ordinary years?

  How often is there a leap year?

Possible sentence stems

- There are _____ days in the month of _____
- There are _____ days in a week, so in _____ weeks there are _____ × _____ = _____ days.
- There are _____ months in a year.
- There are _____ days in a year/leap year.

National Curriculum links

- Solve problems involving converting from hours to minutes, minutes to seconds, years to months, weeks to days

Years, months, weeks and days

Key learning

- Complete the sentences.

  There are _____ days in a week.

  There are _____ months in a year.

  There are _____ days in an ordinary year.

  There are _____ days in a leap year.

  Leap years happen every _____ years.

- Write <, > or = to complete the statements.

  14 days ◯ 2 weeks

  14 days ◯ 1 month

  14 weeks ◯ 2 months

  36 weeks ◯ 6 months

  12 months ◯ 1 year

  3 years ◯ 30 months

- Tommy uses a number track to count in leap years.
  - Complete the number track.

2016	2020						

  - How many days will there be in 2060?

- Complete the tables.

Days	Weeks
	1
	5
	10
	20
	80

Years	Months
	12
2	
	6
	48
10	

- Here is a calendar from January 2022

January						
M	T	W	Th	F	Sa	Su
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

  - Annie's birthday was on the second Saturday of January.
  - Dexter's birthday was on the final Friday of January.
  - Whitney's birthday was 4 days after Annie's birthday.

  When is each child's birthday?

Years, months, weeks and days

Reasoning and problem solving

Max and Kim are talking about their ages.

Max

I am 9 years and 5 months old.

I am 4 months older than Max.

Kim

What is the total of their ages?

19 years and 2 months

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

There are 730 days in two consecutive years.

Explain your answer.

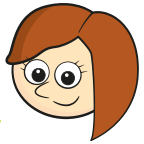
sometimes true

Amir, Rosie and Jack are talking about their birthdays.

Amir

My birthday is in exactly 2 weeks.

My birthday is in exactly 2 months.



Rosie

Jack

My birthday is in 35 days.

If today is 8 June, what is the date of each child's birthday?

How many days are there between Jack and Rosie's birthdays?

Amir: 22 June

Rosie: 8 August

Jack: 13 July

26 days

Hours, minutes and seconds

Notes and guidance

In this small step, children recap the number of seconds in a minute and minutes in an hour, building on their learning from Year 3

Children use multiplicative reasoning and related number facts to convert and compare times recorded in hours, minutes and seconds. A secure understanding of the 6 times-table will help children find related number facts linked to time, for example 36 ÷ 6 = 6 and 360 ÷ 60 = 6, so 360 seconds is equivalent to 6 minutes and 360 minutes is equivalent to 6 hours.

Paired work involving one child counting an agreed duration in their head while a partner uses a stopwatch to record the actual time can help children to develop an appreciation of how long seconds and minutes last. Additionally, they could record the length of time it takes in seconds to complete a task, such as running across the playground or writing their name.

Things to look out for

- When converting units of time, children may rely on additive reasoning, rather than multiplicative reasoning.
- Children are familiar with the base 10 number system, so they may assume that there are 100 seconds in a minute or 100 minutes in an hour.

Key questions

- What activity lasts approximately one second/minute/hour?
- How many seconds/minutes/hours do you think it takes you to _____?
- How many minutes are there in _____ hour(s)?
- How many seconds are there in _____ minute(s)?
- If you know that 1 minute is equal to 60 seconds, how many seconds is 3 minutes equal to?

Possible sentence stems

- 1 day = _____ hours, so in _____ days there are _____ × _____ = _____ hours.
- 1 hour = _____ minutes, so in _____ hours there are _____ × _____ = _____ minutes.
- 1 minute = _____ seconds, so in _____ minutes there are _____ × _____ = _____ seconds.

National Curriculum links

- Solve problems involving converting from hours to minutes, minutes to seconds, years to months, weeks to days

Hours, minutes and seconds

Key learning

- Sort the activities into the table, to show approximately how long each one takes to complete.

brush your teeth | run around the playground | blink | write your name | watch a TV show | clap | tie your shoelaces | get dressed

Less than 5 seconds	Less than 1 minute	Less than 5 minutes	Less than 1 hour

Write another activity in each column.

- Write <, > or = to complete the statements.

30 seconds ◯ 1 minute

300 seconds ◯ 1 minute

30 seconds ◯ $\frac{1}{2}$ minute

30 minutes ◯ 1 hour

300 minutes ◯ 1 hour

30 minutes ◯ $\frac{1}{2}$ hour

- Complete the tables.

Minutes	Seconds
1	
2	
	240
10	

Hours	Minutes
	60
2	
5	
7	

- The time is 20 minutes past 5 in the evening.

Draw digital clocks to show what time it will be:

5 minutes later | $\frac{1}{2}$ hour later | 120 seconds later | 20 minutes later

- Which lasts longer, $\frac{1}{4}$ of an hour or 600 seconds?

Explain how you know.

Hours, minutes and seconds

Reasoning and problem solving

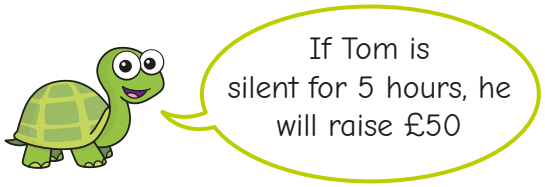
Which is the odd one out and why?

30 hours	30 seconds
30 minutes	12 hours

Is there more than one possible answer?

possible answers:
12 hours – different number
30 hours – only one that is not half of another time unit

Tom is sponsored 10p for every minute of silence.



Do you agree with Tiny?

Explain your answer.

No

Five children run a timed race.

Here are their times.

Name	Time
Dani	114 seconds
Scott	199 seconds
Huan	100 seconds
Aisha	202 seconds
Brett	119 seconds

Whose time is closest to 2 minutes?

Who finished the race in 1st place?

What is the difference between the fastest time and the slowest time?

Give your answer in seconds and in minutes and seconds.

Brett

Huan

102 seconds

1 minute and 42 seconds

Convert between analogue and digital times

Notes and guidance

In this small step, children convert between analogue and 12-hour digital times, reinforcing and building on their learning in Year 3

Discuss with children the importance of knowing whether a time is taking place in the morning or the afternoon and how an analogue clock does not usually show am or pm. Towards the end of this step, children calculate durations of time represented on analogue and 12-hour digital clocks. Use of a blank number line can support finding durations of time or to help children find the start and end times of an activity.

In the next step, children are introduced to the 24-hour digital clock and the concept of am and pm is explored further.

Things to look out for

- Children may confuse am and pm, for example thinking that 1 am should be 1 pm because it is "late".
- Children may need support to understand that times occur twice each day.
- Children may attempt to calculate durations using column subtraction, by taking away the start time from the end time, which will lead to inaccuracies when hours are crossed.

Key questions

- Why is it important to know whether a time is am or pm?
- Does an analogue clock show whether it is am or pm?
- How do you show an analogue time as a 12-hour digital time?
- How will you find the start/end time of the activity?
- How can you use a number line to work out the duration of the activity?
- Do you find it easier to work out how long it is between times using an analogue or a digital clock? Why?

Possible sentence stems

- _____ minutes past _____ is the same as _____ minutes to _____
- 60 – _____ = _____, so the time is _____ minutes to _____
- The time is after/before noon/midnight, so it is _____ am/pm.

National Curriculum links

- Read, write and convert time between analogue and digital 12- and 24-hour clocks

Convert between analogue and digital times

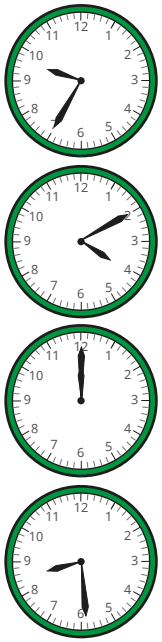
Key learning

- What is the same and what is different about the times?

20 minutes to 9

8:40am

- Match the analogue and digital times.



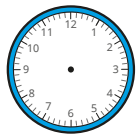
12:00

4:10

8:29

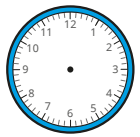
9:35

- Complete the clocks so that the analogue clocks and digital clocks show the same time.



3:35

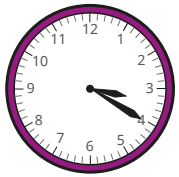
:

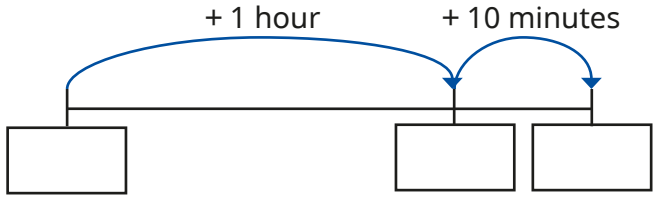


10:20

:

- Nijah leaves school at the time shown.

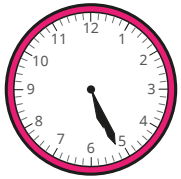




She arrives home 1 hour and 10 minutes later.

Use the number line to help work out what time it will be when she arrives home, on a 12-hour digital clock.

- Esther gets on a train at this time in the evening.



She gets off the train at this time.

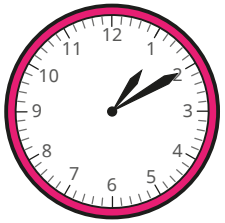
6:59pm

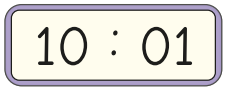
How long was her journey?

Convert between analogue and digital times

Reasoning and problem solving

Tiny converts the analogue time to a 12-hour digital time.





Explain Tiny's mistake.

The minutes and the hour are in the incorrect places.

The time should be 1:10

This time is palindromic.

This means that the digits can be read the same way both forwards and backwards.

Write five other times that are palindromic on a 12-hour digital clock.

multiple possible answers, e.g.

4:04, 6:16, 10:01

On a 12-hour digital clock, how many times will the digit 8 be shown between 2:00 and 3:00?

On a 12-hour digital clock, how many times will the digit 4 be shown between 2:00 and 3:00?

Explain the difference.

6

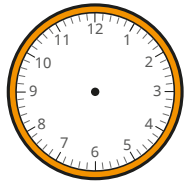
15

Amir looks at a 12-hour digital clock.

The time shows 2:58 pm.

If Amir keeps looking at the clock until the digits are all odd, what time will it be?

Draw hands on the analogue clock to show what time it is.



Convert to the 24-hour clock

Notes and guidance

In this small step, children are introduced to writing 24-hour clock times for the first time.

Children recap the concept of am and pm from Year 3 to support them when converting to the 24-hour clock. They recognise that to convert pm times between 1 pm and 11:59 pm into 24-hour clock times, they add 12 hours to the time. They also learn that 24-hour clock times are always shown with four digits, so if the hour only has one digit, then a zero is placed at the start, for example 09:45

Encourage children to identify what is the same and what is different about 12-hour and 24-hour digital clocks displaying the same time. Using clocks, watches, smartphones and computers can help with this.

Things to look out for

- Children may think that 10 hours are added to pm times rather than 12, for example thinking that 6 pm is 16:00
- Children may not place a zero at the beginning of am times where the hour has 1 digit, such as 06:38
- Children may also add 12 hours to am times.
- Children may write midnight as 24:00

Key questions

- How many hours are there between noon and midnight?
- Is _____ earlier or later than _____?
- What is the same/different about 5 am on a 24-hour digital clock and on a 12-hour digital clock?
- What is the same/different about 5 pm on a 24-hour digital clock and on a 12-hour digital clock?
- Do you always need to add 12 to the hours to convert a time to the 24-hour clock? Why/why not?
- How many digits does a time on a 24-hour clock have?

Possible sentence stems

- To convert to the 24-hour digital clock, I add _____ to the hours if the time is between _____ and _____
- A 24-hour clock time should always have _____ digits.

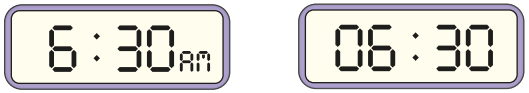
National Curriculum links

- Read, write and convert time between analogue and digital 12- and 24-hour clocks

Convert to the 24-hour clock

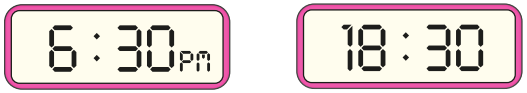
Key learning

- Both clocks show half past 6 in the morning.



What is the same about the clocks? What is different?

- Both clocks show half past 6 in the evening.



What is the same about the clocks? What is different?

- Sort the times into the table.

am	pm

- Match the 12-hour clock times to the 24-hour clock times.

7:30 am	19:30
7:30 pm	21:30
9:30 am	09:30
9:30 pm	11:30
11:30 am	07:30

- Write 24-hour clock times to complete the sentences.
  - _____ is 25 minutes to 8 in the morning.
  - _____ is 10 minutes past 3 in the afternoon.
  - Quarter to 10 in the evening is _____

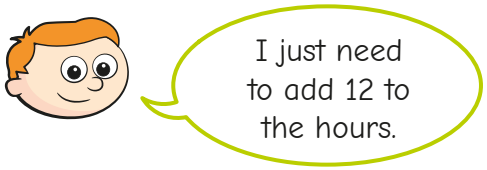
- Write the times as 24-hour clock times.
  - 11:38 am
  - 12:38 am
  - 1:38 am
  - 11:38 pm
  - 12:38 pm
  - 1:38 pm

What do you notice?

Convert to the 24-hour clock

Reasoning and problem solving

Ron is converting to 24-hour clock times.



Here are Ron's answers.

12-hour time	24-hour time
1:45 pm	13:45
10:17 am	22:17
8:39 pm	20:39
5:09 am	17:09

Do you agree with Ron?

Explain your answer.

No

Dora has converted 12-hour clock times to 24-hour clock times.

12-hour time	24-hour time
10:00 pm	22:00
11:00 pm	23:00
12:00 midnight	24:00

What mistake has Dora made?

12:00 midnight should be written as 00:00

Which time is the odd one out?

midnight	12:00	00:00

Explain your answer.

Is there more than one possible answer?

possible answers: Midnight, as it is written in words. 12:00 because it refers to 12 noon and the other two refer to midnight.

Convert from the 24-hour clock

Notes and guidance

Building on the previous step, in this small step children reinforce their understanding of the 24-hour clock format by converting to 12-hour clock times and representing them on analogue clocks.

Children use the knowledge that there are 24 hours in a day and that a new day starts at midnight, 00:00, to help them to understand why they subtract 12 hours to convert a time after 1 pm from a 24-hour clock time to a 12-hour clock time. Discuss with children whether a 24-hour time is before or after noon and what changes need to be made.

Children could consider an event they do during the day, such as brushing teeth/eating lunch, and then convert the 24-hour clock time into the 12-hour clock time.

Things to look out for

- Children may omit am/pm when making conversions.
- Children may subtract 12 hours from times between 12:00 and 13:00, which will lead to incorrect conversions, for example 12:43 to 0:43 pm.
- Children may subtract 10 instead of 12

Key questions

- What is the same/different about 5 am/5 pm on a 24-hour digital clock and a 12-hour digital clock?
- How do you know if a 24-hour clock time is before or after noon?
- How do you convert _____ to a 12-hour clock time?
- Do you always subtract 12 hours to convert from a 24-hour clock time?
- Why is it important to remember to write am or pm when you have converted to a 12-hour clock time?

Possible sentence stems

- To convert from a 24-hour clock time, I subtract _____ from the hours if the time is _____ 13:00
- When I convert a 24-hour clock time before/after noon, I write _____ after the time.

National Curriculum links

- Read, write and convert time between analogue and digital 12- and 24-hour clocks

Convert from the 24-hour clock

Key learning

- The times have been converted from 24-hour clock times to 12-hour clock times.

00:05	12:05 am
03:05	3:05 am
12:05	12:05 pm
15:05	3:05 pm

What do you notice?

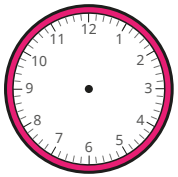
- Match the 24-hour clock times to the 12-hour clock times.

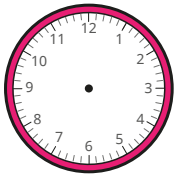
00:28	11:28 pm
12:28	1:38 pm
11:28	12:28 pm
01:28	1:28 am
23:28	12:28 am
13:38	11:28 am

- Complete the sentences.
  - 10:35 is 25 minutes to 11 in the _____
  - 13:11 is 11 minutes past _____ in the _____
  - 19:45 is quarter to 8 in the _____
  - 04:30 is half past _____ in the _____

- Convert each 24-hour clock time to 12-hour clock time.

  Draw your answer on both clocks.

13:45  :

16:38  :

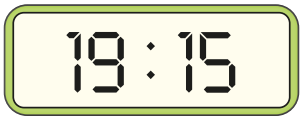
- Convert the 24-hour clock times to 12-hour clock times.
  - 06:17
  - 12:43
  - 08:52
  - 20:14
  - 18:17
  - 00:43
  - 22:01
  - 10:29

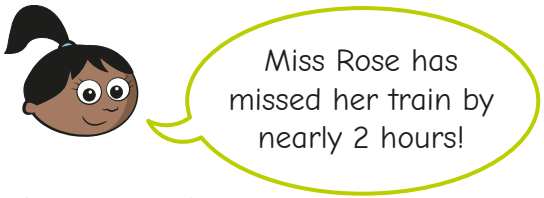
Convert from the 24-hour clock

Reasoning and problem solving

Miss Rose's train leaves at 25 minutes past 7 in the evening.

When she arrives at the station to catch her train, her watch shows this time.





Is Sam correct?

Explain your answer.

Miss Rose's train journey lasts 1 hour and 42 minutes.

What time does she arrive?

Write your answer as a 12-hour clock time.

No

9:07 pm

Tiny converts the 24-hour clock times into 12-hour clock times.

24-hour time	12-hour time
12:45	12:45 am
10:45	10:45 am
09:45	9:45 am
17:45	7:45 pm

Do you agree with Tiny?

Explain your answer.

No

Scott looks at the 24-hour time on his phone.

The hours and the minutes each have the same digits in the same order.

What time could his phone be showing?

Write the 24-hour clock time and the 12-hour clock time.

multiple possible answers, e.g.

01:01, 1:01 am
12:12, 12:12 pm
23:23, 11:23 pm