Five sample sessions inside...

numicon

Big Ideas

Fractions

Multiplying and dividing

Adding and subtracting

Place value

Working with fractions, decimals and percentages

- **A programme of additional sessions for children in Year 5 and above not meeting age related expectations**
- **Focuses on strong re-teaching of key maths topics using an active, practical approach**
- **Suitable for delivery by non-specialists**

This 12 week programme includes pre- and post-assessments, familiarization activities and 48 step-by-step sessions across 5 key areas: Number and place value, Adding and subtracting, Multiplying and dividing, Fractions and Working with fractions, decimals and percentages.

This booklet provides a sample session from each of the five **Big Ideas** to allow you to see how it could benefit your struggling learners.

OXFORD

Ordering and comparing numbers: 4-digit and 5-digit numbers

Session 2

Educational context

This session builds upon the context of a music concert from the previous session. Here the focus is on gaining a feel for the size of a number and how it relates to others by ordering and comparing.

Prior learning

Compare and order numbers up to 1000

Read and write numbers to 1000 in numerals and words

Recognize the place value of each digit in a 4-digit number

Recognize zero as a place holder

Reduce a column value to zero by taking away from that column

Making connections

In Unit 2, Session 1 students draw, describe and visualize place value and zero as a place holder. This develops an understanding that numbers can be expressed in different ways, e.g. one thousand is the same as ten hundred.

Objectives

- To understand the quantity and column value of numbers to 1000, extending to 10 000.
- To recognize the place value of each digit in 5-digit numbers.
- To order and compare numbers up to 100 000.

Vocabulary

column, place value, base-ten, column value, 5-digit number

Have ready

Base-ten apparatus

Counters

0–9 dice (or Spinner with 0–9 Overlay from PCM 42)

Sticky notes

Place Value Arrow Cards (PCMs 29a–29d)

Place Value Frame – TTh Th H T O (PCM 33)

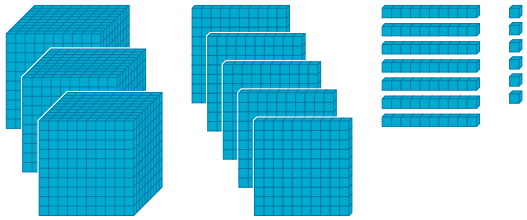
Written Assessment Question Unit 2, 2 (PCM 6a)

Main learning

Step 1

Remind students of the music concert scenario in Session 1, where the lower tier of the stadium can seat 3576 people and the upper tier seats 1842 people.

Ask students to use base-ten to model these numbers (e.g.).



1

Work together to record these maximum capacity numbers on the Place Value Frame, so that children can keep referring back to them.

Ask students: which tier holds more people? (Lower tier) How do you know?

> The lower tier can hold more people, because it seats more than 3000 people while the upper tier seats fewer than 2000.

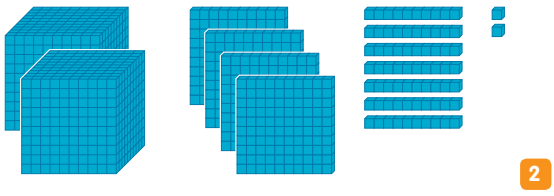
Step 2

Say that on each of the seven evenings in one week, the lower tier was not full but had more than 1000 people.

Ask students to explore with apparatus to write seven different possible numbers for the lower tier and write each number onto separate sticky notes. (Encourage a range of numbers from 1000 to 3575, and look for suitable responses.)

Ask students to read each number aloud. Listen for correct vocabulary.

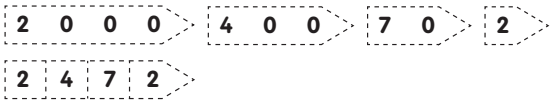
Invite students to show the number using base-ten apparatus (see 2, which shows 2472).



2

What is the biggest possible number you could have written? (3575)

Ask students to show the numbers using Place Value Arrow Cards and Counters on the Place Value Frame (e.g. 3 and).



3

Ten Thousands	Thousands	Hundreds	Tens	Ones
	●●	●● ●●	●● ●● ●● ●	●●

4

Ask students to place the seven numbers from their sticky notes into ascending order.

Step 3

Place 9 Counters into the thousands column (see 5).

Ten Thousands	Thousands	Hundreds	Tens	Ones
	●● ●● ●● ●● ●●			

5

Ask students what number this is. (9000)

Using Counters, count on from 9000 onto the frame, e.g. 9100, 9200, … 9800, 9900.

If they say '9 thousand *ten hundred*', ask for another way of saying 'ten hundred.' (one thousand)

> 9 thousand and 1 more thousand is 10 thousand.

Count up again, this time in thousands (1000, 2000, … 9000, 10 000) and explore this using the Place Value Frame (see 6).

Ten Thousands	Thousands	Hundreds	Tens	Ones
●				

6

Step 4

Play the game.

Sowing the seeds for the next session

Ask students how many ten thousands is the maximum that can go in the ten thousands column. (9)

Count up from 90 000 in thousands (91 000, 92 000, … 99 000, 100 000). Listen for 'ninety ten' thousand and encourage 'one hundred thousand'.

Game

Look and listen for students placing the higher value digits in columns on the left-hand side to give larger numbers.

- Use a 0–9 dice (or a Spinner with 0–9 Overlay) and one Place Value Frame per player.
- Take it in turns to throw the dice and decide which column to write the digit into.
- Repeat until each player has written 5 digits.
- The player who has the biggest number is the winner (e.g. 7).

Player A wins:

Ten Thousands	Thousands	Hundreds	Tens	Ones
9	6	3	1	0

Player B loses:

Ten Thousands	Thousands	Hundreds	Tens	Ones
7	7	5	3	4

Player C loses:

Ten Thousands	Thousands	Hundreds	Tens	Ones
8	5	2	2	1

7

At the end of the game ask: can you read your number?

Can you place the numbers in ascending order? (e.g. 77 534, 85 221, 96 310)

Challenge: How far away from 100 000 is each player?

Varying and repeating

The game can be repeated to provide further practice.

It can be varied so the winner is the player with the smallest number.

Assessing and reflecting

- Watch the students playing the game. Do they know to insert the largest digit into the highest value column that is available. Are they placing low digits into TTh and Th columns too soon, thus making their final number low?
- Written Assessment Question Unit 2, 2.

Discuss how students can use their learning outside the session, and complete their Learning Log (PCM 1) to reflect on the maths they have done so far.

Continuing the learning

Students play the game again at home with their friends or parents.

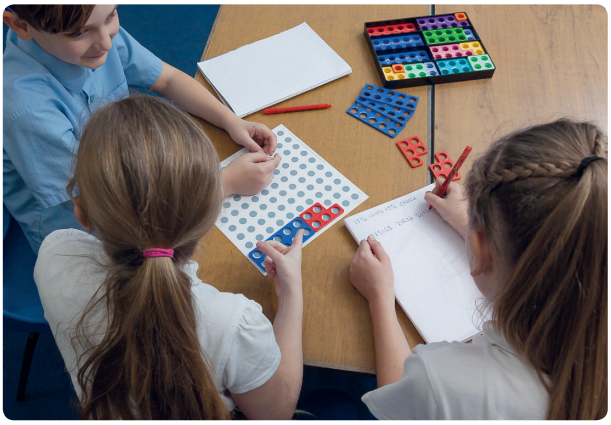
Change the rules, e.g. the winner is the person with the smallest number.

Further teaching and practice

NPC 4, Numbers and the Number System 2, Activities 2 and 3
NPC 5, Numbers and the Number System 1, Activities 6 and 7
MyMaths lessons: Working with thousands (1972); Place value hundreds and thousands (1352)

Percentages

Session 3



Educational context

This session focuses on understanding percentages, including knowing that 'per cent' means 'out of one hundred' and that percentages are a special value fraction: hundredths. This builds on the previous session where students explored hundredths as fractions and decimals.

Prior learning

Dividing by 100

Multiplying by 2, 3, 5, 40

Making connections

This session looks at percentages as another way of representing quantities less than 1 and provides further links to the hundredths as fractions ($\frac{1}{1000}$). It links to multiplication of whole numbers by fractions (Session 4).

Objectives

- To know that percentages are hundredths.
- To be able to work out simple percentages of amounts.
- To know the fraction equivalents of 1%, 50% and 10%.
- To understand that, e.g. 5% is half of 10%.

Vocabulary

percent ('cent' means '100' and 'per' means 'out of'), percent of, off, equivalent

Have ready

- Numicon Shapes
- Decimal Baseboard Laminate
- Counters
- 100-bead string (if available)
- Blank 100 Square (PCM 8)
- Written Assessment Question Unit 6, 3 (PCM 6a)

Main learning

Step 1

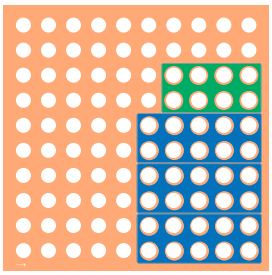
Discuss that percentages are another way of dealing with fractions.

Draw out from students that percentages are hundredths, but instead of writing a fraction, e.g. $\frac{50}{100}$, a percentage is written, e.g. 50%.

Look and listen for students who are able to see that the symbol % looks like it is made from /00 or /100.

Discuss that the Decimal Baseboard shows 100 parts of one whole and use the Baseboard and Numicon Shapes to help students visualize some percentages (see 1).

This shows 38 out of 100. It is an image of 38%.



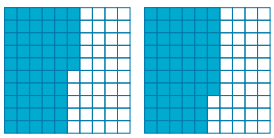
1

Ask students to work together using the Decimal Baseboard and Numicon Shapes to show 20%, 27% and 45%.

Step 2

Discuss that percentage values are as easy to compare as whole numbers.

Explore how they can be compared visually, e.g. use two 100 squares and shade the first 100 square to show 55%, then shade in the second 100-square to show 57% (see 2).

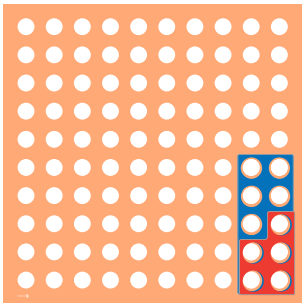


2

Step 3

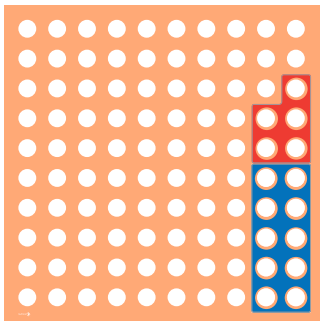
Explore further the relationship between percentages using a Decimal Baseboard and Numicon Shapes.

Discuss that 5% = $\frac{1}{2}$ × 10% and look for students who can show this with a 10-shape and a 5-shape (see 3).



3

Ask students to explore and show that 15% is 10% + 5% (see 4).



4

Ask students to show how these percentages could be represented in a similar way:

20% = 2 × 10% 25% = $\frac{1}{2}$ × 50%

60% = 50% + 10% 40% = 50% – 10%

19% = 20% – 1% 2% = 2 × 1%.

What Shapes will students choose to show these percentages on the Baseboard?

Step 4

Set the scene of a sale in a sofa shop.

Can students find out what 40% is of a sofa that costs $2200?

Explore finding percentages of amounts by interpreting the vocabulary and symbols.

Look and listen for students who can explain that 40%= $\frac{40}{100}$ which means 40 ÷ 100.

Discuss that 'of' means 'multiply' or 'times' (×), so finding 40% of $2200 has two steps:

- $2200 ÷ 100 = $22
- $22 × 40 = $880

> The first operation divides to give 1% of $2200, the second operation multiplies to give 40%.

Look and listen for students making the connection that they now need to subtract $880 from $2200 to find the new price of the sofa. ($1320)

Challenge: Another sofa was originally $1900. If the sale reduction is 30%, what is the new price? Which sofa is cheaper?

Sowing the seeds for the next session

Using 1-shapes, 10-shapes and a Decimal Baseboard, can students explain what the equivalent fraction is to 1% and 10%?

Varying and repeating

Repeat the session using a 100-bead string to show percentages, i.e. 100 beads represent 100%, so how many beads will show 42% or 52%?

Use the bead string to represent £600 and discuss how much 1 bead, or 10 beads, represents.

Activity

Look and listen for students who are able to find percentages totalling 100%.

- Use Blank 100 Squares as your grids for designing a park.
- Work in pairs. Give your partner percentages to use for designing their park, e.g. 50% grass, 20% water, 20% play area, 10% trees, making sure they total 100%.
- Design, shade and label the correct number of squares for each element of your park, and give your design to your partner to check.

Assessing and reflecting

- Which is more money, 20% of $300 or 40% of $200?
- What is 40% of $1200?
- Written Assessment Question Unit 6, 3.

Challenge:

- If there are 25 cars and 5 of them are red, what percentage of the cars are red? How did you work it out?

Discuss how students can use their learning outside the session, and complete their Learning Log (PCM 1) to reflect on the maths they have done so far.

Continuing the learning

Ask students to design a garden area for their school, this time giving each other percentages that are not multiples of ten, e.g. 45% flower beds, 25% paving, 15% shed, and so on.

Can students work out what 10% off and 50% off are for some prices of items in a shop? Discuss the savings and the wording of sales signs, e.g. the use of 'off', 'of', and 'up to'.

Further teaching and practice

Numbers and the Number System 7; Calculating 11

MyMaths lessons: Percentages of amounts 1 (1030); Percentages of amounts 2 (1031)

Adding and subtracting money

Session 2

Educational context

This session focuses on adding and subtracting, using the written column method explored in Unit 3, but with numbers up to two decimal places in the context of money. Students calculate with money where regrouping is extended to decimals. Encourage pupils to continue estimating an answer before carrying out the calculation.

Prior learning

Secure understanding of place value with numbers up to two decimal places

Using the written column method for adding and subtracting

Making connections

In Unit 3, students are introduced to the column method for adding and subtracting, and in Unit 7, they work on decimals.

Objectives

- To know that the decimal point separates the whole and fractional parts in decimal notation.
- To add and subtract numbers up to two decimal places using the column method.
- To solve simple money problems involving numbers to two decimal places.

Vocabulary

estimate, more, column addition, regrouping, column value, difference, cents, dollars, tenths, hundredths, decimal point, zero as a place holder

Have ready

- $1, 10c coins and 1c counters (PCM 13)
- Place Value Frame – Decimals (PCM 34)
- Numeral Cards 0–9 (PCM 27)
- Cafe and Curry Menus (PCM 11)
- Written Assessment Question Unit 8, 2 (PCM 6b)

Main learning

Step 1

Give students copies of the Cafe and Curry Menus sheet. Look together at the Cafe Menu (see 1).

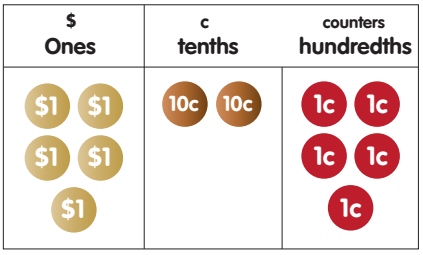
Chef's salad	$7·99
Soup	$5·25
Tomato pasta	$7·90
Chunky chips	$2·45
Coffee	$1·90
Orange juice	$1·49
Water	$0·75

1

Ask students to choose an item from the Cafe Menu and find the correct amount of money from the coins provided.

Discuss how this can be represented on the Place Value Frame. Ask what the column values would be (ones, tenths, hundredths).

Place the coins on the Decimal Place Value Frame, e.g. Soup $5·25 (see 2).



2

Look and listen for students who can interpret coins in terms of decimals and talk about cents as tenths and hundredths.

> When dealing with money, the decimal point separates the dollars from the cents

Remind students that one cent is one hundredth of $1.

Repeat with other amounts, including zero as a place holder.

Ask students if the cost of the tomato pasta could be written as $7·9 instead of $7·90.

Look and listen for students who realize that 0 as a place holder is important in the context of money.

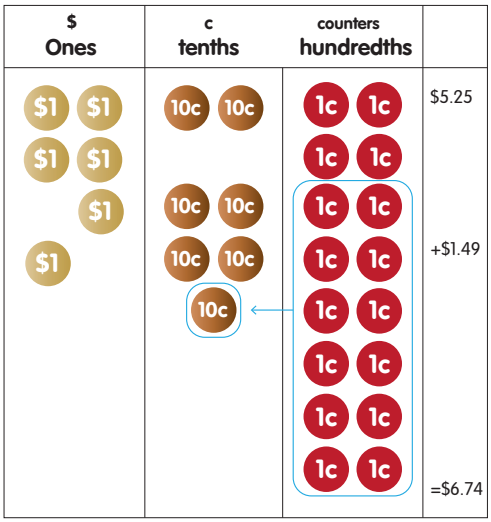
> We always write money to two decimal places or in whole numbers.

Step 2

Tell students you have chosen one item of food – soup – and one drink – orange juice – and need to find the total. Ask them to estimate the answer ($5 + $1·50 = $6·50).

Work out the exact calculation using the coins and Place Value Frame ($6·74) and then work through the calculation together, using the column method.

Look and listen for students applying their understanding of the written method to decimals when regrouping (see 3).



5·25
+1·49
$6·74
1

3

Encourage students to record the final answer as $6·74 and check with their estimate.

Step 3

Ask students to choose two items from the menu and find the total cost. Repeat for several calculations to reinforce understanding of decimal places.

Step 4

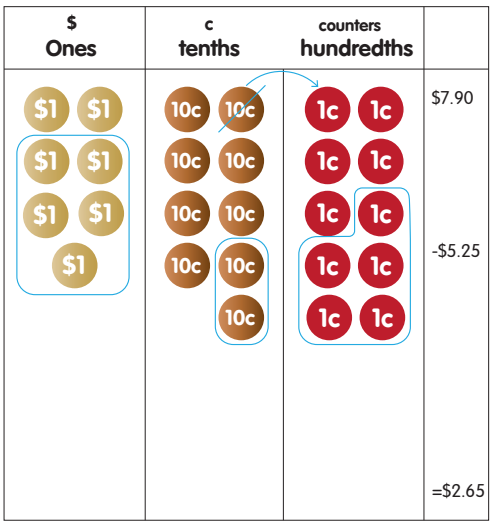
Ask the students to find the difference between the price of the soup and the tomato pasta.

Look and listen for students who realize that this is a subtracting calculation. Ask them to estimate the answer. ($8 – $5 = $3)

Together, explore the calculation using the coins and Place Value Frame (TO·th). Work through the calculation using the column method ($7·90 – $5·25 = $2·65).

Look and listen for students understanding the written method for decimals when regrouping for subtraction (see 4).

Encourage students to record the final answer as $2·65 and check with their estimate. Discuss whether this calculation could have been calculated mentally, e.g. 90 – 25 = 65 and 7 – 5 = 2.



8 1
7·90
– 5·25
$2·65

4

Step 5

Ask students to choose two items from the menu and find the difference. Repeat for several calculations to reinforce understanding of decimal places and regrouping.

Sowing the seeds for the next session

The label on this bottle reads 1·750 ℓ. This number has three decimal places. How would you say this number? What is the value of each digit? Use 0–9 Numeral Cards on the Place Value Frame to represent the number.

Varying and repeating

Vary the numbers involved, as appropriate – increasing or reducing the number of digits and the amount of regrouping involved.

Game

Look and listen for students using estimating to find approximate answers and using subtracting (to two decimal places) to find the difference.

- Use the Curry in a Hurry section of the Cafe and Curry Menus sheet. Play in pairs.
- Take turns to choose a curry, rice and side dish. Estimate first and then write the bill, including finding the total cost of the three items.
- Ask a partner to check the total bill by using the inverse.

Assessing and reflecting

- Benji orders chicken Kung Po $5·35, egg-fried rice $2·55, a vegetable spring roll $1·75 and a glass of lemonade. He spends $11·90. How much does the glass of lemonade cost? ($2·25)
- Written Assessment Question Unit 8, 2.

Challenge:

- Apples cost 56c each and grapes cost $1·50 for 1 kg. Kristie buys 3 apples and 1·5 kg of grapes. How much does she spend? ($3·93)

Discuss how students can use their learning outside the session, and complete their Learning Log (PCM 1) to reflect on the maths they have done so far.

Continuing the learning

Cdlect menus from restaurants or takeaways. Ask students to choose items to make an imaginary order from these, and work out the total cost.

Discuss the importance of reviewing the numbers involved in a calculation to determine whether a mental or written strategy is most appropriate, and that larger numbers or decimals do not automatically make the calculation more complicated.

Further teaching and practice

NPC 4, Numbers and the Number System 6 and 8

GMS 4, Measurement 2

MyMaths lessons: More written methods (1908); Adding decimals in columns intro (1381)

Interpreting remainders

Session 4

Educational context

This session focuses on dividing that results in a remainder and how to interpret that remainder as a number, as a fraction and as a decimal. This builds on the dividing work covered in Unit 9, Session 3.

Prior learning

Decimal numbers

Fractions

Dividing by 2, 5, 10

Making connections

Students build on other work on dividing, even and odd numbers, fractions, decimals, money and mixed numbers.

Objectives

- To recognize a remainder.
- To convert remainders to fractions and decimals.
- To write a remainder as a number, fraction or decimal.
- To write the quotient as a mixed number.

Vocabulary

divide, equally, left over, remainder, exchange, dividend (the quantity to be divided), divisor (the number divided into another number), quotient (the result of a division)

Have ready

Numicon Shapes

Baseboard Laminate

Counters

$1, 20c and 10c coins or Coins (cut from PCM 13)

Spinners and Dividends and Divisors Overlays (PCM 47)

Written Assessment Question Unit 9, 4 (PCM 6b)

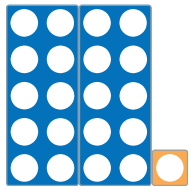
Main learning

Step 1

Set out 21 with Numicon Shapes (two 10-shapes and one 1-shape, see 1).

Ask students how to divide this into 2 equal amounts.

Twenty-one divided by two equals ten remainder one.



1

Discuss the Shapes and remind student about even and odd numbers.

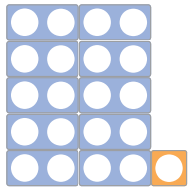
Ask what happens when 1 is divided by 2.

Listen for students recalling that $1 \div 2 = \frac{1}{2}$.

Discuss what decimal occurs when 1 is divided by 2 (0·5).

Set out 21 again, this time with ten 2-shapes and one 1-shape (see 2) and ask students to divide these by 10, into 10 equal parts.

21 ÷ 10 = 2 remainder 1.



2

Discuss what happens when 1 is divided by 10.

Listen for students suggesting one tenth or $1 \div 10 = \frac{1}{10} = 0{\cdot}1$.

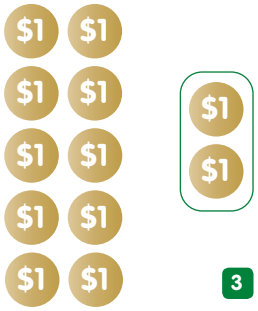
Explore the idea that remainders can be expressed in three ways:

- The number left over (remaining)
- A fraction
- A decimal.

Step 2

Ask students to imagine that five friends had worked together to tidy a garden and were paid $12 altogether.

Discuss how much each friend gets if they share this equally (see 3).



3

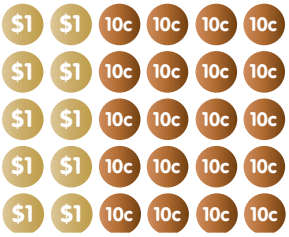
Give students twelve $1 coins to share between the five friends.

Two students each, remainder 2.

Discuss what to do with the $2 remaining.

Look and listen for students exchanging two $1 coins for twenty 10p coins and sharing again (see 4).

Two dollars and forty cents multiplied by five.



4

Discuss how the $2 and 40c can be written ($2·40 or $2 and $\$\frac{4}{10}$).

Ask pupils to show what fraction is created by the 40c if the 10c coins are exchanged for 20c coins ($\frac{2}{5}$).

Challenge: If the five friends tidy another garden and are given $16, how much does each friend get? ($3·20 or $3 and $\$\frac{1}{5}$)

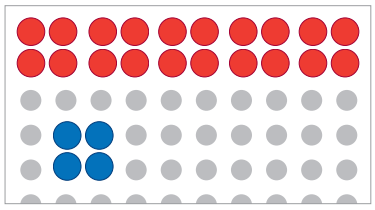
Step 3

Say that the 5 friends pick 24 apples from their own garden.

Ask students to work out how many apples each friend will get if they share them equally.

Listen for students who suggest calculating 24 ÷ 5. Use a Baseboard and Counters to show that the friends would get 4 apples each with 4 left over (see 5).

Four apples each, remainder four.



5

Explore writing the answer to 24 ÷ 5 as a mixed number, $4\frac{4}{5}$ and as a decimal, 4·8 (see 6).

Challenge: Ask pupils to work out sharing 23 apples between the 5 friends ($4\frac{3}{5}$ or 4·6).

$= \frac{4}{5}$ or 0·8

6

Step 4

Show the dividing calculation 56 ÷ 5, using the short written method of dividing (see 7).

$$5\overline{)\,56} \quad 11 \text{ r } 1$$

7

Discuss how the remainder (1) can be divided by 5: 1 ÷ 5 = $\frac{1}{5}$, and can also be written as a decimal, 0·2.

Ask students to solve the dividing calculation 46 ÷ 4 and to write the remainder as a fraction ($11\frac{2}{4}$).

Look and listen for students who can make the connection that the fraction can be simplified to $11\frac{1}{2}$, and can also be written as a decimal, 11·5.

Sowing the seeds for the next session

Discuss that if there are 12 half sandwiches, 12 × $\frac{1}{2}$ = number of whole sandwiches (6).

Can students work out how many quarter sandwiches can be made from them? (24)

Varying and repeating

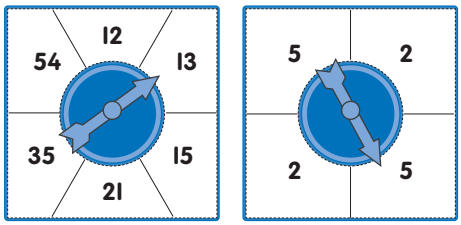
Repeat Step 1 using the Baseboard and Counters.

Students divide $18 and $24 between the five friends in Step 2, and 36 apples between the friends in Step 3.

Game

Look and listen for students dividing and identifying remainders correctly.

- Use two Spinners with Dividends and Divisors Overlays.



- Play the game in pairs. Take turns to spin the two Spinners.

  The first Spinner is for the number to be divided (dividend) and the second Spinner is for the divisor, i.e. Spinner 1 ÷ Spinner 2.
- If the quotient (the result) has a remainder, then you score 1, no remainder scores 0.
- The first player to score 5 wins.

Assessing and reflecting

- Divide 101 by 5 and write the remainder as a fraction.
- Divide 101 by 10 and write the remainder as a decimal.
- Written Assessment Question Unit 9, 4.

Challenge:

- Divide 67 by 5 and write the remainder as a fraction.

Discuss how students can use their learning outside the session, and complete their Learning Log (PCM 1) to reflect on the maths they have done so far.

Continuing the learning

Students play the game again and can score a bonus point if they can express a remainder as a fraction *and* a decimal. The first player to score 10 wins.

Ask students if they can say which of these dividing calculations results in a remainder and how they know:

12 ÷ 2	13 ÷ 2	23 ÷ 2
55 ÷ 5	70 ÷ 5	31 ÷ 5
101 ÷ 10	950 ÷ 10	655 ÷ 10

Further teaching and practice

NPC 5, Calculating 4, 8, 9 and 13

MyMaths lesson: Interpreting remainders (1767)

Comparing and ordering fractions

Session 4

Educational context

This session focuses on comparing and ordering fractions with the same denominator but different numerators, and different denominators but the same numerator. This builds on previous sessions where pupils compared mixed numbers and identified equivalent fractions.

Prior learning

Equivalent fractions

Decimal equivalent of fractions

Making connections

This session focuses on comparing proper fractions. It links back to Session 2 where mixed numbers are compared and to Unit 6, Session 2 where comparisons are made with decimals.

Objectives

- To compare and order fractions with the same denominator and different numerators.
- T
  numerator and different denominators.

Vocabulary

numerator (top number), denominator (bottom number), equivalent fractions

Have ready

Numicon Shapes

Number rods

Strips of paper

Spinner with Numbers Overlay (PCM 45)

Written Assessment Question Unit 10, 4 (PCM 6b)

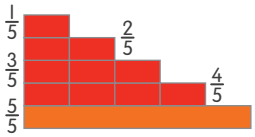
Main learning

Step 1

Give students 10-rods and 2-rods to compare fractions with the same denominator.

Can students show you how to use a 10-rod to represent 1 and the 2-rods to represent $\frac{1}{5}$? (see 1)

The denominators are the same, so the size of the fraction is determined by the value of the numerator.

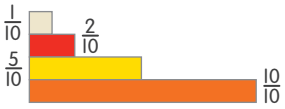


1

Ask students how they know that the 2-rod is $\frac{1}{5}$.
Listen for students reasoning that five 2-rods are the same length as the 10-rod representing 1, so one 2-rod = 1 ÷ 5 or $\frac{1}{5}$.

Step 2

Give students 1-, 2- 5- and 10-rods to use to compare tenths (see 2).



2

Ask them to use the 10-rod to represent 1 ($\frac{10}{10}$).

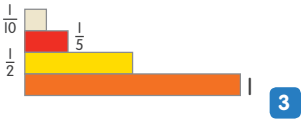
Discuss how we know the 5-rod is $\frac{5}{10}$ (it represents half of 1, or $\frac{10}{10} \div 2 = \frac{5}{10}$).

Challenge: Which is the biggest fraction in 2 ($\frac{10}{10}$) and which is the smallest ($\frac{1}{10}$)?

Step 3

Work together to compare fractions with the same numerator.

Use the same number rods as in Step 2 with the equivalent fraction names (see 3).



3

Listen for students discussing the relative fraction sizes.

Ask them to identify the biggest fraction less than 1 ($\frac{1}{2}$) and the smallest ($\frac{1}{10}$).

Explore putting the fractions in order of size, starting with the biggest (see 4).

If the numerators are the same, then the bigger the denominator, the smaller the fraction.

$\frac{1}{2} > \frac{1}{5} > \frac{1}{10}$ 4

Step 4

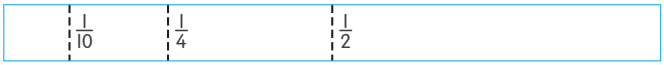
Give students a strip of paper to represent 1.

Ask them to fold it in half and write $\frac{1}{2}$ at the fold.

Then ask them to fold the half into half to make quarters and write $\frac{1}{4}$ at the first fold.

Discuss where $\frac{1}{10}$ would be on the strip and ask students to mark it on.

Look and listen for students identifying the positions of the fractions correctly (see 5).



5

Ask them to identify the biggest fraction ($\frac{1}{2}$) and the smallest ($\frac{1}{10}$).

Explore putting the fractions in order of size, starting with the biggest (see 6).

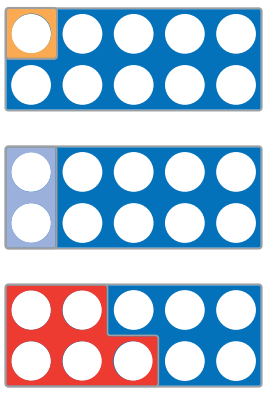
$$\frac{1}{2} > \frac{1}{4} > \frac{1}{10}$$ 6

Sowing the seeds for the next session

Using number rods or Shapes to illustrate their thinking, can students explain why it is possible to add fractions with the same denominator, but not fractions with different denominators? (The denominators show the kind of fraction being added, so need to be the same.)

Varying and repeating

Use 10-, 5-, 2- and 1-shapes to set up a Shapes version of the number rods in Steps 2 and 3 (see 7).



7

Fold the paper strip in Step 4 into thirds and sixths to compare, e.g. $\frac{1}{10}, \frac{1}{6}, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}$.

Game

Look and listen for students identifying the numerators and denominators and comparing fractions correctly.

- Use a Spinner and a Numerals Overlay.
- Take turns to spin the Spinner twice.
- Player 1's first spin gives the denominator of their fraction and the second spin gives the numerator.
- The next player does the same.
- Write down and compare the two fractions (or more, if playing in a group).
- The biggest fraction scores a point.
- Decide how many points to score for a win.

Note that this will generate proper and improper fractions.

Assessing and reflecting

- Which of these fractions is the biggest: $\frac{6}{11}, \frac{3}{11}, \frac{9}{11}$ or $\frac{5}{11}$?
- What are two proper fractions bigger than $\frac{1}{3}$?
- Written Assessment Question Unit 10, 4.

Challenge:

- A running track is 400 m. What fraction of a kilometre is this in tenths and in fifths?

Discuss how students can use their learning outside the session, and complete their Learning Log (PCM 1) to reflect on the maths they have done so far.

Continuing the learning

Students play the Game again, this time comparing the fractions and the player with the smallest fraction wins a point.

Can students collect information to present to a partner using fractions, e.g. there are 20 cars in the car park: $\frac{12}{20}$ of the cars are silver, $\frac{4}{20}$ are black, $\frac{2}{20}$ are red and $\frac{2}{20}$ are blue?

Further teaching and practice

NPC 5, Calculating 4, 14 and 15

MyMaths lessons: Comparing fractions (1075); Comparing scalable fractions (1844)

numicon

Numicon Big Ideas

This sample contains one session from each of the five Big Ideas:

- **Ordering and comparing numbers: 4-digit and 5-digit numbers** from Number and place value
- **Percentages** from Fractions, decimals and percentages
- **Adding and subtracting money** from Adding and subtracting
- **Interpreting remainders** from Muliplying and dividing
- **Comparing and ordering fractions** from Fractions

Three easy ways to order:

1. Visit **www.numicon.co.nz**
2. Call **0800 678 581**
3. Email your order to **info@numicon.co.nz**

Title	Price
Big Ideas Manual	$200
Big Ideas Apparatus Pack	$250

Oxford School Improvement

Oxford OWL
Essential support for school improvement
www.numicon.co.nz

web www.numicon.co.nz
email info@numicon.co.nz

phone 0800 678 581

OXFORD UNIVERSITY PRESS