Introduction to percentages Each day covers one maths topic. It should take you about 1 hour or just a little more.

Carefully read through the Learning Reminders

Tackle the questions on the Practice Sheet. There might be a choice of either Mild (easier) or Hot (harder)!

Learning Reminders
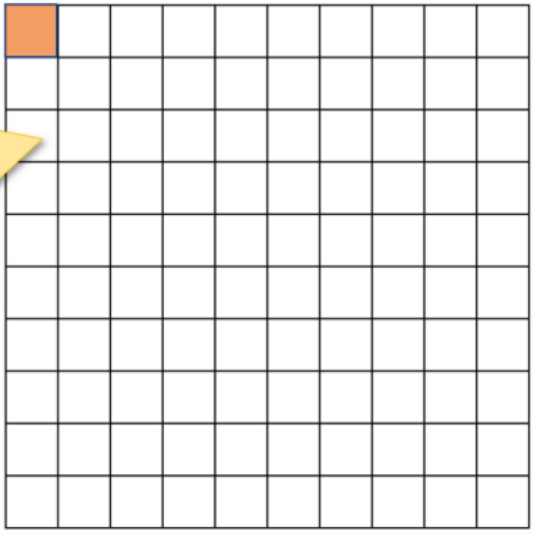
Introduction to percentages.

%

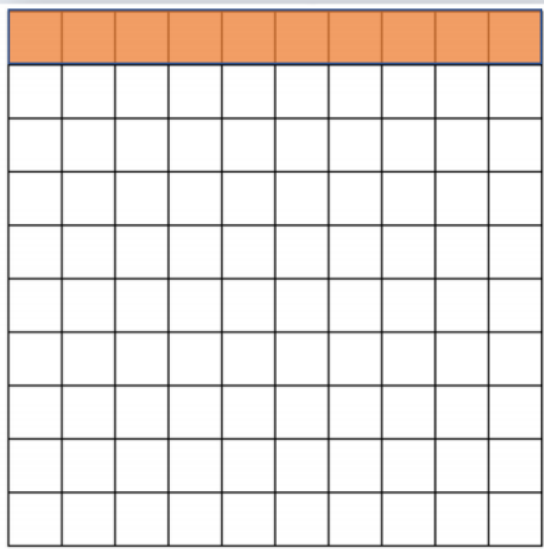Where have you seen this symbol? What does it stand for? **?**

Per cent means per 100, or out of 100.

Each small square is one hundredth of the whole square. 1 out of a 100 is the same as 1 percent. We write this as 1%.
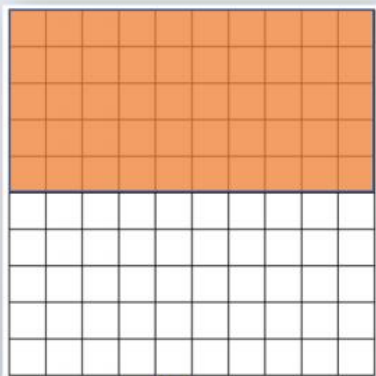
$^1/_{100} = 1\%$

Introduction to percentages.

10 small squares are shaded this time. That is equivalent to 10% of the whole square.

The symbol '≡' means **'equivalent to'**.

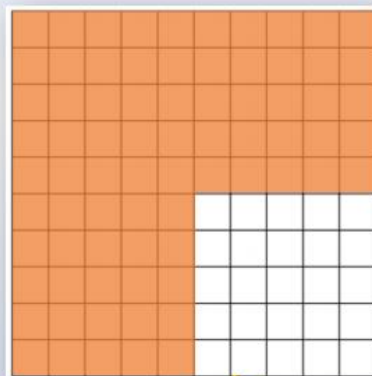$^{10}/_{100} \equiv {}^{1}/_{10} \equiv 10\% \equiv 0.1$

That's a lot of different ways to write the same amount!

Introduction to percentages.

50 small squares are shaded. That is equivalent to 50% of the whole square.

$50\% \equiv {}^{50}/_{100} \equiv {}^{5}/_{10} \equiv {}^{1}/_{2} \equiv 0.5$

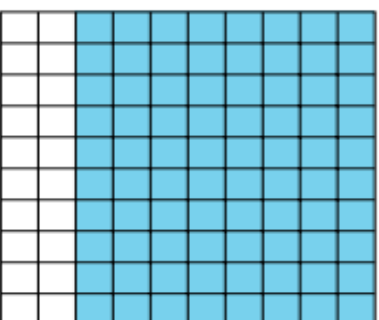75 small squares are shaded. That is equivalent to 75% of the whole square.

$75\% \equiv {}^{75}/_{100} \equiv {}^{3}/_{4} \equiv 0.75$

Practice Sheet Mild

Percentages

Write the percentage of each square that is shaded.

e.g.   **20%**
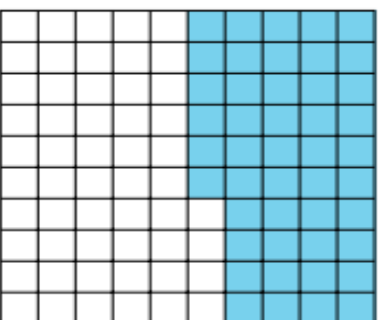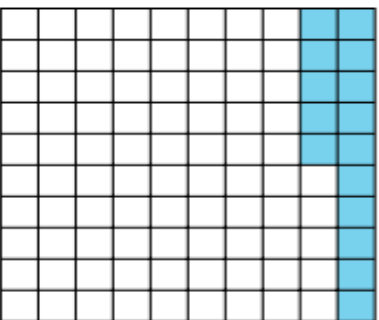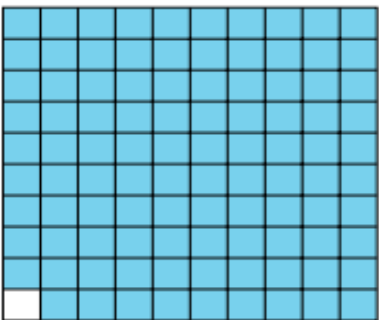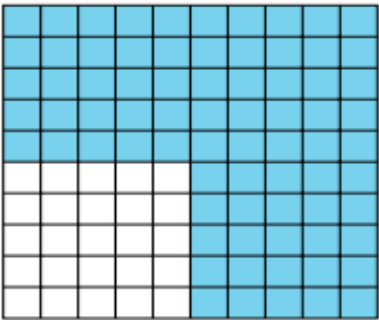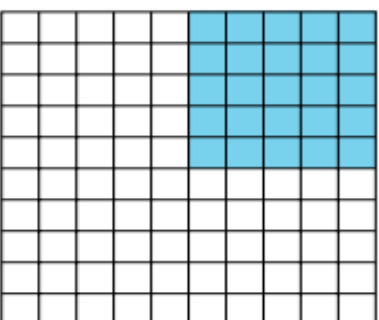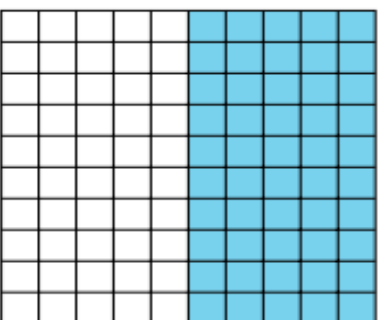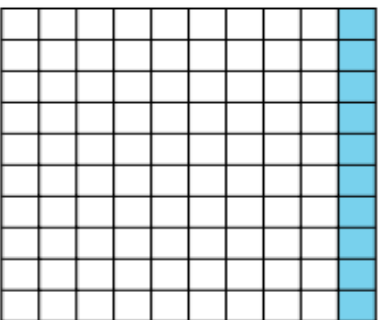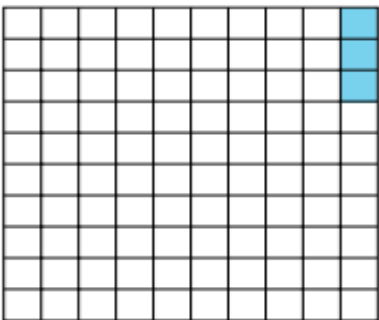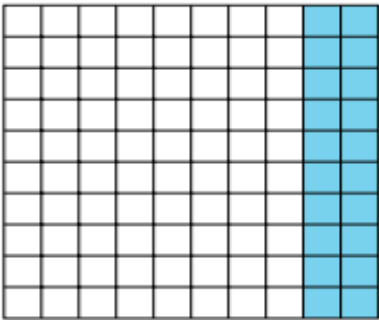
Practice Sheet Hot

Percentages

Write the percentage of each square that is shaded, and an equivalent fraction and decimal.

e.g.   **20% = 0.2 = $\frac{1}{5}$**
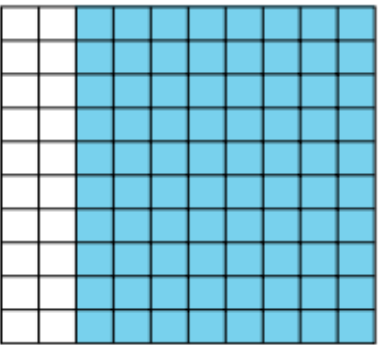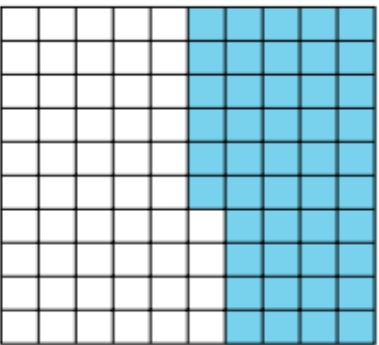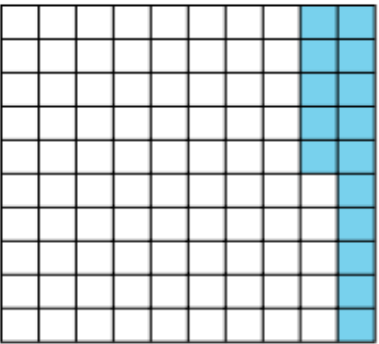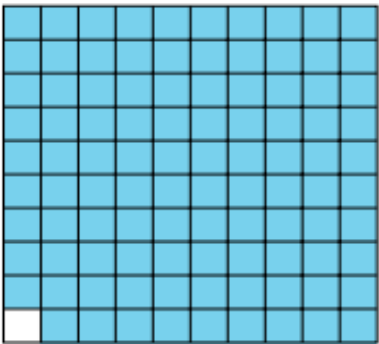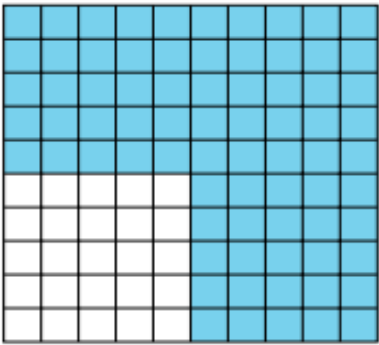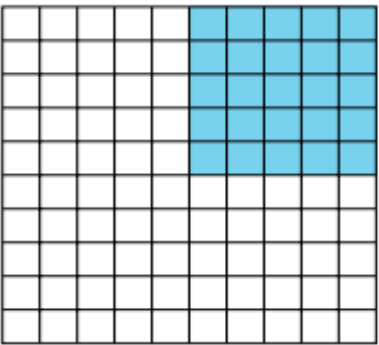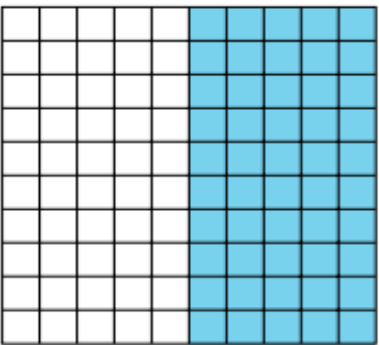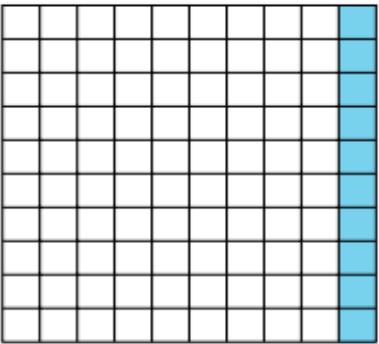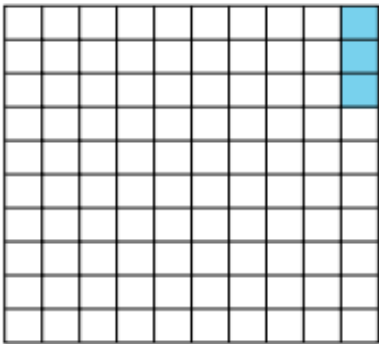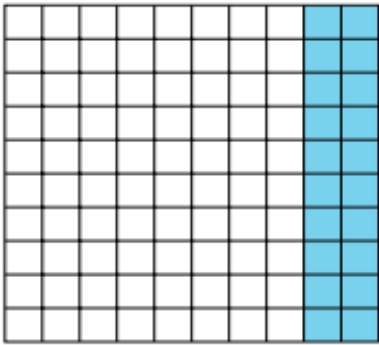
Investigation
Percentage explorers

You will need:
* squared paper

What to do:
* Draw seven 5 × 2 rectangles on squared paper.
  Each therefore has an area of 10 squares.

* Shade small squares in each grid to show the following percentages.

| 50% | 25% | 60% |

| 10% | 20% | 75% | 90% |
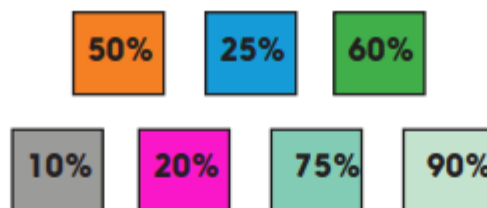
* In each case how many squares are coloured in?

* Which of the percentages resulted in some of the small squares being halved?

* Predict how many squares would be coloured in for each percentage if the rectangle measured 5 by 4 squares.

* Now check your predictions, were any squares halved this time?

Summer term   year 5   WB 13.07.20   **Maths**
Monday
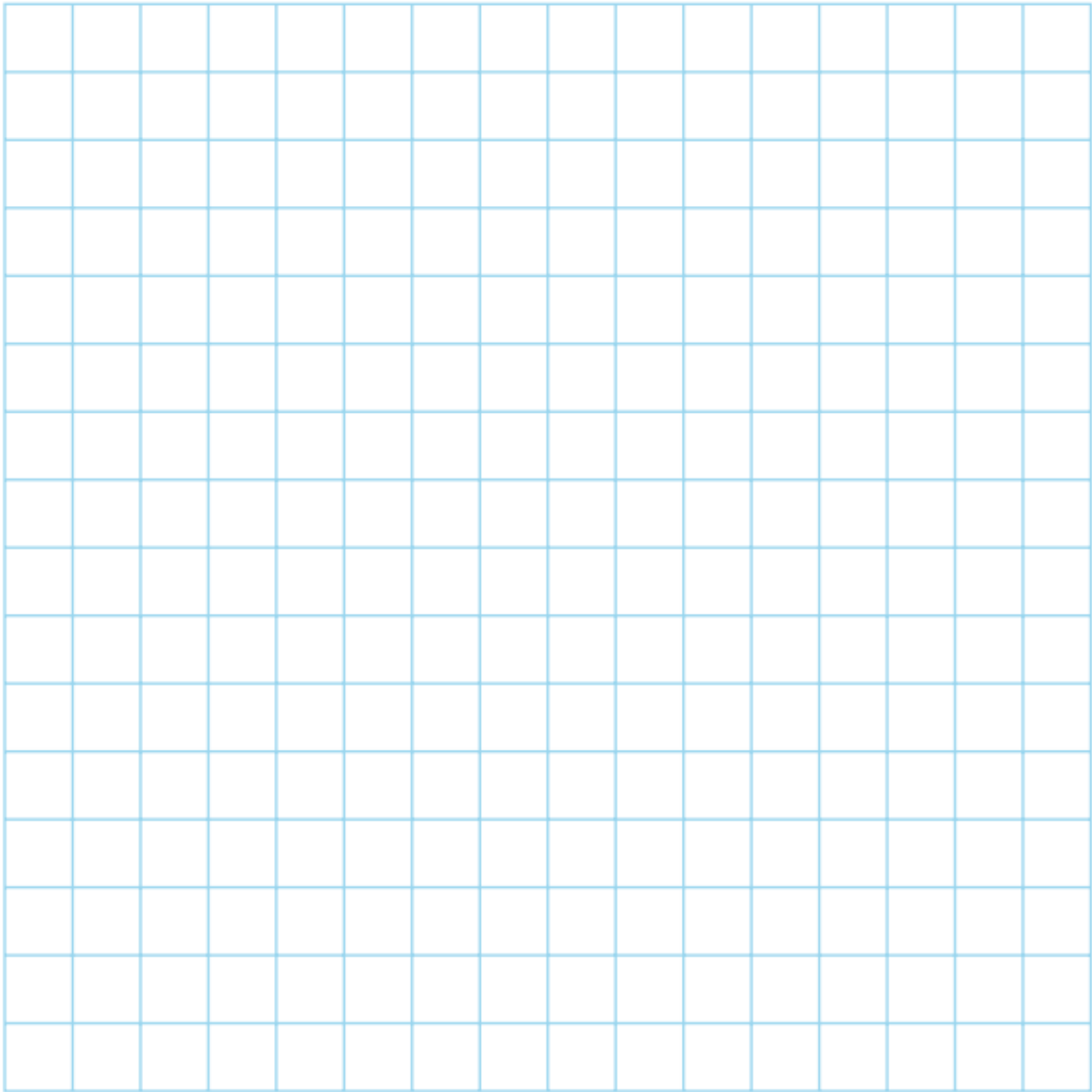
Tuesday

Use Frog (counting up) to subtract pairs of decimal numbers.   Carefully read through the Learning Reminders.

Learning Reminders

Use Frog (counting up) to subtract pairs of numbers.

Harry's best javelin throw at sports day last summer was 9.67 metres, but today he has thrown a huge 11.32 metres! How much further has he thrown?

We can use FROG to count up to find the difference in the throws.

1. Frog jumps 0.33m from 9.67m to the next whole number of metres.

2. Frog next jumps 1.32m from 10m to 11.32m.

1.32m

0.33m

9.67m   10m   11.32m

3. Then we add the hops.
1.32m + 0.33m = 1.65m.

Use Frog (counting up) to subtract pairs of numbers.

Distance	Measurement
Classroom width	4.56m
Classroom length	5.3m
Hall length	10.4m
Hall width	7.56m
Table width	0.5m
Table length	1.25m

How much *longer* is the classroom than it is *wide*?

We draw an empty number line jotting to show how we could find this difference.

We need to be careful about place value when adding tenths to tenths and hundredths to hundredths.

0.44

0.04   0.4   0.3

4.56   4.6   5   5.3

0.04 to 4.6, then 0.4 to 5, or one big jump of 0.44.
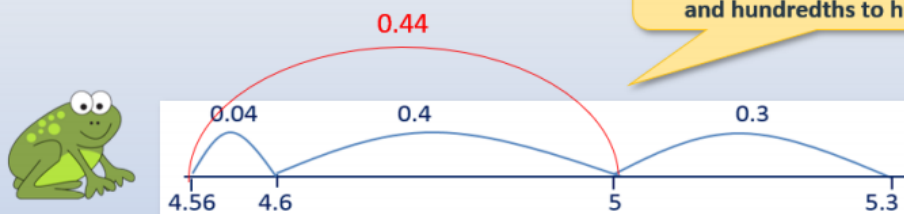
Then 0.3 to 5.3.

0.4m + 0.3m + 0.04m = 0.74m, or 74cm

Tuesday

Practice Sheet Mild
Subtracting decimals

Use Frog to solve these subtractions.

1.   3.5 - 2.9   2.   5.2 - 3.7   3.   9.1 - 5.8

4.   7.2 - 6.85   5.   8.3 - 4.75   6.   9.23 - 7.8

Challenge
Make up at least 5 subtractions with an answer of 1.4

Tuesday

Practice Sheet Hot
Subtracting decimals

Use Frog to solve these subtractions.

1.   7.3 - 6.79   2.   8.45 - 7.8   3.   5.24 - 3.7   4.   9.4 - 5.78

5.   8.7 - 6.45   6.   7.5 - 5.29   7.   10.67 - 5.3   8.   12.8 - 9.27

Challenge
Make up at least 5 subtractions with an answer of 3.15

Investigation
Decimal differences

1.   Use counting up to work out
9.8 – 7.65. Keep a note of both the
subtraction and the answer.

2.   Now work out 8.7 – 6.54. Keep a note
of the subtraction and your answer.

3.   Carry on this pattern of subtractions,
7.6 – 5.43, 6.5 – 4.32, 5.4 – 3.21, making
a record of all your subtractions and
their answers.

Can you predict the answer to the
next subtraction?
Why do you think the sequence of
subtractions gives such a pattern?

4.   Now try 12.3 – 4.56
23.4 – 5.67
34.5 – 6.78 and so on.

0.05   0.3

7.65 7.7   8.0   9.8

9.8 - 7.65 =
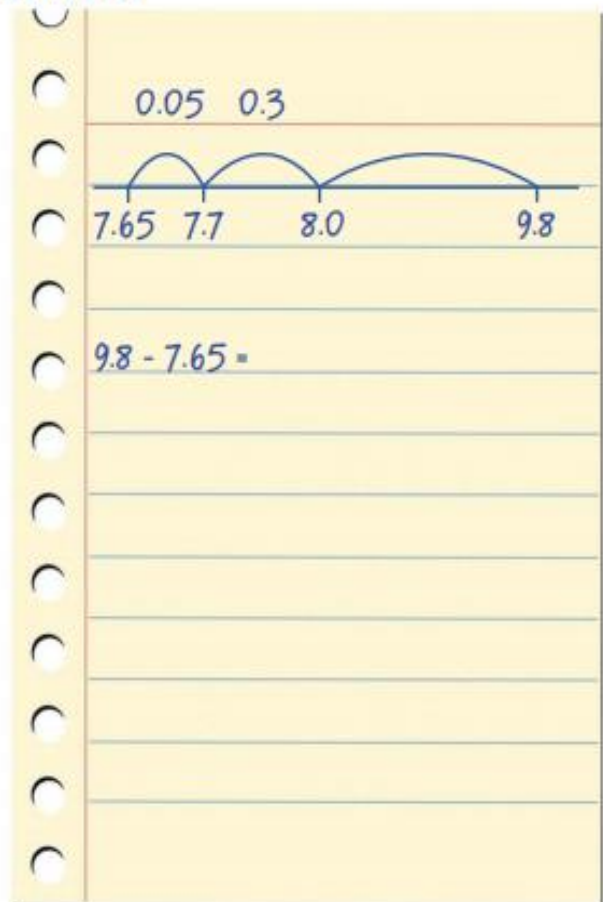
What happens this time? This is a harder pattern to explain!
Look at how the whole number parts of the pair of numbers in each subtraction
are increasing, and then how the decimal parts are increasing.

Investigate your own sequences of subtractions with consecutive
digits, e.g. 9.87 – 6.5
8.76 – 5.4
7.65 – 4.5
For this sequence, you can use place value to subtract rather than counting up.
See what other patterns you can find. Why do you think they occur?

 Wednesday

Equivalence between percentages and fractions.

Equivalence between percentages and fractions.

It is helpful to **remember** common **equivalent fractions** and **percentages.**

$^1/_{10} \equiv 10\%$ $^1/_5 \equiv 20\%$ $^1/_4 \equiv 25\%$ $^1/_2 \equiv 50\%$

If we remember that $^1/_{10} \equiv 10\%$, we can find other tenths by multiplying the percentage.
E.g. $^3/_{10} \equiv 30\%$ and $^7/_{10} \equiv 70\%$.

If $^1/_4 \equiv 25\%$, $^3/_4 \equiv 75\%$, since 3 x 25 = 75.

Equivalence between percentages and fractions.

A class of children are asked to choose between swimming, cycling and football. $^1/_4$ chose swimming. $^3/_{10}$ of them prefer cycling. What percentage chose football?

Put the information we have into a bar model and fill in the equivalent percentages for swimming and cycling

$^1/_4 \equiv 25\%$

$^3/_{10} \equiv 30\%$

Class of children		
$^1/_4$ 25% Swimming	$^3/_{10}$ 30% Cycling	? Football

The percentages MUST add to 100% so that everyone in the class is included.

25% + 30% + ? = 100%
So 45% chose football.

Practice Sheet Mild
Equivalent percentages

Complete the missing percentages.

Children were asked to vote for cycling, swimming or football as their favourite weekend activity

Fraction	Percentage
$\frac{1}{2}$ children prefer swimming	
$\frac{1}{4}$ prefer cycling	
The rest prefer football	

Children were asked to vote for dogs, cats or rabbits as their ideal pet

Fraction	Percentage
$\frac{1}{2}$ prefer dogs	
$\frac{3}{10}$ prefer cats	
The rest prefer rabbits	

Children were asked to vote for oranges, bananas or apples as their favourite fruit

Fraction	Percentage
$\frac{4}{10}$ prefer bananas	
$\frac{3}{10}$ prefer apples	
The rest prefer oranges	

Practice Sheet Hot

Equivalent percentages

Complete the missing percentages.

Children were asked to vote for dogs, cats or rabbits as their ideal pet

Fraction	Percentage
$\frac{1}{2}$ prefer dogs	
$\frac{1}{5}$ prefer cats	
The rest prefer rabbits	

Children were asked to vote for cycling, swimming or football as their favourite weekend activity

Fraction	Percentage
$\frac{1}{2}$ of children prefer swimming	
$\frac{3}{10}$ of children prefer cycling	
The rest prefer football	

Children were asked to vote for oranges, bananas or apples as their favourite fruit

Fraction	Percentage
$\frac{2}{5}$ of children prefer bananas	
$\frac{3}{10}$ of children prefer apples	
The rest prefer oranges	

Challenge

In another pet survey, fish were voted for by $\frac{1}{20}$ of children, while snakes got $\frac{1}{25}$ of the vote! What percentages are these fractions?

Wednesday

Investigation
Percentage professionals

What to do:

o   Take an A4 piece of paper. Fold it in half, half again, half again and half again.

o   Open it. There should be 16 sections.

o   In the top 8 sections, write the following percentages:

1%	10%	20%	25%
50%	60%	75%	90%

o   In the other 8 sections, write a fraction equivalent to each of the percentages (you'll need $\frac{1}{100}$, $\frac{1}{10}$, $\frac{1}{5}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{5}$, $\frac{3}{4}$ and $\frac{9}{10}$).

o   Now cut up the sheet so you have 16 cards.

Try this...

- Without looking, remove one of the 16 cards.
- Spread out the remaining 15.
- How quickly can you figure out which one is missing?
- Repeat several times.
- Try removing 2 cards.

.. or play this game of Percentage Pelmanism

- Turn over all of the 16 cards and arrange in a 4 by 4 grid.
- Choose two cards to turn over.
- If they are a pair of equivalent fractions/percentages, keep them; if not, turn them over and choose two more.
- How many turns does it take to find all 8 pairs?

Thursday

Use equivalent fractions to find percentages.

Learning Reminders

Use equivalent fractions to find percentages.

Unit fractions always have a numerator of 1, e.g. $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{10}$.

To find ¼ of 80 divide 80 by 4.   ¼ of 80 = 20.

Remember we can find unit fractions of a number by dividing by the denominator (bottom number) of the fraction.

Non-unit fractions always have a numerator (top number) of more than 1, e.g. $\frac{3}{4}$, $\frac{2}{5}$, $\frac{7}{10}$.

Remember we can find non-unit fractions of a number by dividing by the denominator, then multiplying by the numerator of the fraction.

To find $\frac{2}{5}$ of 30 divide 30 by 5 then multiply by 2.
$\frac{1}{5}$ of 30 = 6, $\frac{2}{5}$ of 30 = 12.

Use equivalent fractions to find percentages.

Hamilton Primary school has a £500 grant to spend to improve the outside space. All 200 children were asked to vote for what they would like. 50% voted for a wildlife pond, 25% voted for a climbing frame, and 25% voted for friendship benches.

We can use equivalent fractions to help find percentages!

How can we find 50% of 200?

50% is equivalent to $\frac{1}{2}$, so we can find $\frac{1}{2}$ of 200.

100 children voted for a wildlife pond.

How can we find 25% of 200?

25% is equivalent to $\frac{1}{4}$, so we can find $\frac{1}{4}$ of 200.

50 children voted for a climbing frame and 50 for friendship benches.

Thursday

Use equivalent fractions to find percentages.

Moreton Primary also has £500 grant. They have 150 children. 10% voted for the friendship benches, 20% for a climbing frame and 70% for a wildlife pond.

How can we find 10% of 150?

10% is equivalent to $\frac{1}{10}$, so we can find $\frac{1}{10}$ of 150.

$\frac{1}{10}$ of 150 = 150 ÷ 10 = 15. 15 children voted for friendship benches.

To find 20% double the answer for 10%. Double 15 = 30. 30 children voted for a climbing frame.

To find 70% multiply the answer for 70% by 7. 15 x 7 = 105. 105 children voted for a wildlife pond.

Practice Sheet Hot
Comparing percentages

The following new woodlands have been planted:

Burley Common
100 trees
50% oak, 20% ash, 15% beech, 15% willow

Merttens Meadow
150 trees
20% oak, 20% hazel, 40% willow, 20% beech

Chidgey Common
200 trees
40% oak, 30% beech, 10% ash, 20% sweet chestnut

Holes Hollow
120 trees
25% oak, 10% hazel, 15% willow, 30% beech, 20% ash

Calculate how many trees of each type there are in each of the four woodlands.

Challenge

In Weston Wood, there are 280 trees, as follows:
14 holly
126 lime
84 beech
56 silver birch.
What percentages do these numbers represent?

Practice Sheet Mild

Comparing percentages

The following new woodlands have been planted:

Burley Common
100 trees
50% oak, 20% ash, 15% beech, 15% willow

Merttens Meadow
300 trees
20% oak, 20% hazel, 40% willow, 20% beech

Chidgey Common
200 trees
40% oak, 30% beech, 10% ash, 20% sweet chestnut

Holes Hollow
200 trees
25% oak, 10% hazel, 20% willow, 15% beech, 30% ash

Calculate how many trees of each type there are in each of the four woodlands.

Practice Sheets Answers Monday

20%

3%

10%

50%

25%

75%

99%

15%

46%

80%

Practice Sheets Answers

Explore more Hamilton Trust Learning Materials at https://wrht.org.uk/hamilton

Percentages (hot)

20% = 0.2 = 2 0/100 = 2/10 = 1/5

3% = 0.03 = 3/100

10% = 0.1 = 10/00 = 1/10

50% = 0.5 = 5 0/100 = 5/10 = 1/2

25% = 0.25 = 25/ 100   = 1/4

75% = 0.75 = 75/100= 3/4

99% = 0.99 = 9/100

15% = 0.15 = 15/100 = 3/20

46% = 0.46 = 4 6/100 = 2 3/50

80% = 0.8 = 8 0/100 = 8/10 = 4/5

Tuesday

Practice Sheets Answers

Subtracting decimals (mild)

1. 3.5 - 2.9 = 0.6
2. 5.2 – 3.7 =1.5
3. 9.1 – 5.8 = 3.3
4. 7.2 – 6.85 = 0.35
5. 8.3 – 4.75 = 3.55
6. 9.23 – 7.8 =1.43

Challenge

Accept any calculations with the correct answer of 1.4, e.g. 6.8 - 5.4 = 1.4, 3.1 - 1.7 = 1.4 etc.

Subtracting decimals (hot)

1. 7.3 - 6.79 = 0.51
2. 8.45 - 7.8 = 0.65
3. 5.24 - 3.7 = 1.54
4. 9.4 - 5.78 = 3.62
5. 8.7 - 6.45 = 2.25
6. 7.5 - 5.29 = 2.21
7. 10.67 - 5.3 = 5.37
8. 12.8 - 9.27 = 3.53

Challenge

Accept any calculations with the correct answer of 3.15, e.g. 8.75 - 5.6 = 3.15

Wednesday

Practice Sheets Answers

Equivalent percentages (mild)

Children were asked to vote for cycling, swimming or football as their favourite weekend activity

Fraction	Percentage
$\frac{1}{2}$ children prefer swimming	50%
$\frac{1}{4}$ prefer cycling	25%
The rest prefer football	25%

Children were asked to vote for dogs, cats or rabbits as their ideal pet

Fraction	Percentage
$\frac{1}{2}$ prefer dogs	50%
$\frac{3}{10}$ prefer cats	30%
The rest prefer rabbits	20%

Children were asked to vote for oranges, bananas or apples as their favourite fruit

Fraction	Percentage
$\frac{4}{10}$ prefer bananas	40%
$\frac{3}{10}$ prefer apples	30%
The rest prefer oranges	30%

Equivalent percentages (hot)

Children were asked to vote for cycling, swimming or football as their favourite weekend activity

Fraction	Percentage
$\frac{1}{2}$ children prefer swimming	50%
$\frac{3}{10}$ prefer cycling	30%
The rest prefer football	20%

Practice Sheets Answers

Equivalent percentages (hot) continued

Children were asked to vote for dogs, cats or rabbits as their ideal pet

Fraction	Percentage
$\frac{1}{2}$ prefer dogs	50%
$\frac{1}{5}$ prefer cats	20%
The rest prefer rabbits	30%

Children were asked to vote for oranges, bananas or apples as their favourite fruit

Fraction	Percentage
$\frac{2}{5}$ prefer bananas	40%
$\frac{3}{10}$ prefer apples	30%
The rest prefer oranges	30%

Practice Sheets Answers Thursday

Comparing percentages (mild)

Burley Common has:

50 oak, 20 ash, 15 beech and 15 willow.

Merttens Meadow has:

60 oak, 60 hazel, 120 willow and 60 beech.

Chidgey Common has:

80 oak, 60 beech, 20 ash and 40 sweet chestnut.

Holes Hollow has:

50 oak, 20 hazel, 40 willow, 30 beech and 60 ash.

Comparing percentages (hot)

Burley Common has:

50 oak, 20 ash, 15 beech and 15 willow.

Merttens Meadow has:

30 oak, 30 hazel, 60 willow and 30 beech.

Chidgey Common has:

80 oak, 60 beech, 20 ash and 40 sweet chestnut.

Holes Hollow has:

30 oak, 12 hazel, 18 willow, 36 beech and 24 ash.

Friday- day off

Last Day of term

Happy Holidays have a good time