Measure

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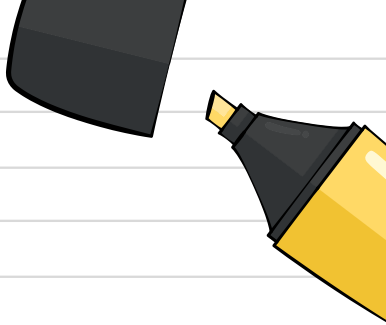
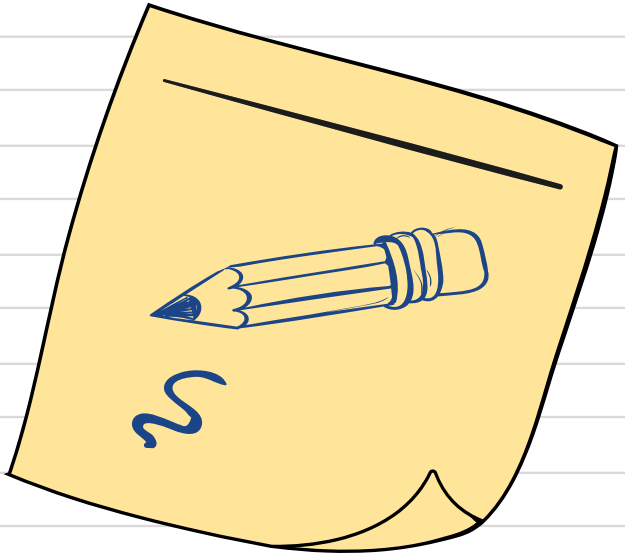
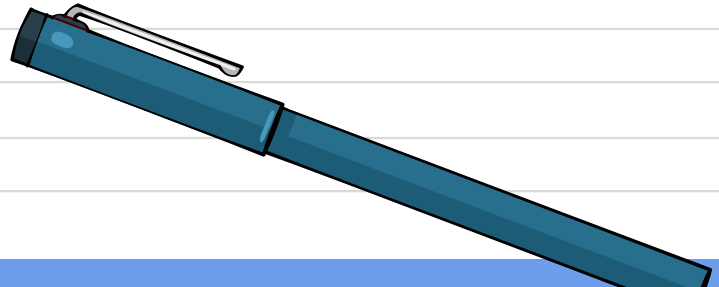
- Measuring time
- Using calendars
- Area(2)
- Perimeter(2)
- Using mental strategies
- Working with decimals



WHOA!

Let’s Start!!!





Measuring and drawing lines

Let's investigate

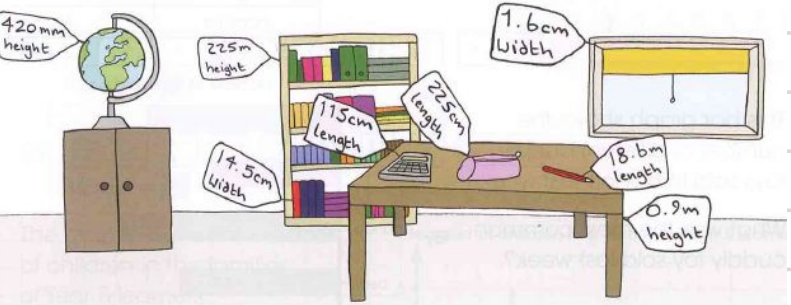
Angela needed a piece of string at least 5 m long.

She had lots of 50 cm pieces of string. Every time she tied two pieces together she used 50 mm of each piece of string for the knot.

How many pieces of 50 cm long string, does she need to make 5 m?

You can do the calculation in mm, cm or m. Remember to make sure all the measurements have the same unit.

Imagine three or four pieces of string. Think about what happens when you tie them together. Does this help you understand the problem?

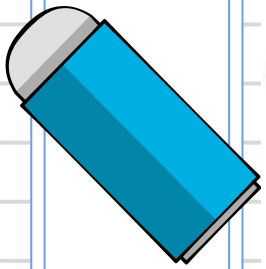


(a) Which items in the classroom have their measurements in the wrong units?

(b) Write the measurements with the correct units for each object.

(c) Choose three objects in your classroom.
Measure one in millimetres, one in centimetres and one in metres.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



4 Copy the table below.

Line	Estimate in centimetres	Measurement in millimetres	Measurement in centimetres	Rounded to the nearest centimetre
(a)				
(b)				
(c)				
(d)				
(e)				
(f)				

Estimate the length of each line. Write your estimate in the table.
Measure each line and complete the table.

(a)

(b)

(c)

(d)

(e)

(f)

5 Draw straight lines that measure:

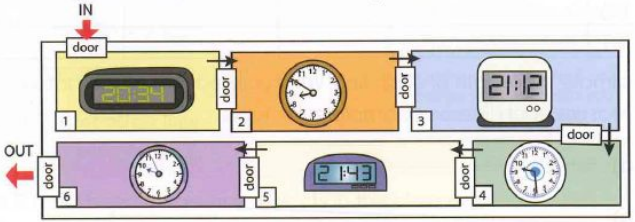
(a) 3.2 cm
(b) 89 mm
(c) 67 mm
(d) 10.3 cm
(e) 128 mm
(f) 9.1 cm

Use a sharp pencil.
Check the scale on your ruler.
Find the '0' and the point on the scale you need to make the correct length.

Measuring time

1 Tom takes part in a puzzle game. There are six time puzzles in a set of rooms. Tom can only move into the next room when he has solved the puzzle in the room that he is in.

(a) Tom left the last room at four minutes past ten at night.
The clocks in the rooms show the time when Tom entered each room.
How long did it take Tom to solve each puzzle?



(b) These are the time puzzles Tom solved. Use a clock to time how long you take to solve each puzzle to the nearest minute.

Puzzle 1
This clock is reflected horizontally in a mirror. What is the correct time?

Puzzle 2
This clock has been rotated 180° clockwise. What is the correct time?

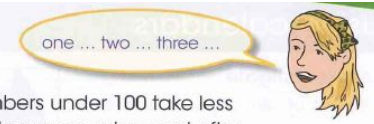
Puzzle 3
This clock is 18 minutes slow. What is the correct time?

Puzzle 4
This clock has been reflected vertically in a mirror. What is the correct time?

Puzzle 5
This clock has been rotated 180° anti-clockwise. What is the correct time?

Puzzle 6
This clock is 24 minutes fast. What is the correct time?

If you had no timer or clock, you could try counting seconds to measure time.



In spoken English most of the numbers under 100 take less than 1 second to say. Some people use an extra word after each counting number to make the count more accurate. Three words used are 'and', 'elephant' and 'Mississippi'.

Count from 1 to 20 and ask a partner to time you using a stopwatch. Try using 'and', 'elephant' and 'Mississippi' to make the count more accurate.

Which of the words gives you the most accurate count for 20 seconds?

Try other words. Can you find a word that makes the count more accurate for you?

Sunita and Isobel made a water clock using two empty drinks bottles.

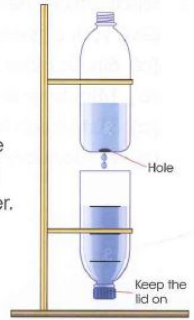
Sunita used a stopwatch to time the drips and Isobel counted the drips. Sunita marked the bottom bottle to show the level of the water after each minute passed. Isobel counted the drips and found that the water had dripped 48 times each time Sunita drew a line.

(a) Was the water dripping faster or slower than one drip a second?

(b) At the second line, how much time had passed and how many drips had fallen?

(c) Approximately how much time has passed on the timer in the picture? How many drips have fallen?

(d) With a partner, make your own water or sand timer. Make a mark on the timer to show when one minute has passed. Use the timer to time an event in the classroom.



Using calendars

Let's investigate

The first of January is on a Tuesday and the year is not a leap year.

What day of the week is the first of December?

Mon	Tues	Wed	Thurs	Fri	Sat	Sun
	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			

Either work out the day of the week for the first day of each month, or add up all the days of the months between 1st January and 1st December to work out the day.

1 Use the calendar to answer these questions.

	October		
M	30	7	14
T	1	8	15
W	2	9	16
T	3	10	
F	4	11	
S	5	12	
S	6	13	

(a) What day of the week will be the 28th of October?
(b) What are the dates of all the Thursdays in October?
(c) What day of the week will be the first day of November?
(d) What are the dates of all the Fridays in November?
(e) What day of the week will be the 4th of December?
(f) What day of the week will be the last day in December?

2 What is the time interval between these dates?
Give your answer in weeks and days.
(a) 6th October to 28th October
(b) 14th June to 30th June
(c) 31st March to 26th April
(d) 7th January to 7th February

Count on from the start date, **do not** include it in the count.

Example
2nd May to 19th May = 2 weeks and 3 days

3 Work out the date of each child's birthday.
Write the day of the week and the date.

4 Tim the Time Traveller uses a special time travelling watch to transport him to to the past or future. He puts in the number of years and months he wishes to travel into the past or future, presses the button, and the watch takes him there.

(a) Tim has arrived in April in the year 2028.
Look at the display on the time travelling watch to work out when he came from.
(b) From April 2028, Tim wants to travel to January 2001.
What should he change the watch display to?
(c) From January 2001, Tom changes the watch's display to '– 5 years 4 months'.
What time does this take Tim to?
(d) Tim now wants to get to May 2005.
What should he change the watch display to?

Area (2)

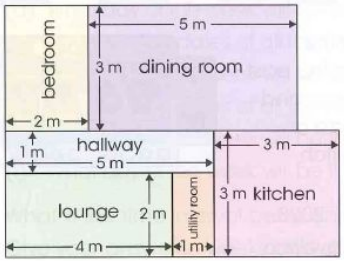
Let's investigate

Class 5 investigated the value of different felt tip pens. They shaded rectangles until the pen ran out.

Which pen covered the largest area?

Remember that the area of a rectangle can be worked out by multiplying its length by its width.

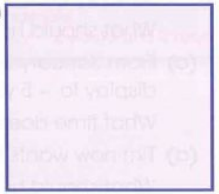
1 Work out the area of each room on this floor plan.



2 Measure the length and width of these rectangles to the nearest centimetre and work out the area.

(a) 

(b) 

(c) 

3 Mykel used blue and red tiles to make a mosaic pattern.

All of the tiles are 2 cm wide and 3 cm long.

This is a picture of Mykel's pattern.

The tiles are not drawn the correct sizes, so you can't measure it to answer the questions!

(a) What is the area of one tile?

(b) What is the width and length of the whole pattern?

(c) What area of the pattern is blue?

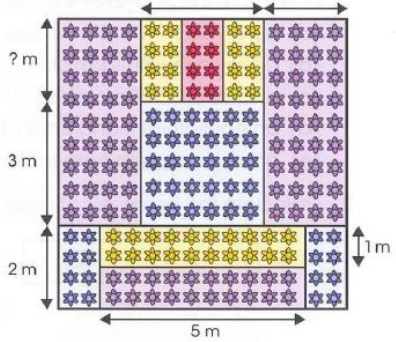
(d) What area of the pattern is red?

(e) What is the area of the whole pattern?

4 For their centenary celebration, Mykel's school asked children to design a new flowerbed.

The total flowerbed had to be a square with an area of 49 m².

This is Mykel's design. The red and yellow rectangles are 1 m wide.



(a) What are the width and length measurements of the whole flowerbed?

(b) What should be the measurement at '? m'?

What is the area covered in:

(c) red flowers?

(d) yellow flowers?

(e) blue flowers?

(f) purple flowers?

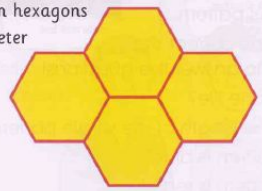
(g) Check your answers to questions (c) to (f) by making sure that they add up to the total area of the flowerbed.

Perimeter (2)

Let's investigate

This shape is made from hexagons that each have a perimeter of 30 cm.

What is the perimeter of the whole shape?

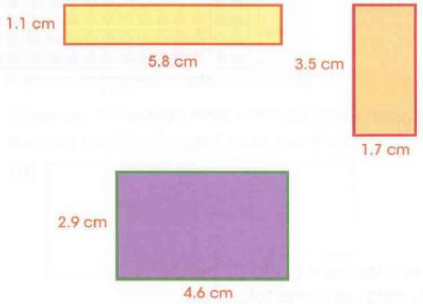


Work out the length of each side of the hexagons first.
You could sketch the shape and label the lengths that you know.

1 Use your times tables facts to calculate the perimeter of each of these regular shapes:
- (a) a pentagon with 5 cm sides.
- (b) a hexagon with 9 cm sides.
- (c) a square with 8 cm sides.
- (d) an equilateral triangle with 10 cm sides.
- (e) an octagon with 6 cm sides.

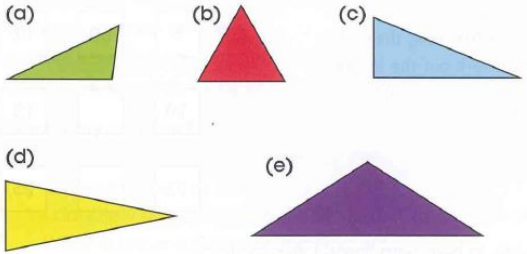
Calculating the perimeter of a regular shape
To calculate the perimeter of a regular shape, multiply the number of sides by the length of one side.

2 Calculate the perimeter of each rectangle.



3 Draw three different rectangles that have a perimeter of 22 cm.

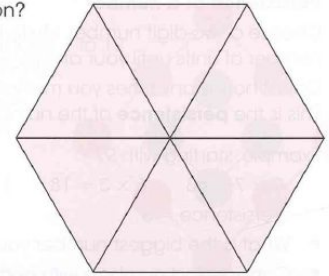
4 Look at these triangles.
For each triangle, write down the type of triangle, the length of each side to the nearest millimetre, and the perimeter.



5 Investigate the possible length and width of a rectangle that has an area of 20 cm^2 and a perimeter of 24 cm.
Draw a rectangle with this area and perimeter.

6 Investigate the possible length and width of a rectangle that has an area of 36 cm^2 and a perimeter of 26 cm.
Draw a rectangle with this area and perimeter.

7 This hexagon is made from equilateral triangles that each have a perimeter of 24 cm.
What is the perimeter of the hexagon?



Using mental strategies

Let's investigate

Study the pattern in the first row, then apply it to the other rows to work out the answers.

5	60	12
19		13
17		25

Use your mental skills to help with these investigations.

1 Number chains

Choose any starting number and then apply the following rule:

If the number is even, halve it.

If the number is odd, add 1 and halve it.

Example: 14 → 7 → 4 → 2 → 1

- Do all chains end at 1?
- Investigate different starting numbers.

2 Persistence of a number

Choose a two-digit number. Multiply the number of tens by the number of units until your answer is a single digit.

Count how many times you multiplied.

This is the **persistence** of the number.

Example: starting with 97

$9 \times 7 = 63$ $6 \times 3 = 18$ $1 \times 8 = 8$

Persistence = 3

- What is the biggest number you can find with persistence 1?
- Can you find numbers with persistence 1, 2, 3, 4 or more?

3 Elevens

$26 \times 11 = 286$

$32 \times 11 = 352$

Multiply other two-digit numbers by 11.

Can you see any patterns?

Discuss your findings with a partner.

Can you find a quick way of multiplying by 11?

4 What's my number?

Work with a partner to find these numbers.

(a) Gabriela says, 'I'm thinking of a number. I double it and the answer is 38.'
What number is Gabriela thinking of?

(b) Leroy says, 'I'm thinking of a number. I halve it and the answer is 42.'
What number is Leroy thinking of?

(c) Pierre says, 'I'm thinking of a number. I double it, then add 4 and my answer is 88.'
What number is Pierre thinking of?

(d) Tara says, 'I'm thinking of a number. I double it and double it again and the answer is 60.'
What number is Tara thinking of?

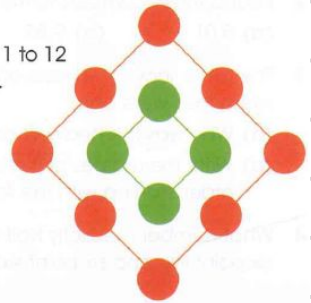
5 Ring totals

Copy this diagram and write the numbers 1 to 12 in the circles. Use each number only once.

The total of the numbers in the outside ring must be the same as the total in the inside ring.

Work with a partner.

Discuss ways of solving the problem.



Working with decimals

Let's investigate

Here are three number cards:

Choose two cards to complete the grid below, then find the nearest whole number.

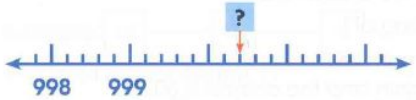
□ . □

Example:

4 . 6 → nearest whole number → 5

- How many different decimal numbers can you make?
- How many different nearest whole numbers did you find?

1 Here is part of a number line. What number goes in the box?



2 Round these numbers to the nearest whole number.

(a) 5.01 (b) 9.52 (c) 6.65

3 The table shows the mass of children when they were born.

(a) Who was the heaviest baby?

(b) Write the masses of the babies in order, starting with the lightest.

Student	Mass (kg)
Bruno	4.35
Carmen	4.78
Daniel	3.81
Ella	5.61
Fatima	4.54

4 What number is exactly half way between six point five and six point six?

5 Write the correct sign < or > between each pair of numbers.

(a) 3.03 ? 3.8 (b) 4.14 ? 4.2

(c) 6.78 ? 6.87 (d) 0.3 ? 0.13

6 Rearrange these numbers in order of size, starting with the smallest.

(a) 5.05 5.5 5.15 5.51 5.55

(b) 3.13 3.03 3.33 3.31 3.01

(c) 3.13 31.3 3.11 13.1 31.1

7 Which of these numbers is closest in value to 0.1?

0.01 0.5 0.2 0.11 0.9

8 Write these numbers in order, starting with the largest.

4.04 4.24 4.4 4 4.2

9 Ahmed has these cards:

Which numbers can he make between 0 and 40 using all four cards?

10 Here are four digit cards.

Use all four cards to make this calculation correct.

? . ? + ? . ? = 10