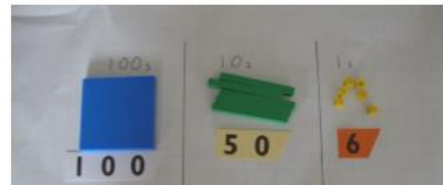# Models and images to support place value

To help you solve a range of place value problems, there a variety of models and images that can support your understanding. These include: number lines, place value charts, place value counters / Diennes, place value sliders. A quick drawing of a place value chart can help you to order and compare numbers quickly and efficiently.
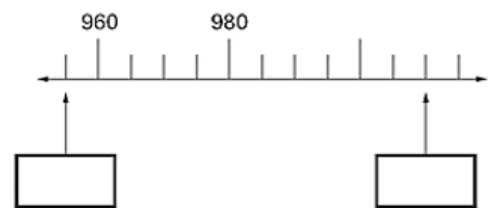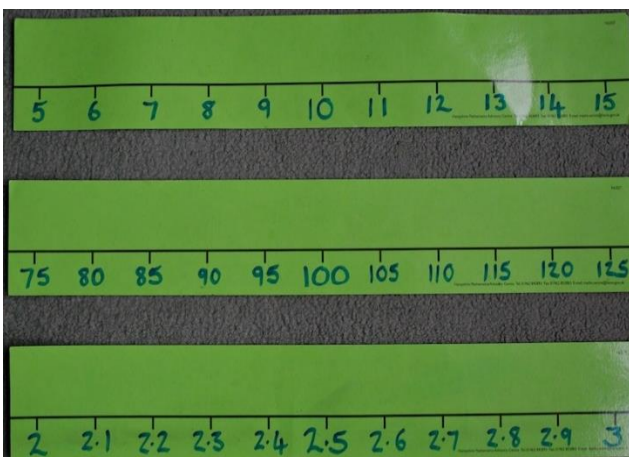
For example, when asked to order the following numbers from smallest to largest and explain how you approached it, what images could you use to support you?

Order the following number cards: 62102, 47397, 34512, 34527, 24673, 63015

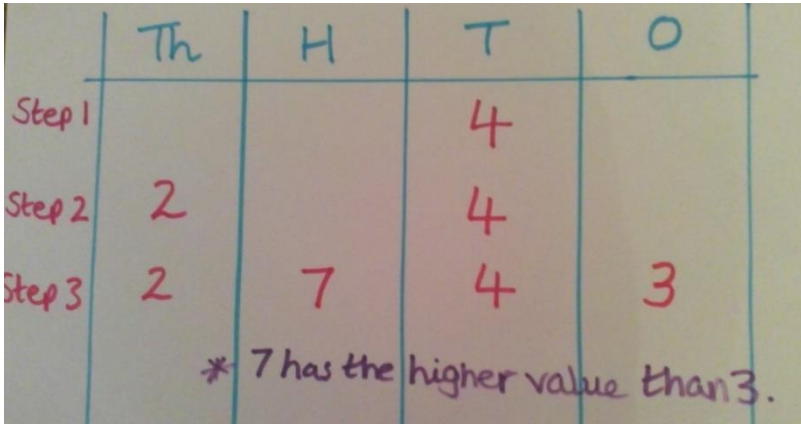| TTh	Th	H	T	O

A number line is a line drawing where numbers are written from smallest to largest. A number line can be a tool to help you solve maths problems. It is easiest to use a number line to help you add and subtract small numbers or to find the difference. You can also use it to help you solve differences in temperature between negative and positive numbers. However, remember that number lines can be a very useful tool to help you round numbers, compare and order numbers including fractions and decimals.

On the next page you will find a worked example of how to use images to support problem solving with place value.

Then, there are several questions that lend themselves to this approach for you to practise. For each problem, read the question carefully, out loud if you need to, or ask an adult to read the question to you. Then think about how you could draw a key image to help you unpick the problem and to make sense of what you are being asked to solve. Then answer the question in the context of the problem. Good luck!

A framework for solving a problem involving Place Value (worked example)

Problem to solve:	Here are four number cards. 2 3 4 7 Layla uses each card once to make a four-digit number. She places: • 4 in the tens column • 2 so that it has a higher value than any of the other digits • the remaining two digits so that 7 has the higher value. Write a digit in each box to show Layla's number.
What models and images would help you to solve the problem? Consider the use of the number line, place value chart, bar model Work systematically where possible.	 Step 1: Placed the 4 in the tens column Step 2: Placed the 2 so that it has the higher value than any of the other digits Step 3: Placed the remaining two digits (7 and 3) so that the 7 has the higher value e.g. 7 in the hundreds and the 3 in the ones Therefore the number is 2743
Answer in context of the problem:	**2743**

Problems to solve – place value

1.	I think of a four digit decimal number. When rounded to the nearest tenth my number rounds to 23.6 What could my number be? Find all possibilities. **How could you use a number line to help you with this problem?**
2.	A number was partitioned into: 6,000,000+30,000+8,000+50+4 What was the number? **How could a place value chart help you here?**
3.	When these numbers are put in order from largest to smallest, they make a number sequence. 42, 67, 92, -8, 17 What will be the next number in the sequence? What number will come before 92 in the sequence? **Use your place value knowledge to find the difference between each of the numbers in the sequence to help you.**
4.	Look at this sequence: 23.46, 23.96, 24.46, 24.96, 25.46 Will 27.64 be in this sequence? Explain your reasoning. Give me a number greater than 50 that will be in your sequence. **Use your place value knowledge to find the difference between each of the numbers in the sequence. What do you notice?**
5.	4.27, 5.73, 4.76, 5.37 Which of these decimals has the digit 7 in the tenths place and rounds to five when rounded to the nearest whole number? **How could a place value chart help you solve this problem?**
6.	Look at the sequence; 1.2, 1.5, 1.8, 2.1 What will the next two numbers be? Will the number 6 be in the sequence? Explain your reasoning. **What models/images could you use to prove your reasoning here?**
7.	Put these decimal fractions in order; 0.36, 0.306, 0.036, 3.06, 3.6

	Which decimal fraction goes in the middle?
8.	Which of the following numbers has a 7 in the hundred thousands place? 23,567,895 14,756,372 32,675,958 7,870,700 27,707,890 **How could your place value chart help you here?**
9	In Iceland the coldest recorded temperature last year was -17˚C and the warmest temperature was 23˚C. What is the difference in temperature between the coldest and warmest days? **How could a number line help you here?**
10.	On Tuesday the temperature was 14˚C but on Wednesday it has fallen by 27˚C. What was the temperature on Wednesday? **How could a number line help you with this question?**
11.	There are 7,246 hundreds in the number 724,629. Is this correct? Explain your thinking. **What model / image could you use to prove your thinking?**

12.	Here are the temperatures in four cities at midnight and at midday.

City	Temperature	
	At midnight	At midday
Paris	–4°C	–2°C
Oslo	–13°C	–7°C
Rome	3°C	10°C
Warsaw	–6°C	2°C

At **midnight**, how many degrees colder was Paris than Rome?

degrees

1 mark

Which city was 6 degrees colder at midnight than at midday?

_____

1 mark

13.

The numbers in this sequence **decrease** by the same amount each time.

303,604   302,604   301,604   300,604   …

What is the next number in the sequence?

14.

The numbers in this sequence increase by the same amount each time.

Write the missing numbers.

	42	49		63	

15.

This table shows the areas of the United Kingdom and Jamaica.

Country	Area (square kilometres)
United Kingdom	240,000
Jamaica	10,000

The area of the United Kingdom is larger than the area of Jamaica.

How many times larger is the United Kingdom?

	times larger