

NUMBERS AND THE NUMBER SYSTEM

Pupils should be taught to:

Multiply and divide whole numbers, then decimals, by 10, 100 or 1000

As outcomes, Year 4 pupils should, for example:

Demonstrate understanding of multiplying or dividing a whole number by 10.

Understand that:

- when you multiply a number by 10, the digits move one place to the left;
- when you divide a number by 10, the digits move one place to the right.

For example:

- Multiply by 10 using base-10 apparatus on a ThHTU board. For example, put 26 on the board (2 tens, 6 ones) and label with digit cards. Multiply each piece by 10, make the exchanges to become 2 hundreds, 6 tens, 0 ones, and label again with digit cards. Repeat twice. Describe the pattern.

$$\begin{aligned}26 \times 10 &= 260 \\260 \times 10 &= 2\,600 \\2\,600 \times 10 &= 26\,000\end{aligned}$$

- Explain this grid (which shows multiplication by 10). Describe what happens when you divide by 10.

| | | | | | | |
|------|------|------|------|------|-----|------|
| 1 | 2 | 3 | 4 | 5 | ... | 9 |
| 10 | 20 | 30 | 40 | 50 | ... | 90 |
| 100 | 200 | 300 | 400 | 500 | ... | 900 |
| 1000 | 2000 | 3000 | 4000 | 5000 | ... | 9000 |

Extend to multiplying integers less than 1000 by 100.

Respond to oral or written questions such as:

- How many times larger is 260 than 26?
- How many £1 coins are in £15, £150, £1500?
How many 10p coins?
- Tins of dog food are put in packs of 10.
One tin costs 42p.
How much does one pack cost? 10 packs?

Work out mentally the answers to written questions such as:

$$\begin{aligned}6 \times 10 &= \square & 900 \div 10 &= \square \\28 \times 100 &= \square & 50 \div 10 &= \square \\329 \times 10 &= \square & 8000 \div 10 &= \square \\73 \times \square &= 730 & 4000 \div \square &= 400\end{aligned}$$

See also decimal place value (page 28).

As outcomes, Year 5 pupils should, for example:

Demonstrate understanding of multiplying or dividing a whole number by 10 or 100.

Understand that:

- when you multiply a number by 10/100, the digits move one/two places to the left;
- when you divide a number by 10/100, the digits move one/two places to the right.

Understand that multiplying by 100 is equivalent to multiplying by 10, and again by 10.

For example:

- Write a single-digit number in the centre of a large sheet of paper. Keep multiplying by 10 and record the result in words and figures, then divide by 10 and by 10 again. Describe the pattern.

| | |
|-------------------------|---------|
| six hundred thousand | 600 000 |
| sixty thousand | 60 000 |
| six thousand | 6 000 |
| six hundred | 600 |
| sixty | 60 |
| six | 6 |
| nought point six | 0.6 |
| nought point nought six | 0.06 |

Discuss questions like:

- What is 600 times 10? 600 divided by 10?
- What is 600 times 100? 600 divided by 100?
- What is one tenth of 600? Of 60? Of 6?
- What is one hundredth of 6000? Of 600? Of 60?

Observe and comment on the effect of multiplying or dividing by 10 or 100 using a calculator.

Respond to oral or written questions such as:

- How many times larger is 2600 than 26?
- How many £10 notes are in £120, £1200?
How many £1 coins, 10p coins, 1p coins?
- Tins of dog food at 42p each are put in packs of 10.
Ten packs are put in a box.
How much does one box of dog food cost?
10 boxes? 100 boxes?

Work out mentally the answers to questions such as:

$$\begin{array}{ll} 329 \times 100 = \square & 8000 \div 100 = \square \\ 56 \times \square = 5600 & 7200 \div \square = 72 \\ 420 \times \square = 4200 & 3900 \div \square = 390 \end{array}$$

See also decimal place value (page 29).

As outcomes, Year 6 pupils should, for example:

Demonstrate understanding of multiplying or dividing a whole number by 10, 100 or 1000.

Understand that:

- when you multiply a number by 10/100/1000, the digits move one/two/three places to the left;
- when you divide a number by 10/100/1000, the digits move one/two/three places to the right.

Understand that multiplying by 1000 is equivalent to multiplying by 10, then by 10, then by 10, or is equivalent to multiplying by 10 and then by 100.

For example:

- Look at a metre stick. Name something about 1 metre in length.
Now name something about 10 m in length.
Build up a table, recognising that the table involves multiplying or dividing by 10.

| | |
|-----------------------------|----------|
| distance to town centre | 10 000 m |
| from the school to the park | 1 000 m |
| length of playground fence | 100 m |
| length of swimming pool | 10 m |
| height of shelves | 1 m |
| length of a pencil | 0.1 m |
| width of a thumb nail | 0.01 m |
| thickness of a 5p coin | 0.001 m |

Discuss questions like:

- What is about 100 times the width of a thumb nail?
- What is one hundredth of a pencil length?
- What is one thousandth of the length of the fence?
- How many pencils would fit along the pool?
- How many 5p coins would stack under the shelves?

Observe and comment on the effect of multiplying or dividing by 10, 100 or 1000 using a calculator.

Respond quickly to oral questions such as:

- How many times larger is 26 000 than 26?
- How many £100 notes are in £1300, £13 000, £130 000...?
How many £10 notes, £1 coins, 10p coins, 1p coins?
- Tins of dog food at 42p each are put in packs of 10.
Ten packs are put in a box.
Ten boxes are put in a crate.
How much does 1 crate cost?
10 crates? 100 crates?

Work out mentally the answers to questions such as:

$$\begin{array}{ll} 0.8 \times 10 = \square & 8 \div 10 = \square \\ 56 \times \square = 56 000 & 72 000 \div \square = 72 \\ 7.3 \times \square = 73 & 4 \div \square = 0.4 \end{array}$$

See also decimal place value (page 29).