Can I multiply and divide by 10 and 100 and 1000?

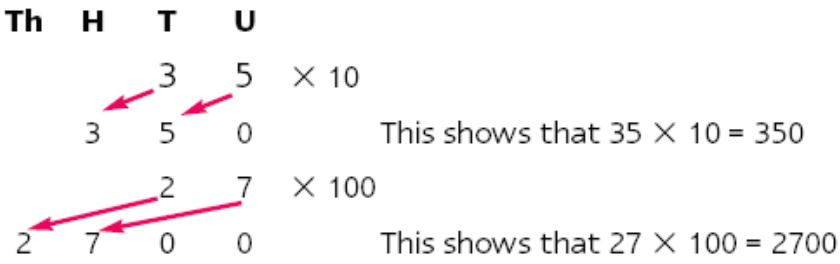
Teaching guidance

Key vocabulary

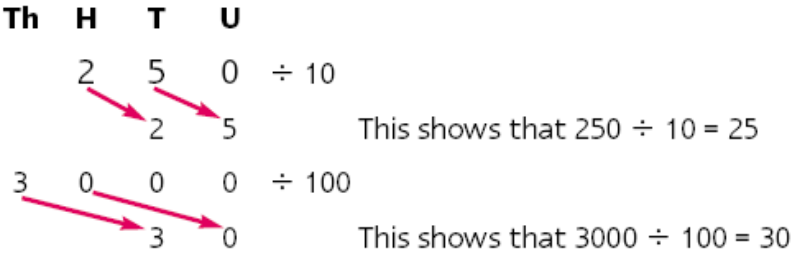
digit, decimal, multiply, times, divide, share, scale up, scale down, increase, decrease, factor, how many 100s in …?, tens of thousands, thousands, hundreds, tens, units, ones, tenths, hundredths, thousandths

Models and images

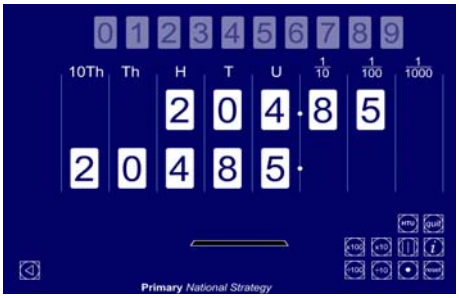
Show children how multiplying a number by 10 moves the digits one place to the left, and multiplying by 100 moves the digits two places to the left.



Demonstrate the effect of dividing a number by 10. Show children how the digits move one place to the right, and when dividing by 100 the digits move two places to the right.



Use a calculator or the *Moving digits* ITP to model how it is the digits and not the decimal point that move when we multiply or divide by powers of 10.



Moving digits ITP

Teaching tips

- Help children to generalise correctly so that they can cope with decimals. Multiplying by 10 gives an answer that is bigger than the original number and all the digits move one place to the left. Dividing by 10 gives an answer that is smaller than the original number and all the digits move one place to the right. Use visual images such as digit cards and a fixed decimal point or the Moving digits ITP to reinforce understanding.
- Discuss common misconceptions, for example why 4.6 × 10 does not equal 4.60 and why 40.3 ÷ 10 is not the same as 4.3.
- Create sequences of equations to explore the patterns involved when multiplying and dividing by 10, 100 or 1000, for example
  - $4.85 \times 10 = 48.5$
  - $4.85 \times 100 = 485$
  - $4.85 \times 1000 = 4850$
- Explore with children the relationships between the operations and how to simplify combinations of operations. For example, multiplying by 10 then dividing by 100 is the same as dividing by 10. Help children to recognise that dividing by 200 is the same as dividing by 10, dividing by 10 again and then halving, by using a calculator to explore different examples.
- Emphasise that multiplication and division by 10, 100 and 1000 should be mental calculations.
- Use conversion between units of measure as a context to consolidate and practise multiplying and dividing by 10, 100 or 1000.
- Extend multiplying by 10, 100 and 1000 to multiplying by multiples of 10, 100 and 1000; for example, solve 3.4×200 by multiplying 3.4 by 100 and then doubling it.