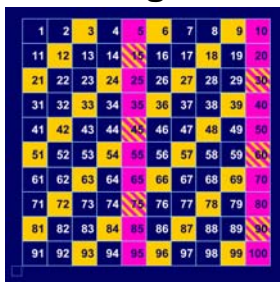# Can I use knowledge of factors and multiples?

Teaching guidance

Key vocabulary

factor, factorise, multiple, square number, prime number, prime factor, common, highest common factor, lowest common multiple, product, quotient, sequence, denominator, equivalent

Models, images and resources

Number grid ITP

Explore patterns of multiples using this ITP. Children could use this to investigate general statements such as: *All multiples of six are also multiples of three* (True); *All multiples of three are also multiples of six* (False); *The numbers that are common multiples of three and five are all multiples of 15* (True).

Sorting diagrams such as Carroll and Venn diagrams

|	Multiple of 3	Not a multiple of 3
Factor of 20		1 2 4 5 10 20
Not a factor of 20	3 6 9 12 15 18 21 24 27 30	7 8 11 13 14 16 17 19 22 23 25 26 28 29
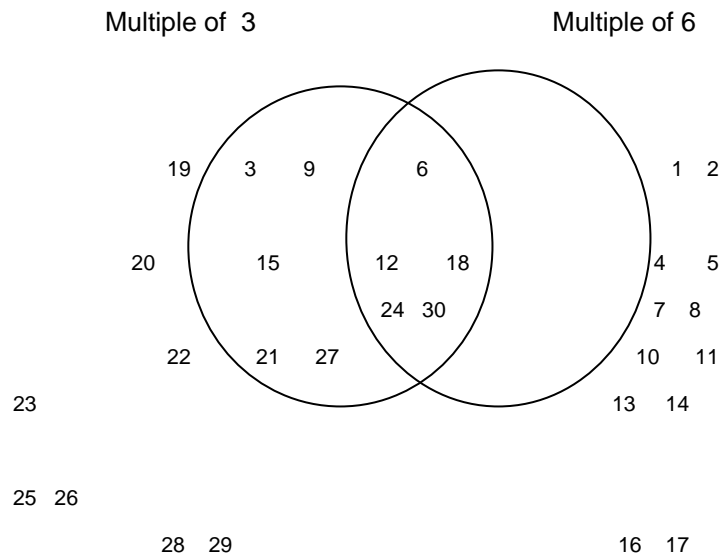
Which number where spreadsheet

Versions 5 and 6 of this activity involve children placing the numbers one to nine into the correct yellow boxes to make the given products. Children can only work efficiently if they use their knowledge of factors.

Teaching tips

- Make sure that children can describe the meaning of the terms factor and multiple and can give examples. They should understand that each number has a limited set of factors but an infinite set of multiples.

- It is easier to ensure that you have found all possible factors of a number by listing them in pairs methodically. The factors of 36 are given below:

1   2   3   4   6   6   9   12   18   36
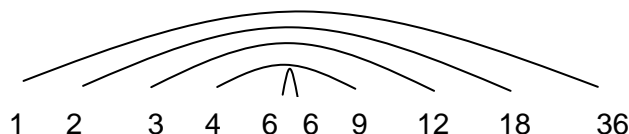
- Teach children how to use tests of divisibility to help them to identify factors.

- Explore patterns in numbers of factors and link these to properties of numbers:

  o Most numbers have an even number of factors.
  o Only square numbers have an odd number of factors.
  o Prime numbers have exactly two factors: one and themselves.

- Help children to understand the term common as meaning applying to both or all; so for example 20 is a common multiple of four and five because it is both a multiple of four and a multiple of five.

- Rehearse finding the highest common factor of two numbers by listing all factors of each number, identifying all of the common factors and then identifying the highest of these. Alternatively, use Venn diagrams to record factors of two numbers. Common factors will appear in the intersection.

- Rehearse finding the lowest common multiple by listing the first few multiples of each number. If no common multiple is found, then continue the lists. Alternatively, use Venn diagrams to record multiples of two numbers. Common multiples will appear in the intersection.

- Develop children's ability to reason about numbers by investigating general statements involving factors and multiples such as:

  o All multiples of six are also multiples of three. (True)
  o All multiples of three are also multiples of six. (False)
  o If a whole number ends in zero, it cannot be prime. (True)

- Give children experience of problems and puzzles where they need to use factors and multiples, for example:

  o How can you pay exactly for 51p postage using only 5p and 12p stamps?
  o Find two numbers that have a product of 32 and a quotient of two.

- Help children to apply their understanding of common multiples and factors when comparing and simplifying fractions:

  o I can see that $^7/_{12}$ cannot be simplified further because 7 and 12 do not have common factors.
  o I can see that $^{12}/_{15}$ can be reduced further because 12 and 15 have common factors.
  o I can work out that $^7/_8$ is greater than $^5/_6$ because I know $^7/_8 = {}^{21}/_{24}$ and $^5/_6 = {}^{20}/_{24}$.