

Can I create an algebraic expression that describes a simple relationship?

Teaching guidance

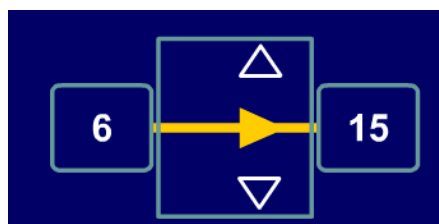
Key vocabulary

equation, predict, rule, formula, relationship, sequence, pattern, generalise, integer, multiple, operation, inverse

Models and images and resources

Function blocks ITP

Give children experience of looking at input and output numbers to work out the relationship between the pairs of numbers.



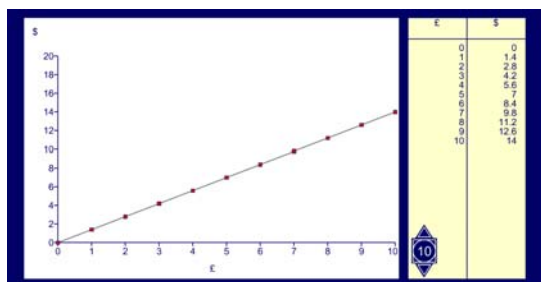
Tables

No of tickets	1	2	3	4	5	6	7	8	9
Price	£25	£50	£75	£100	£125	£150	£175	£200	£225

Tables can help children to spot patterns and clarify the relationship between sets of numbers that are in a constant ratio.

First number	Second number
10	21
6	13
24	49
17	?
n	?

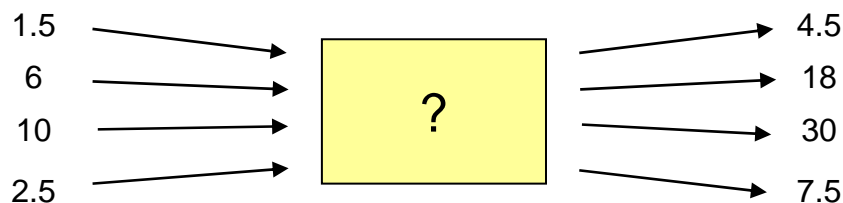
Line graphs



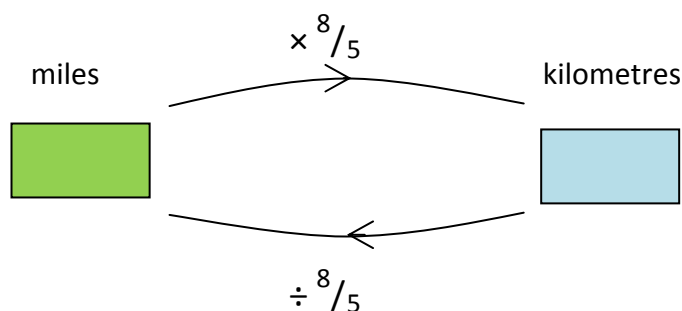
Line graphs provide a useful image to demonstrate the relationship between two variables. Conversion graphs allow children to read off quickly the equivalent values for two units of measure.

Teaching tips

- Use function machines to explore relationships between variables.
 - Give children input and output numbers and ask them what the function is



- Encourage children to describe the relationship first in words and then using an algebraic expression. For example, if you multiply the input number by three, you get the output number or output = input \times 3, or $t = 3n$, for example, where t is the output number and n is the input number.
- Use inverse operations to express relationships in the opposite direction:



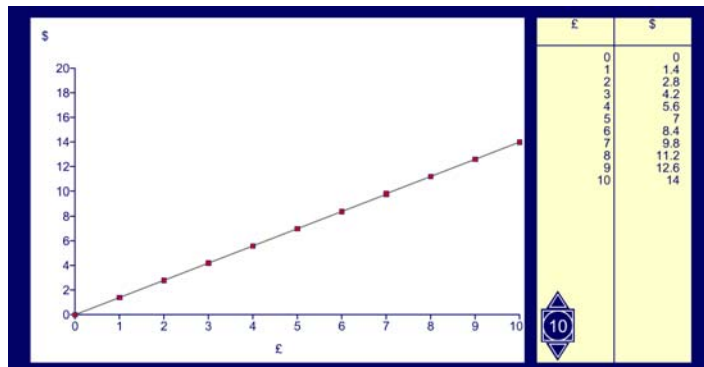
- Use everyday examples with children to generate algebraic expressions for relationships between variables, for example:

$1 \text{ km} = 1000 \text{ m}$

 - Use this relationship to find how many metres are in 2 km, 3 km, 5 km, 20 km, n km.
 - Establish that the number of metres is always equal to the number of km \times 1000 and that this can be written as metres = km \times 1000 or $m = 1000k$, distinguishing between this and $1 \text{ km} = 1000 \text{ m}$ in order to avoid mistaken interpretation of this formula as stating that 'one metre is equal to 1000 kilometres'.
- Other examples of formulae include:
 - Area of rectangle = length \times breadth
 - Conversions, such as: $\$ = \pounds \times 1.4$
 - Wage rates, for example: $\pounds 10 \times$ hours worked
 - Cooking times, for example: cooking time for beef = 15 minutes \times pounds weight + 15 minutes

3 of 3 The National Strategies | Primary Overcoming barriers level 4–5

- Line graphs are a visual way of exploring the relationship between two variables. Give children experience of creating line graphs and describing the relationships they represent.



- Give children experience of equations with two unknowns, for example:
 - $a + b = 10$, and a and b are both positive whole numbers. Write down all the possible pairs of a and b that would make the statement true.
 - Ask children to write an expression for a given relationship, for example two numbers multiplied together equal 30, and then to find some numbers to fit their expression.