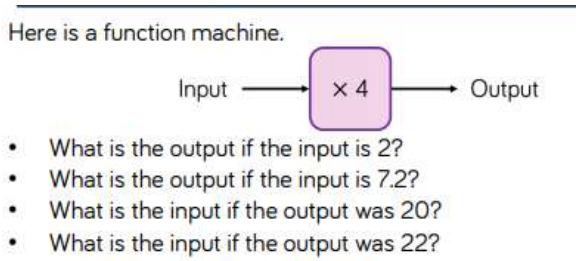
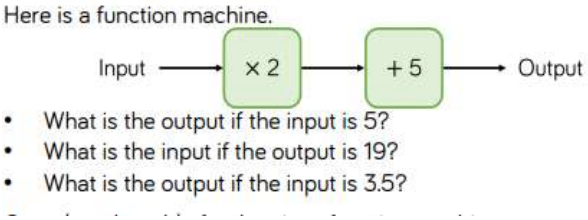
Video 1 Find a rule – a function machine (think of this as an instruction or set of instructions applied to a number e.g. +7 divide by 3)



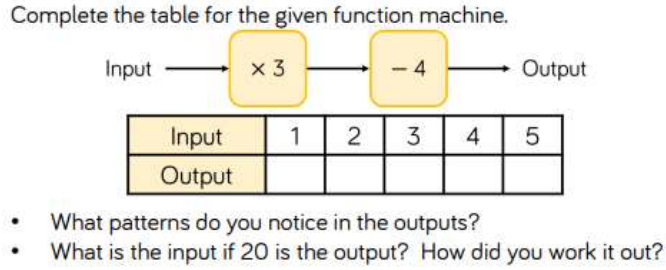
Children explore simple one-step function machines. Explain that a one-step function is where they perform just one operation on the input. Children understand that for each number they put into a function machine, there is an output. They should also be taught to "work backwards" to find the input given the output. Given a set of inputs and outputs, they should be able to work out the function.

Video 2 Find a rule step 2

Children build on their knowledge of one-step functions to look at two-step function machines.

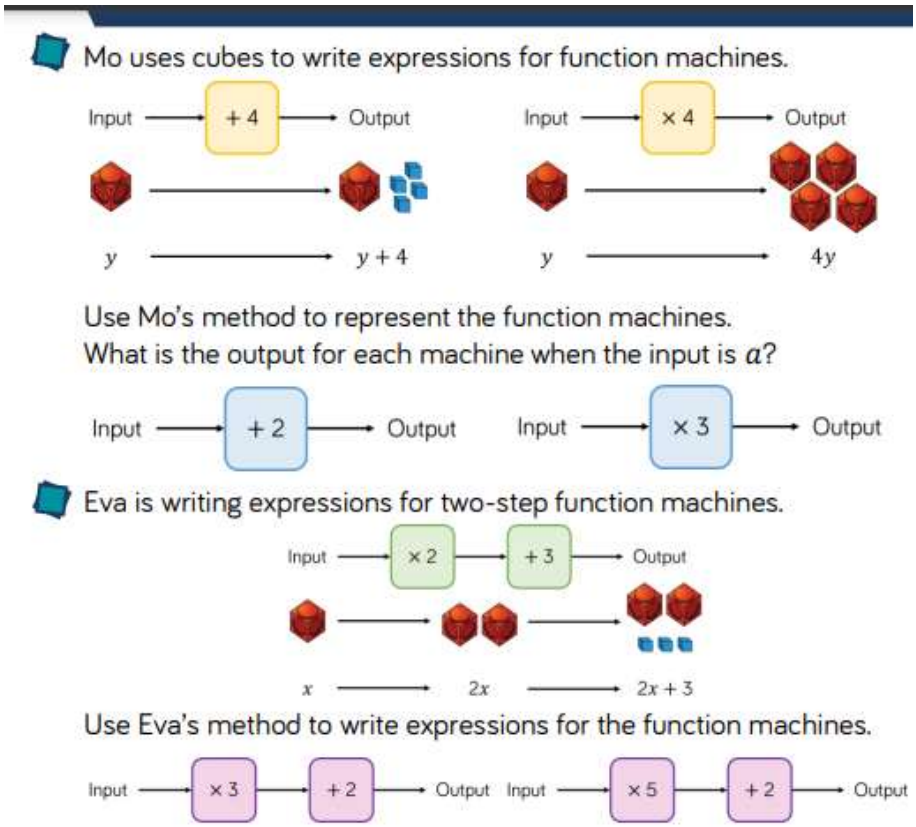


Discuss with children whether a function such as + 5 and + 6 is a two-step function machine or whether it can be written as a one-step function. (e.g. +11) Children look at strategies to find the functions. They can use trial and improvement or consider the pattern of differences.



Children record their input and output values in the form of a table.

Video 3 Forming expressions

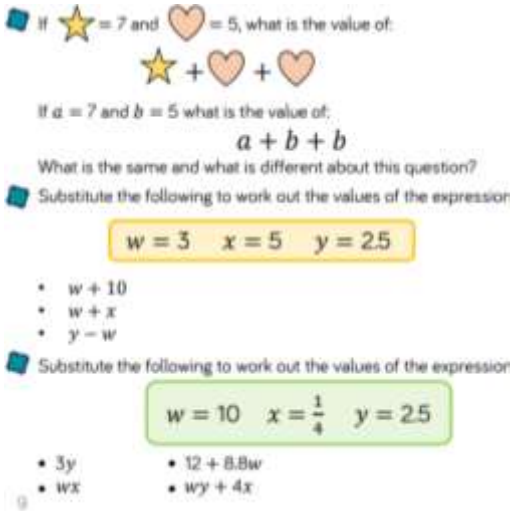


Children have now met one-step and two-step function machines with numerical inputs. In this step, children use simple algebraic inputs e.g. y. (a letter represents a number or value). In the examples above, the red cube stands for an unknown value

Using these inputs in a function machine leads them to forming expressions e.g. y + 4. The use of cubes to represent a variable can aid understanding. Children are introduced to conventions that we use when writing algebraic expressions. e.g. y × 4 as 4y

Video 4 Substitution

Children substitute into simple expressions to find a particular value.



(They have already experienced inputting into a function machine.)

Substitute the letter for the value

e.g. $w + 10$ is the same as 3+10 when $w = 3$ $x = 5$ $y = 2.5$

- $w + x$ is the same as 3+5
- $y - w$ is the same as 2.5 -3

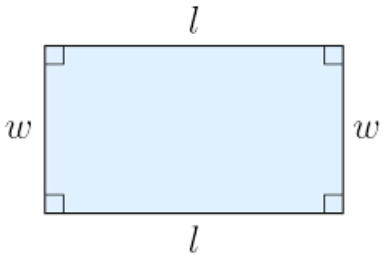
Children will need to understand that the same expression can have different values depending on what has been substituted.

e.g. w+10 =16 w+x=17 y-w= 14.5

when $w = 6$ $x = 11$ $y = 20.5$

<u>Video 5 Formulae</u>

Children need to see a formula is a special short hand version of a calculation that works every time. We use letters to stand in for values and the letters remind you of certain words. E.g. the perimeter of a rectangle is the sum of the 2 long sides and the 2 widths.



We can show perimeter for any rectangle as p=2l + 2w when p stands for perimeter, l stands for length and w stands for width

Children substitute into familiar formulae such as those for area and volume. They also use simple formulae to work out values of everyday activities such as the cost of a taxi or the amount of medicine to take given a person's age.