

For 10 - 12 yr old SCRATCH coders

Seniors code this resource for Juniors

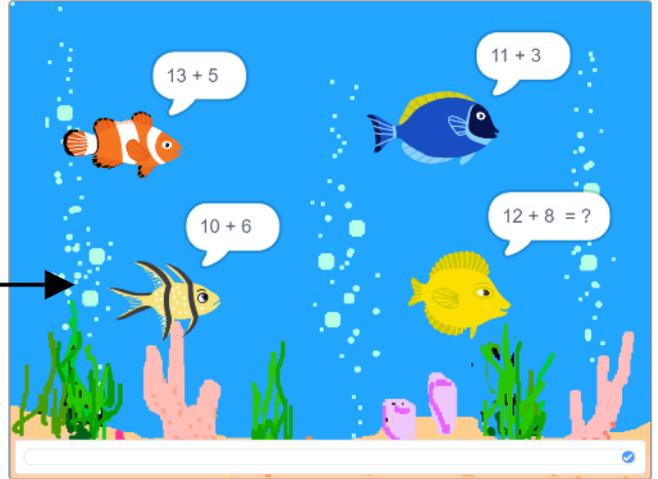
Template of 4 Interactive Number Exercises

<https://scratch.mit.edu/projects/171571632>

Here is a set of four number exercises which very young children would be expected to write out and answer in their copybooks or worksheets. This example set of four sums typifies several levels of Maths work at primary school. More next page.

1

a	13 + 5 =	b	11 + 3 =
c	10 + 6 =	d	12 + 8 =



when green flag clicked

switch costume to fish-a

say 13 + 5

when this sprite clicked

ask 13 + 5 = ? and wait

if answer = 13 + 5 then

say 13 + 5

stop this script

else

say Try again for 2 seconds

say 13 + 5

script 1 of 1 on the Diver

when green flag clicked

say Click any fish for 2 seconds

Keep the exercise within the objective and add an extra page

- What if you were to add four more sums with a variation e.g. single digit number first ?
- How would you code a second page to appear automatically and on cue?
- How would you add a simple score script (no percentages as it wouldn't suit the target age)?

This project is an example of how young programmers can create a resource for even younger users. The young users write out and complete the four exercises on paper first. Then, in a lesson situation with the teacher or parent, they check their work using this interactive learning resource. A white board could be used.

The 'programmers' are only a grade or two higher than the target grade. There is great potential for pupils and students at a higher level coding a SCRATCH resource for kids at a lower level (the maths concept could be for 8-9 year olds; the code is by 11+ year olds). The resource could have two or three 'pages' of sums, including a SCORE code. Programmers can get creative in their choice of sprites and backdrop context.

- It makes no difference what the Maths Objective is. The code is the same except for the Operators in the solution algorithm.
- There is scope for creativity in setting the context or backdrop: fish underwater, the scuba diver, or Giga's in space.

1a

e	3 + 14 =	f	5 + 12 =
g	8 + 11 =	h	6 + 14 =

more examples and work next page

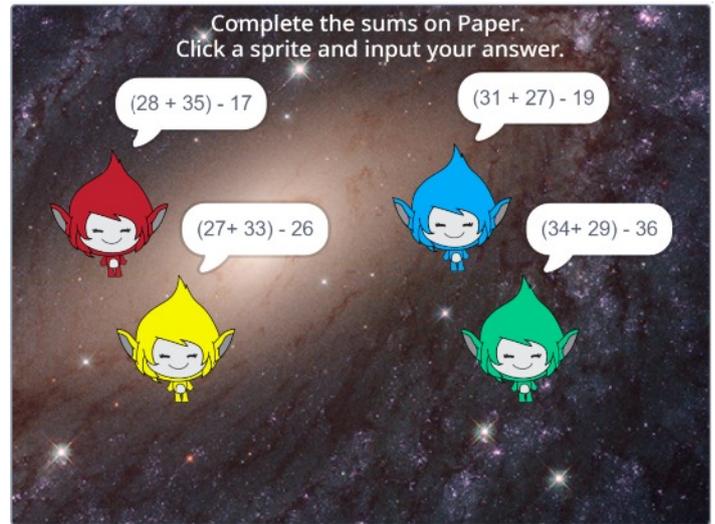
2. Code a two-step solution algorithm

Script 1 of 2

- when green flag clicked
- set size to 60 %
- say (28 + 35) - 17

Script 2 of 2

- when this sprite clicked
- ask (28 + 35) - 17? and wait
- if answer = 28 + 35 - 17 then
 - say join answer is CORRECT
 - speak join answer is CORRECT
 - stop this script
- else
 - say Click me and try again
 - speak Click me and try again
- say (28 + 35) - 17?



<https://scratch.mit.edu/projects/290080916>

a	$\begin{array}{r} 28 \\ + 35 \\ \hline \end{array}$	b	$\begin{array}{r} 31 \\ + 27 \\ \hline \end{array}$
	$\begin{array}{r} - 17 \\ \hline \end{array}$		$\begin{array}{r} - 19 \\ \hline \end{array}$
c	$\begin{array}{r} 27 \\ + 33 \\ \hline \end{array}$	d	$\begin{array}{r} 34 \\ + 29 \\ \hline \end{array}$
	$\begin{array}{r} - 26 \\ \hline \end{array}$		$\begin{array}{r} - 36 \\ \hline \end{array}$

3. Order of Operations in Maths

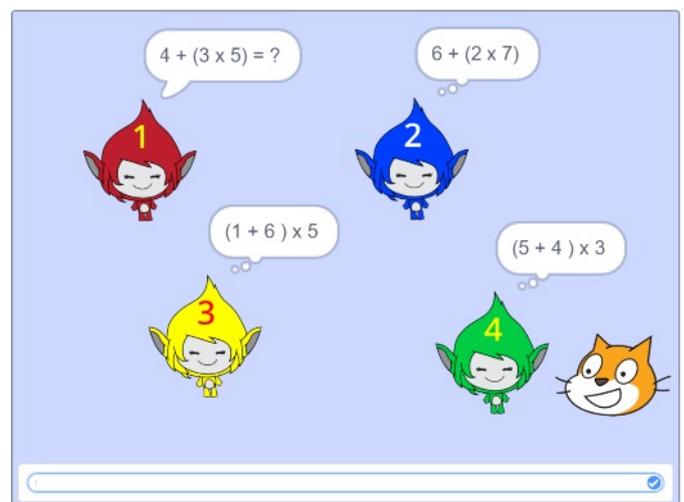
A Double Objective in this example

a	$4 + (3 \times 5)$	b	$6 + (2 \times 7)$
c	$(1 + 6) \times 5$	d	$(5 + 4) \times 3$

(1) Children of 8-9 yrs would not be expected to be able to code at this level but it should be well within the capabilities of children, a year or two older. The **text to speech** feature that is used above, makes the sprite actually **say** the correct answer. It could be omitted to simplify the programming.

(2) The exercises pictured here would benefit the programmers mathematically by reinforcing their understanding of *Order of Operations*. They also test the younger users' understanding of the **concept** by using easy single digit numbers.

(3) Understanding the *Order of Operations* is essential to success in Maths. SCRATCH Operators can help to illustrate and visually conceptualise the concept and make it even better understood.



<https://scratch.mit.edu/projects/171597350>

In written work we have to use brackets to force **addition before multiplication**: $(1 + 3) \times 6 = 24$

SCRATCH operators are like brackets. Without brackets, the value of $1 + 3 \times 6$ equals 19. Look at it in SCRATCH ...

$(1 + 3) \times 6$	$1 + 18 = 19$	$(3 \times 6) + 1$
multiply <i>inside</i> addition	$18 + 1 = 19$	multiply <i>inside</i> addition
$(1 + 3) \times 6$	$4 \times 6 = 24$	$(6 \times 1) + 3$
addition <i>inside</i> multiply	$6 \times 4 = 24$	addition <i>inside</i> multiply