Counting Machine

Program Aim Can the users create and adapt a counting machine that displays the numbers counted and then removes one to test the users numeracy skills.

Computer Science Concepts

-Repeat x times loops

-Variables in a loop

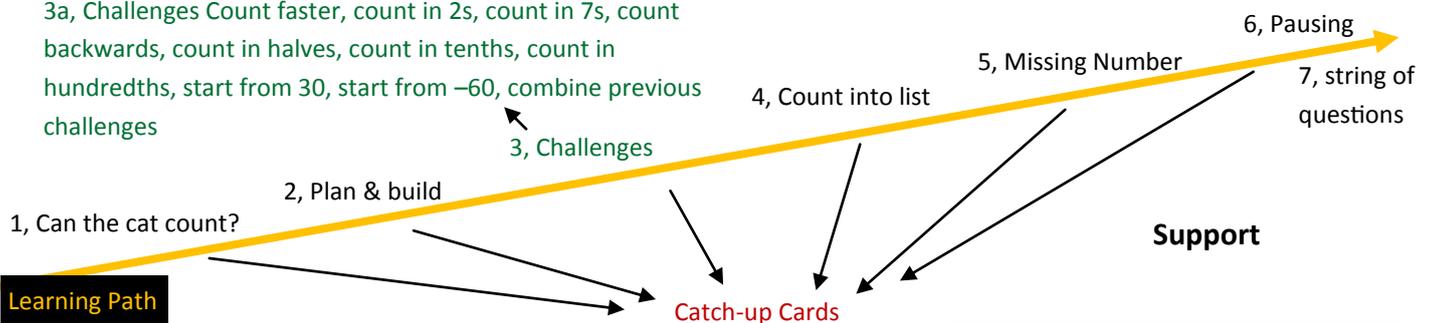-Input to a list

-Using a variable within a say command

Maths Concepts

-Counting in multiples, counting backwards, counting in halves, counting in tenths, counting in hundredths, counting from a different starting number

Differentiation and Assessment for Learning This planning should be used alongside the *catch-up cards* supporting SEN pupils and the *extension cards* supporting the more able, although in this module a lot of the extension tasks can be given orally. At the beginning of each session the *learning intention sheet* is shared and the learning journey expanded through success criteria. Pupils feed their progress back to the teacher through annotating this sheet with smiley faces at the end of the lesson. Teachers can also anno-tate the sheet to indicate those who need more or less help in future lessons. These extra resources can be found on the code-it.co.uk website.

Extension

3a, Challenges Count faster, count in 2s, count in 7s, count backwards, count in halves, count in tenths, count in hundredths, start from 30, start from –60, combine previous challenges

3, Challenges

2, Plan & build

1, Can the cat count?

4, Count into list

5, Missing Number

6, Pausing

7, string of questions

Support
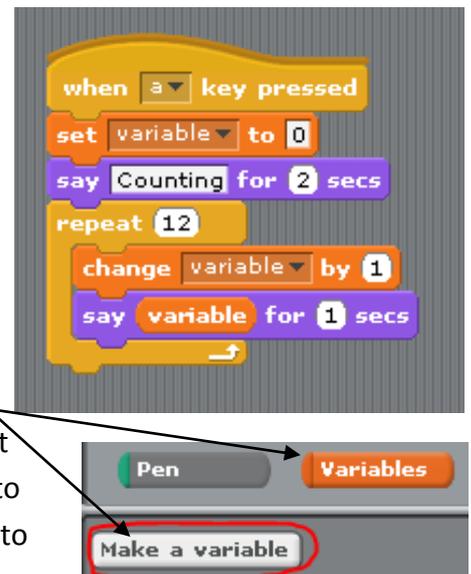
Learning Path

Catch-up Cards

1, Can the cat count?

Ask pupils if they can work out a way to make the cat count. They will often come up with lots of say commands strung together. Welcome their efforts and ask them what the draw backs are for this method? (very time consuming) if they don't come up with this ask them if they would be happy to make the cat count to 1000 using their method?

2, Plan and build

Explain that we have a much easier way. Show them how to make a variable called variable. Then hand out the Counting Machine Flowchart Introduction printed in colour one to each pair. Explain that they need to match the blocks to the flow chart drawing lines and then use this plan to build the counting machine.

```
when  a ▼  key pressed
set  variable ▼  to  0
say  Counting  for  2  secs
repeat  12
    change  variable ▼  by  1
    say  variable  for  1  secs
```

Pen   Variables

Make a variable

Counting Machine P2

3a, Challenges As pupils finish building and testing their machine and have filled in the question on the bottom of the counting machine flow chart challenge encourage them to come up and get challenges from you.

Give the challenges in this order

Challenges Count faster, count in 2s, count in 7s, count backwards, count in halves, count in tenths, count in hundredths, start from 30, start from –60,

combine previous challenges

As they come up get them to point out on your challenge check sheet what they have changed. Give them the next challenge.

Start counting from 30 change set variable to 30, start counting from –60 set variable to –60
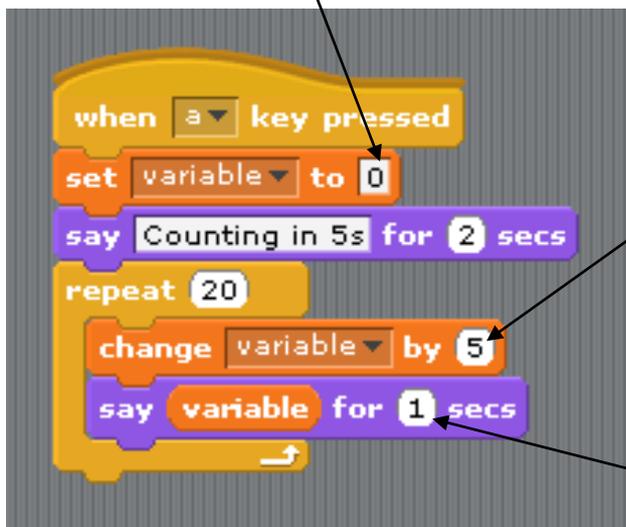
Count in 2s change variable to 2, count in 7s change variable to 7, count backwards change variable to negative number, count in halves change variable to 0.5, count in tenths change variable to 0.1, count in hundredths change variable to 0.01,

Count faster change seconds to decimal fraction such as 0.5

4, Count into a list

Explain that you are going to make a list and then fill it up with all the numbers that are put into the variable

Left click on Variables

Left click on make a list

Type in name List

For all sprites

Click ok

Counting Machine P3

4, Count into a list continued

Select the delete 1 of list and use the black triangle to drop it down to all Explain how this removes everything from our list every time we run the program

Now we need to add things to the list every time they are said by the sprite

Select an add thing to list block and drag a variable block over where it says thing

This will then add the variable to the list every time it is looped over

Run through this using pencils and a box for the variables and a whiteboard for the list

5, Missing number

Remove one random number from the list Replace it with a ?

Find the replace item 1 of list Place a pick random 1-12 or as high as you need with ?

Place this block on the bottom Add a final question in a say block

5a, 2 Missing numbers

5b, User Input

Counting Machine P4

6, Pausing between questions

Ask pupils what they will do if the users is too slow to answer the question in the 2 seconds provided? One answer could be to give more time in the what is the missing number block another solution would be to provide the user with a pause mechanism.

Set out these blocks but don't show them how to fit these together.

```
say Press space key to continue
wait until  key space pressed?
```

6a, Using if and else quiz mechanism

NOTE This is far higher concepts than the rest of the module as it involves multiple variables and an understanding of lists and should only be attempted by very able

7, String of questions or one question in a loop

Challenge pupils to create a string of interesting questions. Each question much clearly say what it does in the opening say command or put one question in a loop with a pause

```
when [flag] clicked
delete all of list
set variable to 0
say Counting in 8s starting from 0 for 2 secs
repeat 10
    say variable for 1 secs
    change variable by 8
    add variable to list
replace item pick random 1 to 10 of list with ?
say What is the missing number? for 2 secs
say Press space key to continue
wait until key space pressed?
delete all of list
set variable to 0
say Counting in 9s starting from 0 for 2 secs
repeat 10
    say variable for 1 secs
    change variable by 9
    add variable to list
replace item pick random 1 to 10 of list with ?
say What is the missing number? for 2 secs
say Press space key to continue
wait until key space pressed?
```

```
when [flag] clicked
forever
    delete all of list
    set variable to 0
    say Counting down on 12s starting from 50 for 2 secs
    repeat 12
        say variable for 0.4 secs
        change variable by -12
        add variable to list
    replace item any of list with Missing
    say What is the missing number? Press space key to con
    wait until key space pressed?
```