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technocamps



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institute of
CODING
in Wales
technocamps

Coding across the Curriculum For Wales



Coding Across the CFW

Coding can be implemented across all the Areas of Learning and Experience, reinforcing learning in the classroom and improving digital literacy in the process.

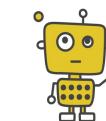
In today's world digital literacy is an essential skill for learners to develop. The technological requirements for jobs are ever increasing, and a strong start in digital skills will prepare learners and give them an advantage.



Expressive Arts



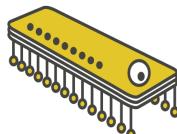
Health and Wellbeing



Humanities



Languages, Literacy and Communication



Mathematics and Numeracy



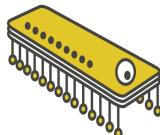
Science and Technology

Ideas for Coding Across the Curriculum



Health and Wellbeing

- Food Pyramid
- Pong



Mathematics and Numeracy

- Drawing Shapes
- Estimating Pi



Science and Technology

- States of Matter
- Water Cycle



Languages, Literacy and Communication

- Translating Quiz
- Pronouns Quiz



Expressive Arts

- Algorithmic Art
- Matching Art Styles



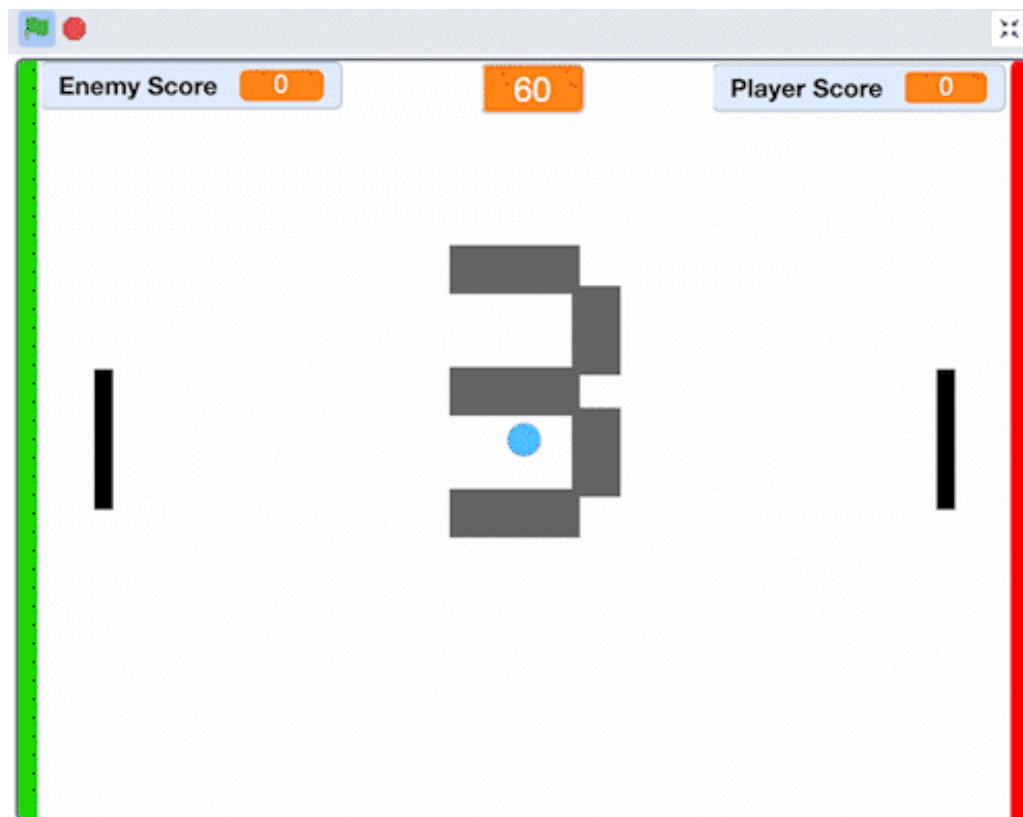
Humanities

- Interactive Timeline
- Migration Simulation



Pong - Scratch

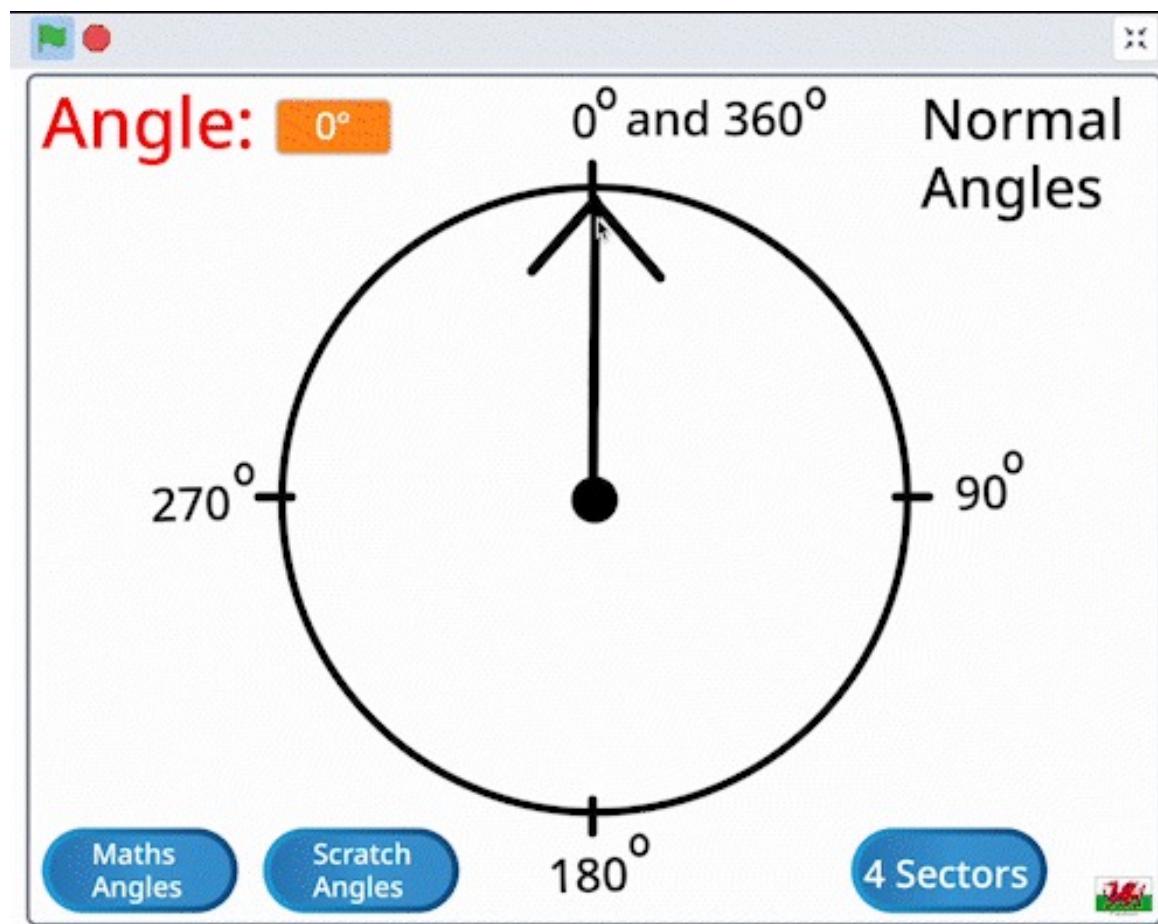
Pong





Compass - Scratch

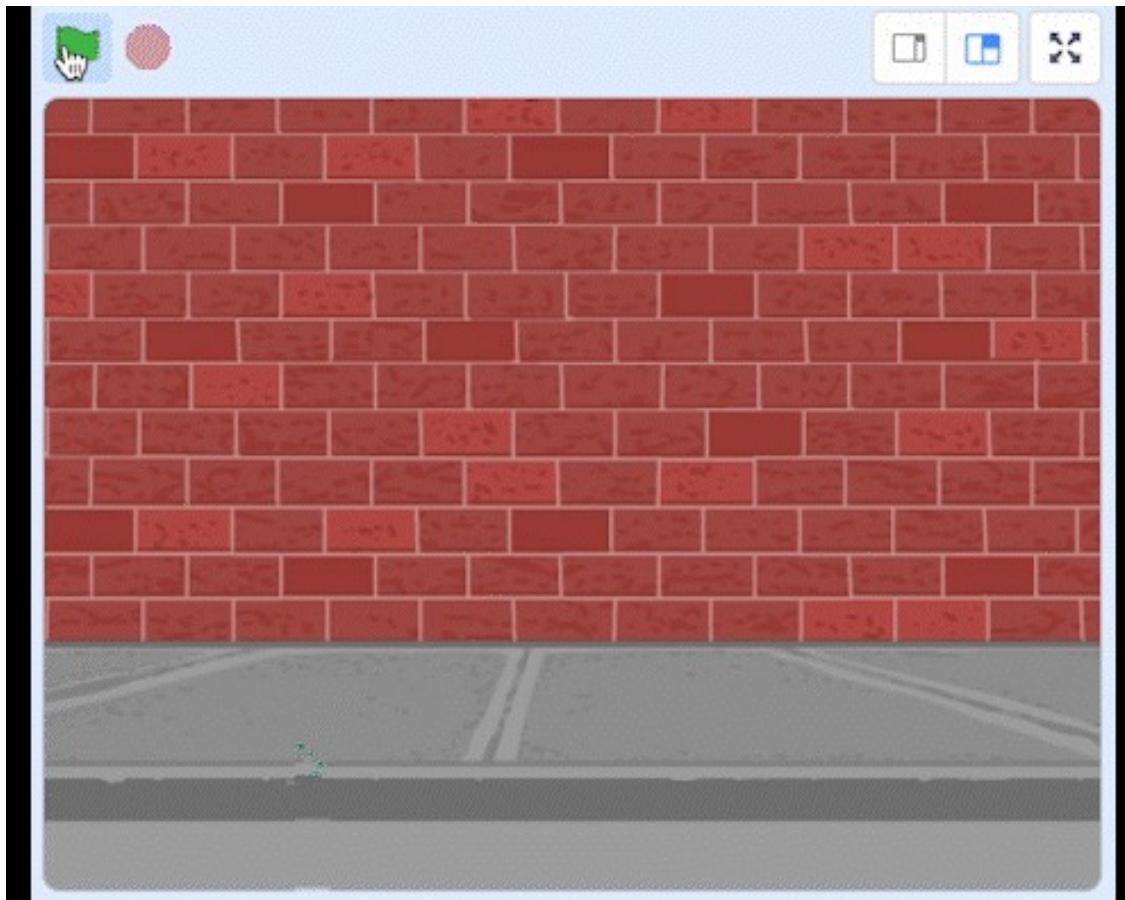
Compass

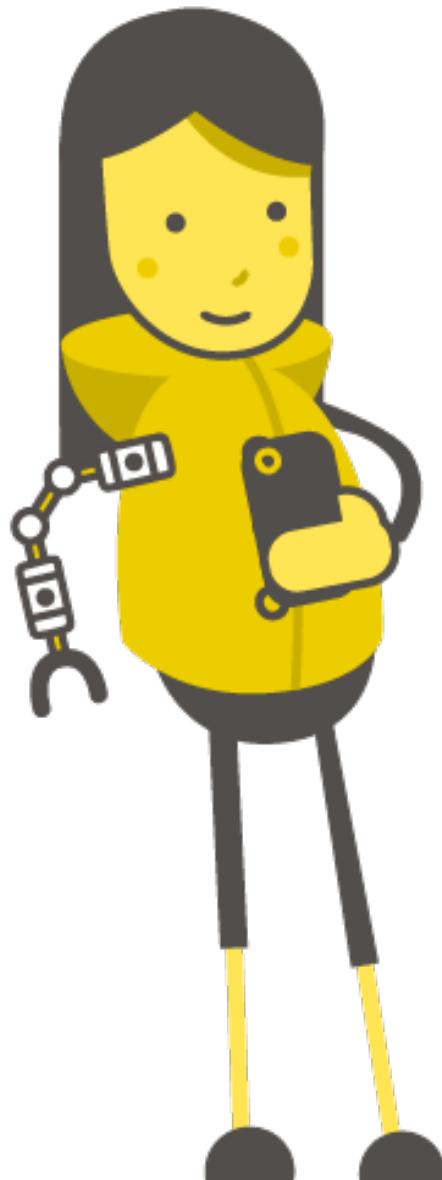




Colour Game - Scratch

Colour Game

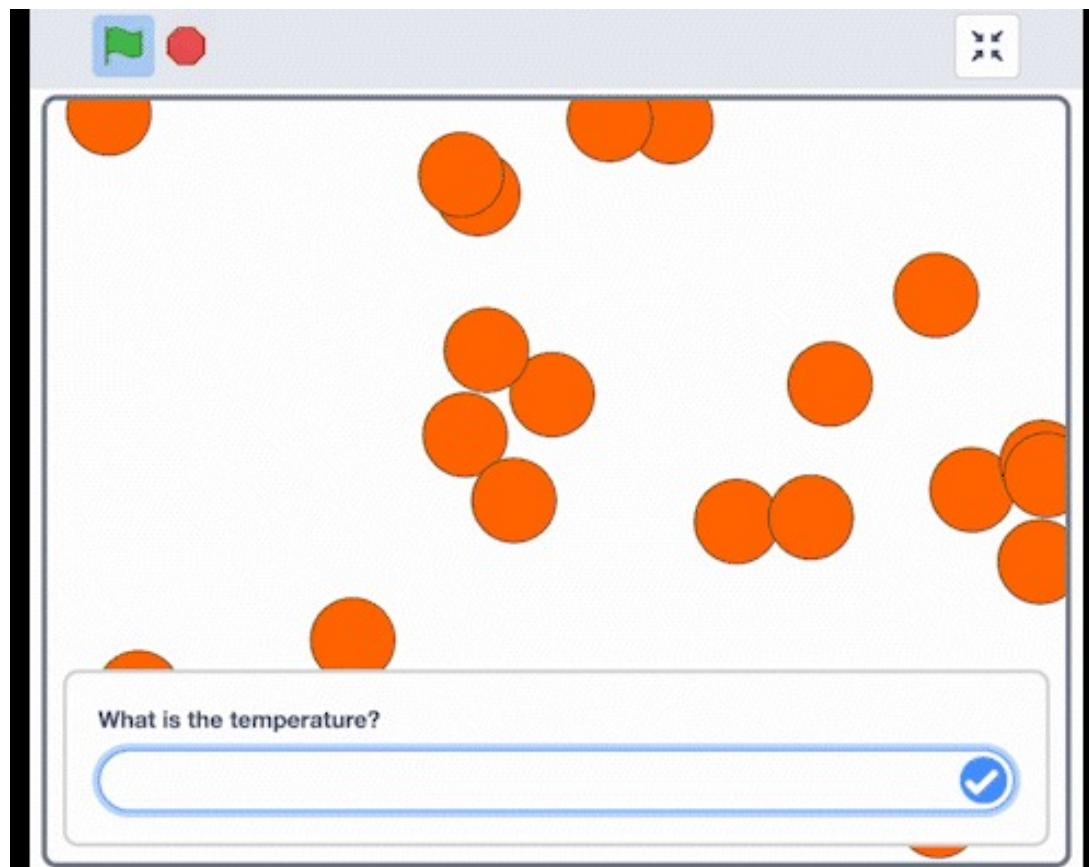




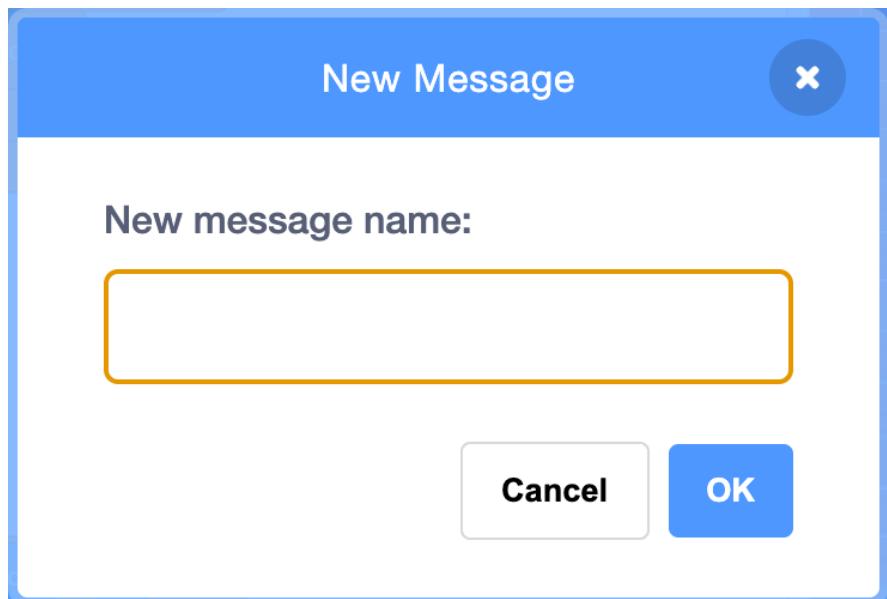
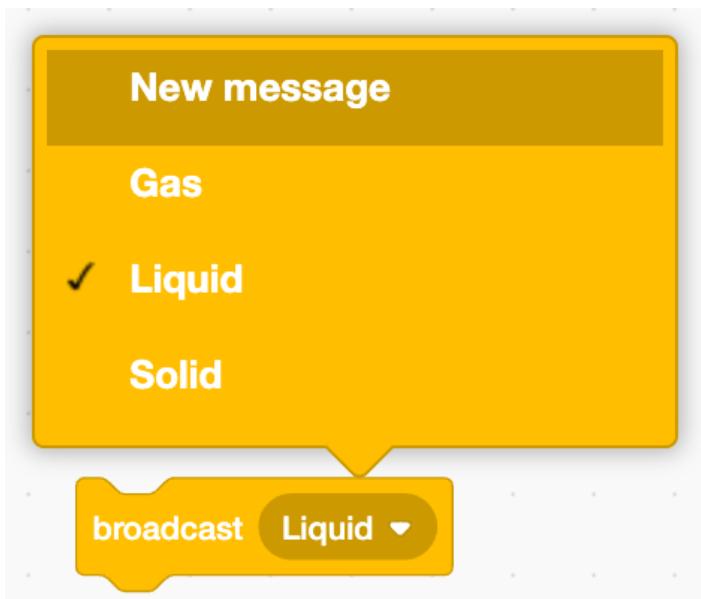
States of Matter

- Scratch

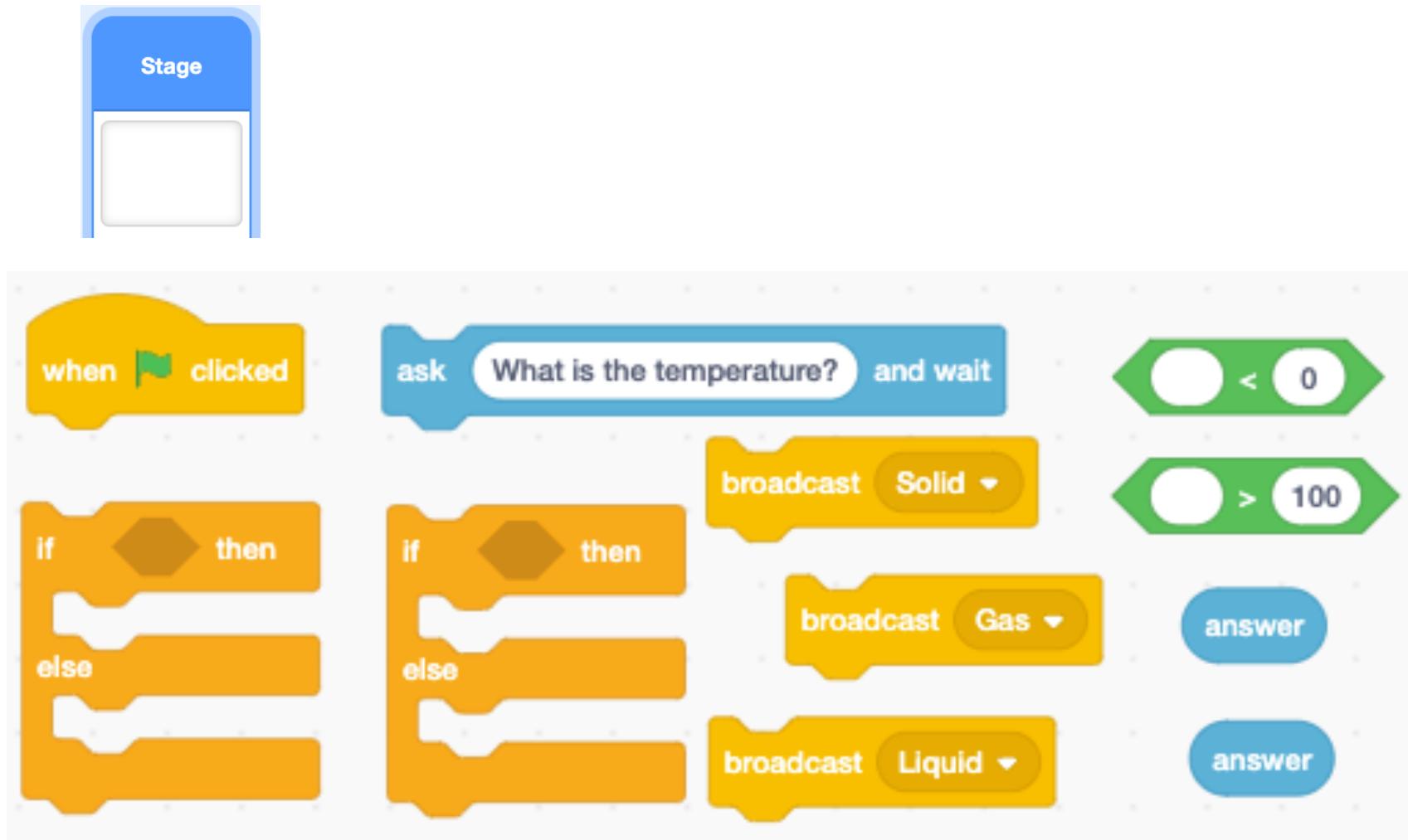
States of Matter



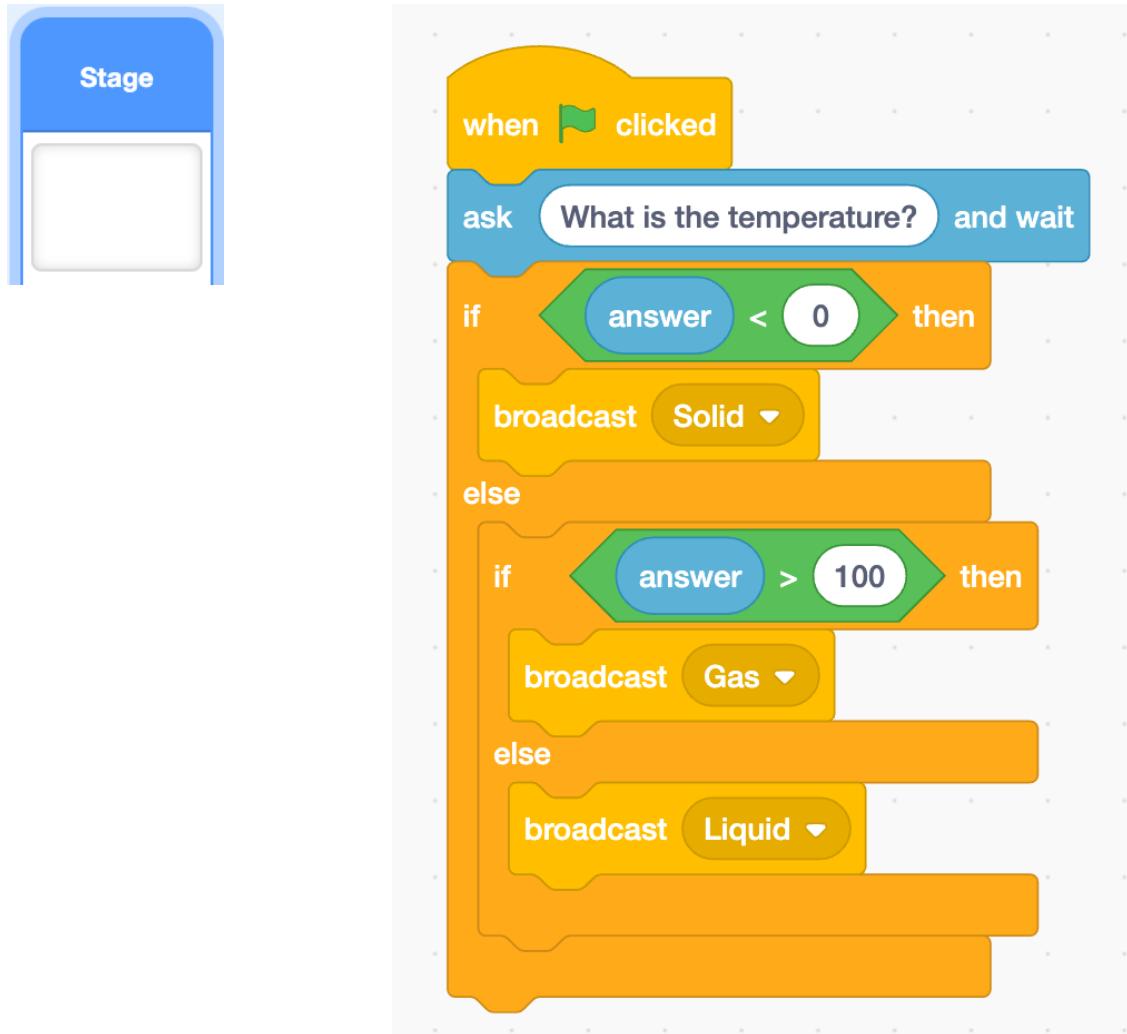
States of Matter - Broadcasting



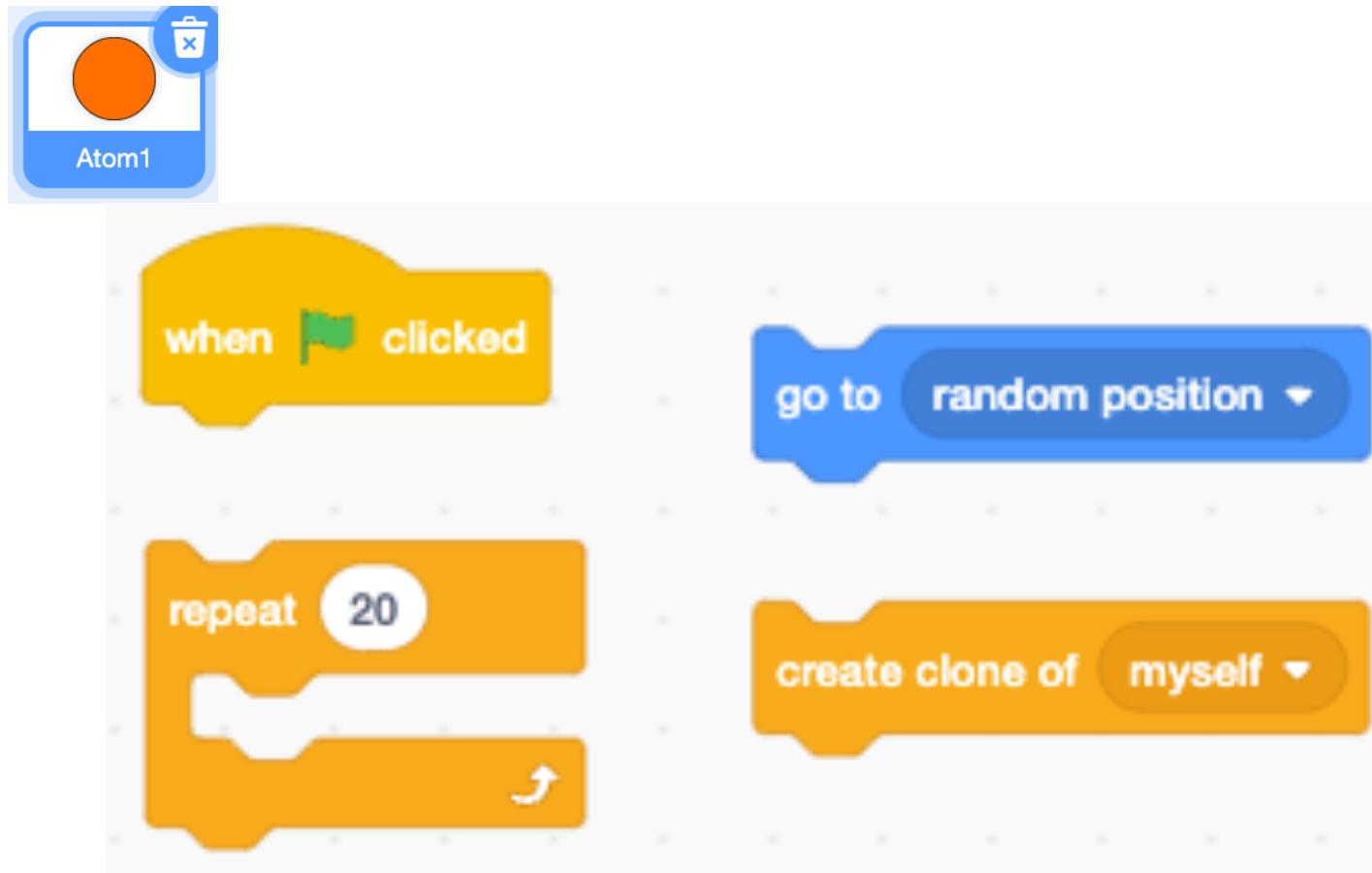
States of Matter - Background



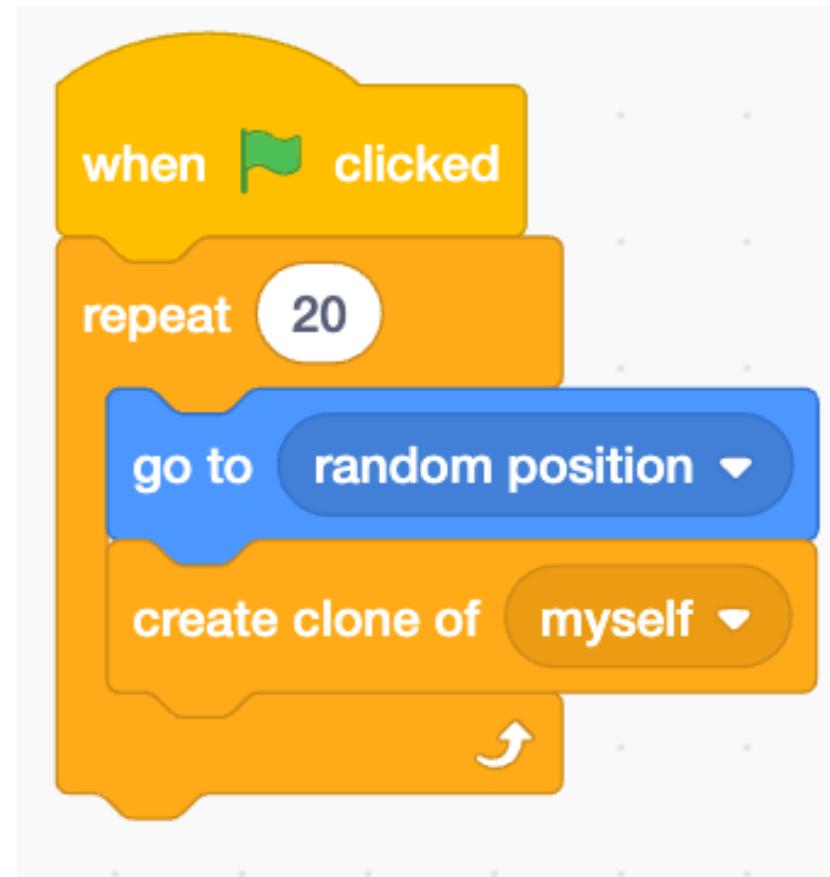
States of Matter - Background



States of Matter - Clones



States of Matter - Clones



States of Matter - Solid



```
when I receive [Solid v]
forever
  point in direction [pick random 1 to 360 v]
  move (5) steps
  wait (0.1) seconds
  move (-5) steps
  wait (0) seconds
```

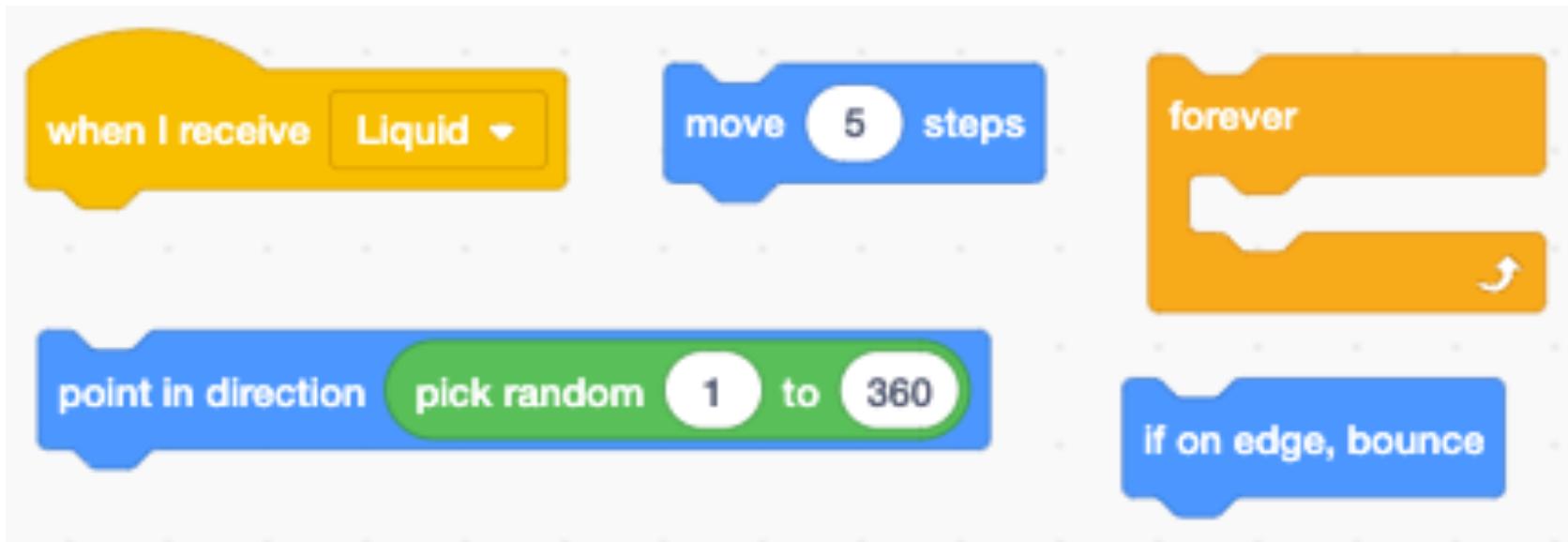
States of Matter - Solid



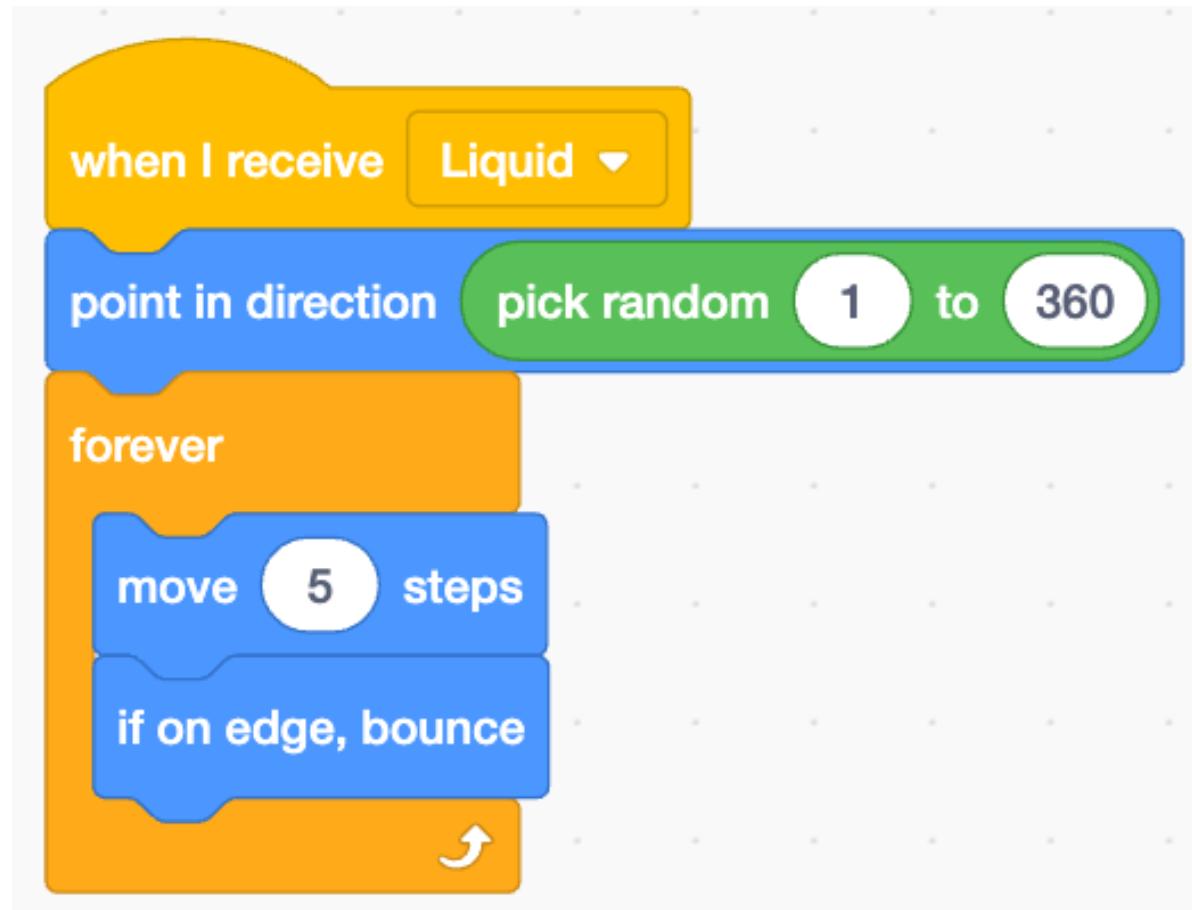
```
when I receive [Solid v]
forever
  point in direction [pick random 1 to 360 v]
  move (5) steps
  wait (0.1) seconds
  move (-5) steps
  wait (0) seconds
end
```

A Scratch script for the "Atom1" sprite. It begins with a "when I receive [Solid v]" hat block, followed by a "forever" control loop. Inside the loop, the script performs the following actions in sequence: "point in direction [pick random 1 to 360 v]", "move (5) steps", "wait (0.1) seconds", "move (-5) steps", and "wait (0) seconds". The script ends with a "end" control block.

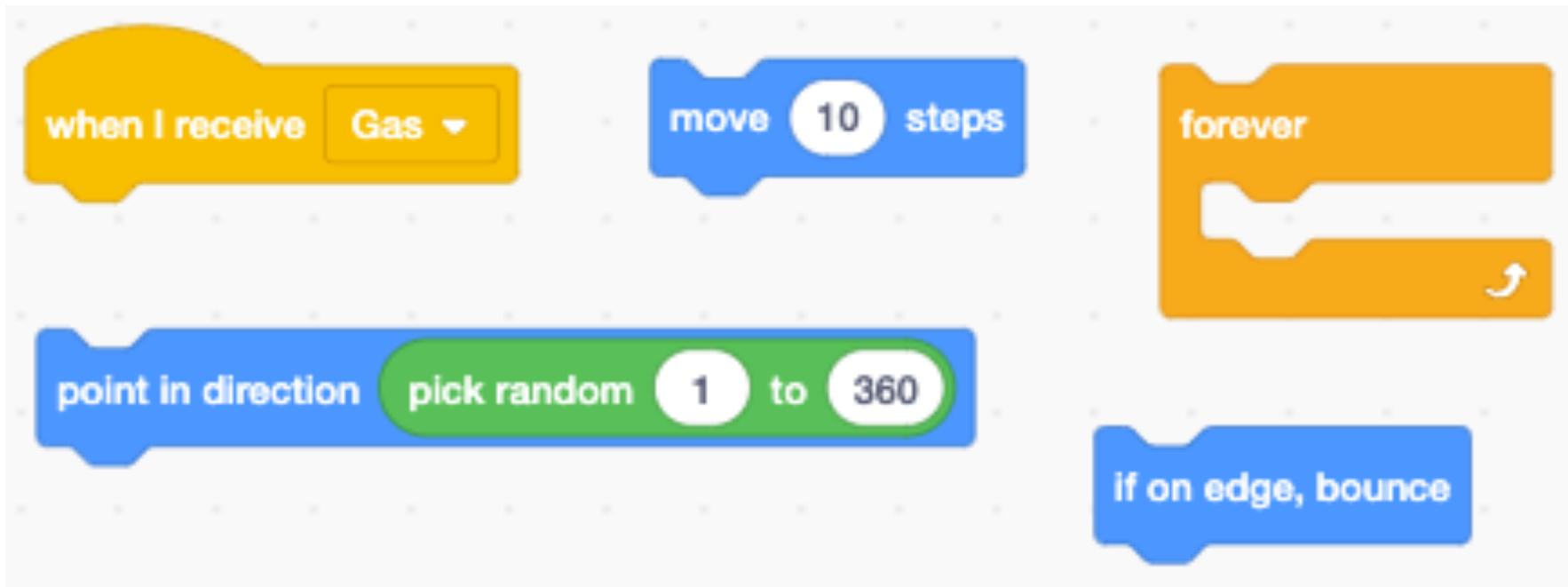
States of Matter - Liquid



States of Matter - Liquid



States of Matter - Gas



States of Matter - Gas



```
when I receive Gas
  point in direction [pick random 1 to 360 v]
  forever
    move (10) steps
    if on edge, bounce
end
```



Water Cycle - Scratch

Water Cycle



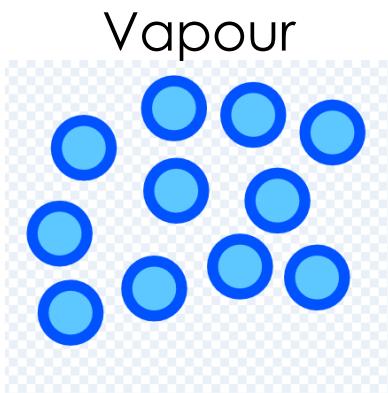
Water Cycle – Background

Create a background that with a sea, mountains and a river to animate the water cycle over.

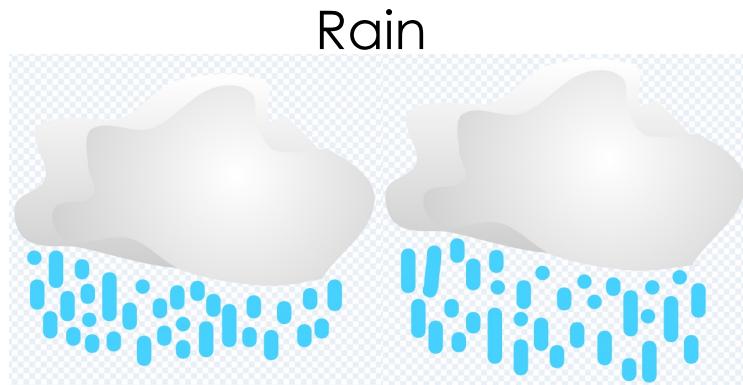


Water Cycle – Sprite

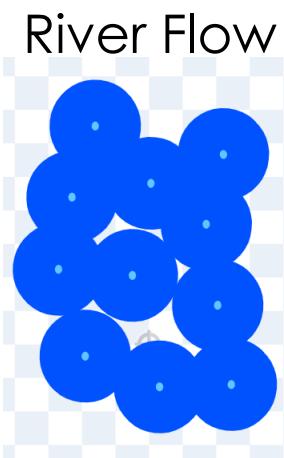
Create a sprite with 5 costumes; river flow, water vapour, clouds, and two rain costumes (to animate rainfall)



Clouds

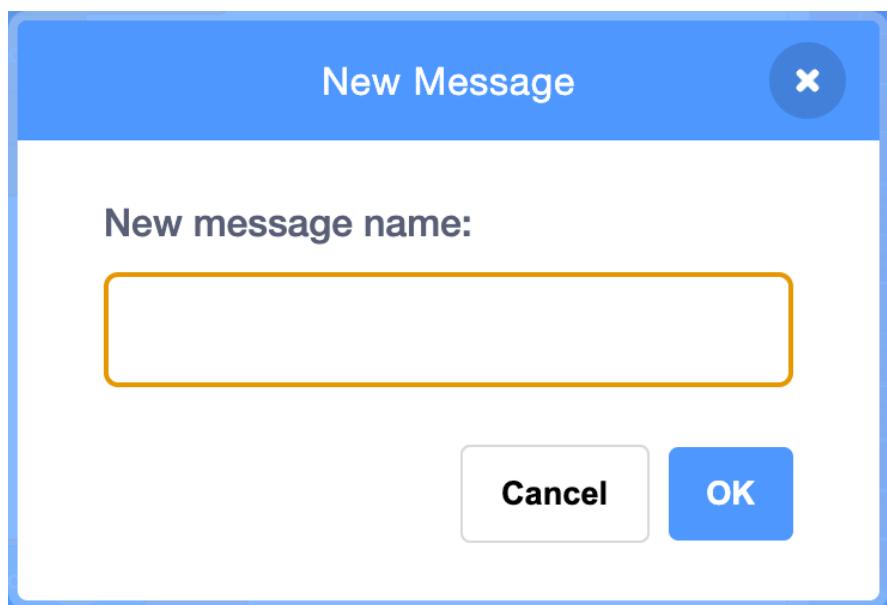
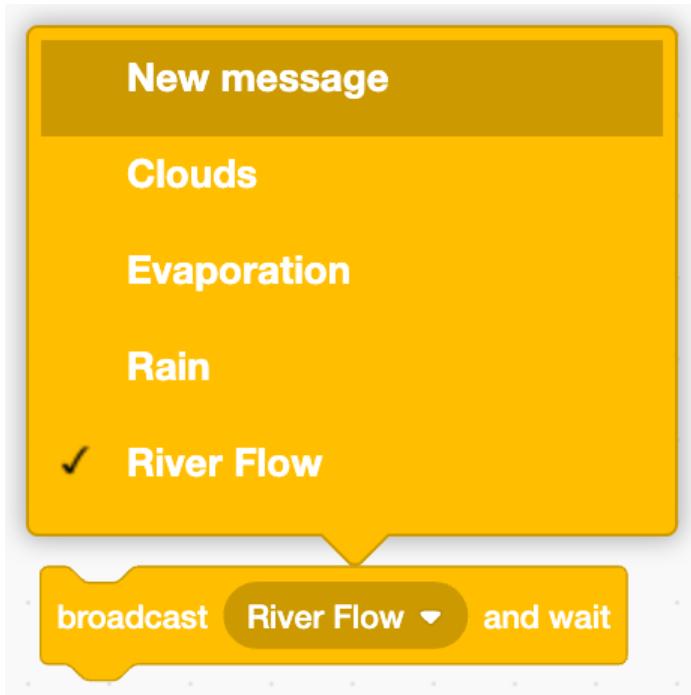


Rain

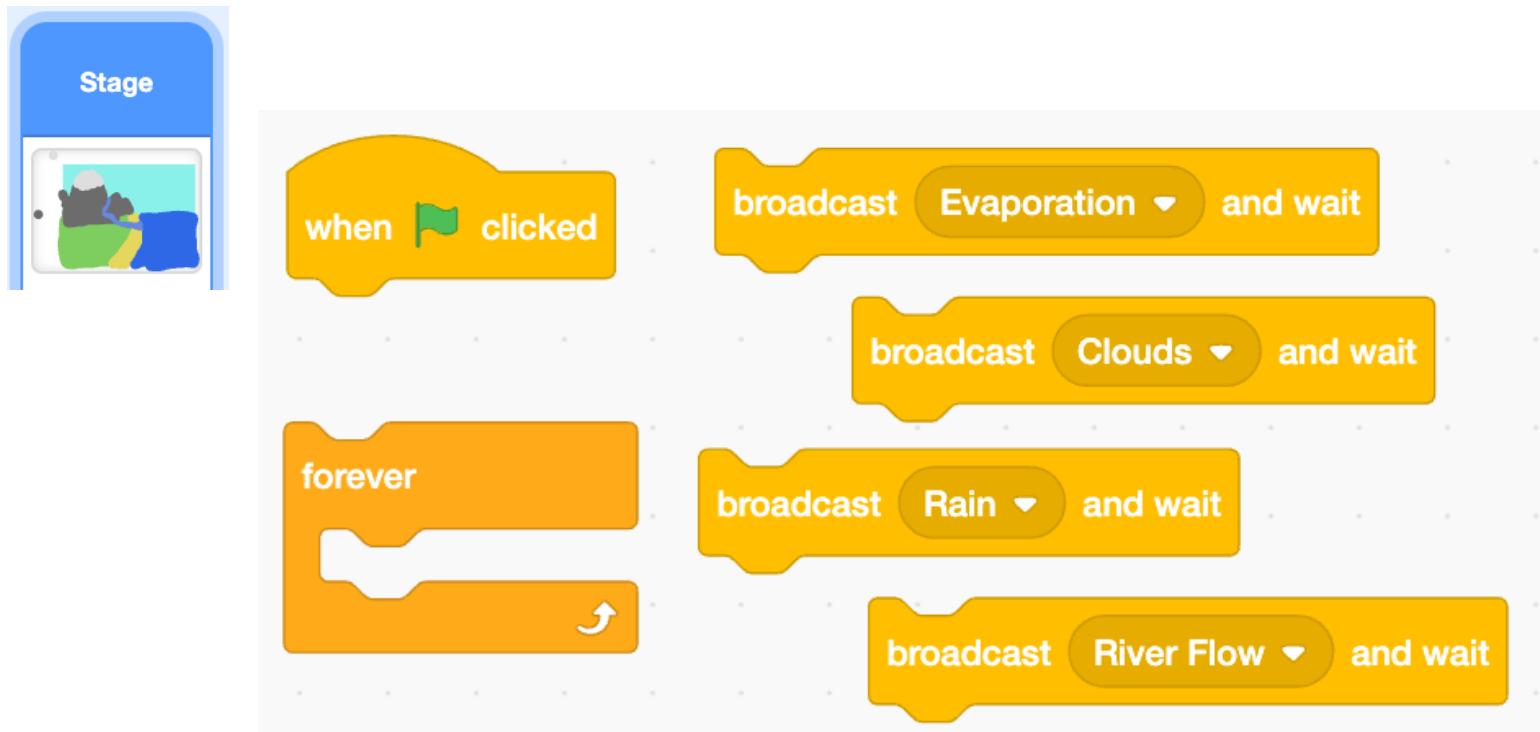


River Flow

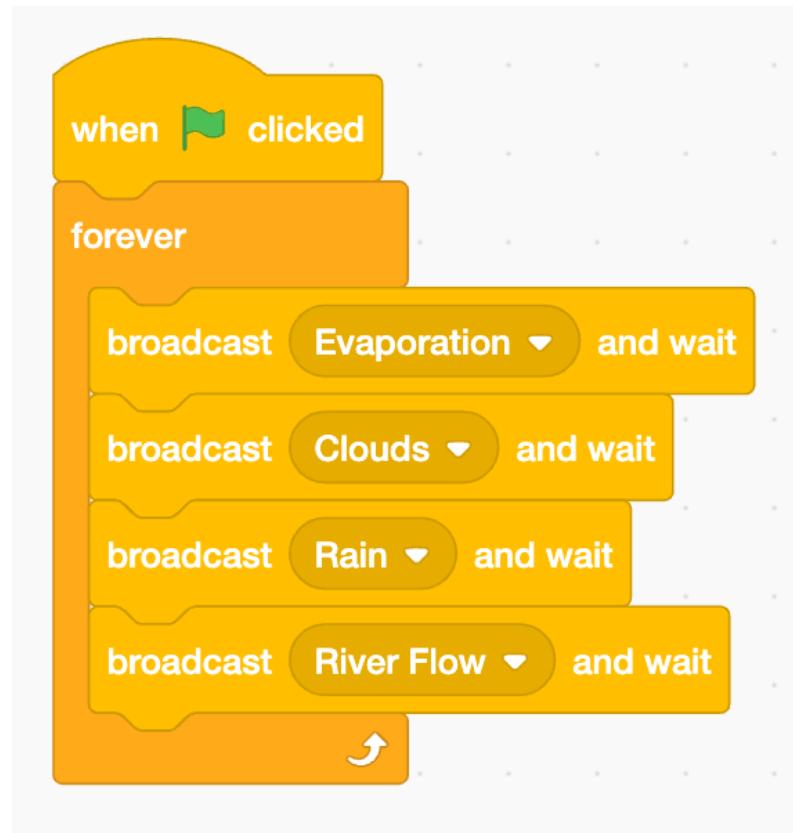
Water Cycle - Broadcasting



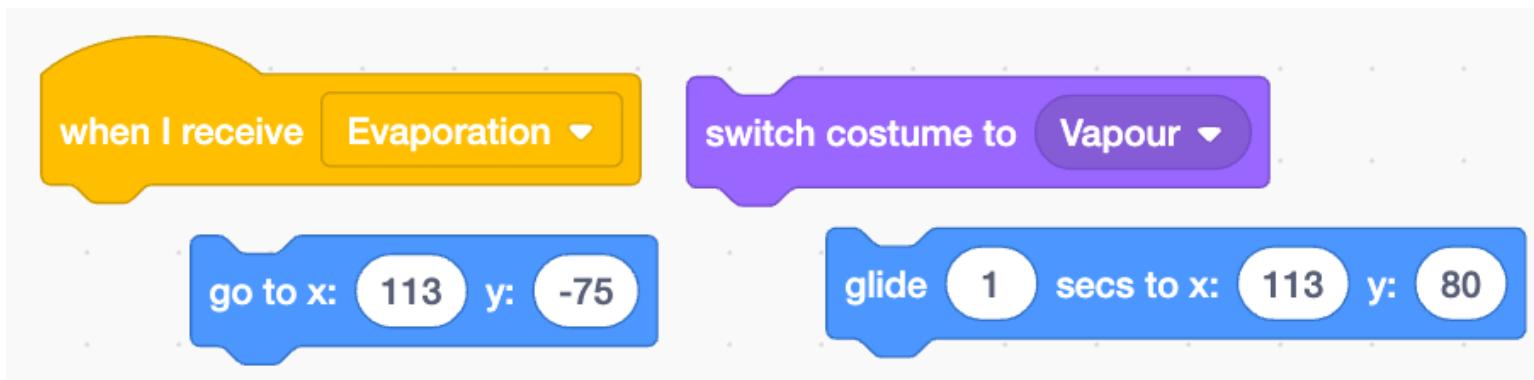
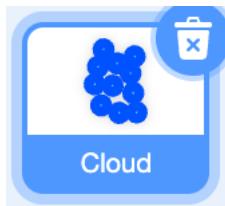
Water Cycle - Animate



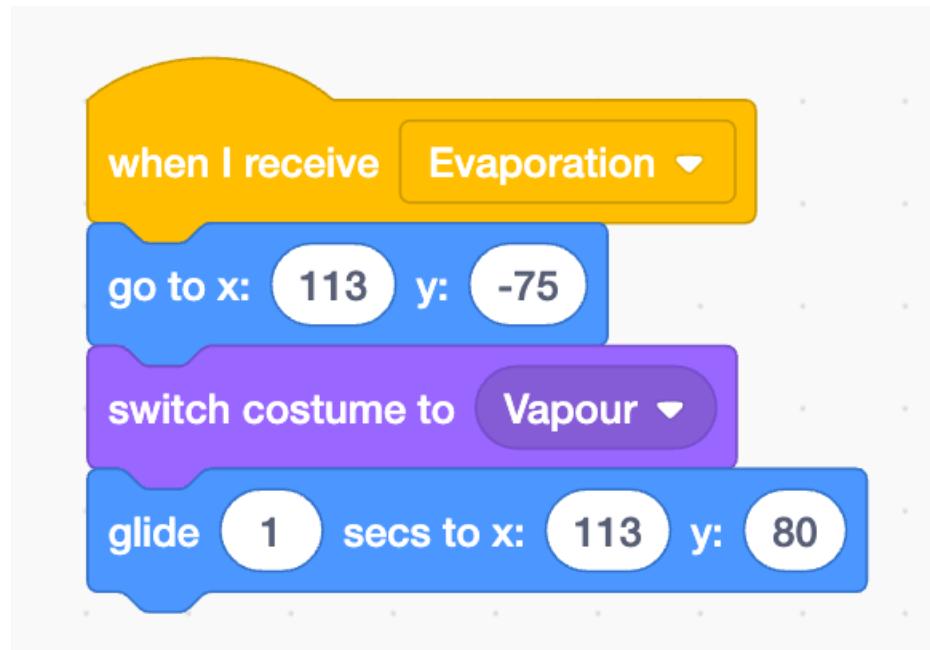
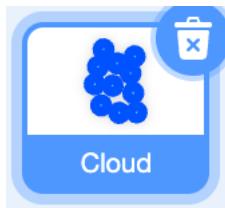
Water Cycle - Animate



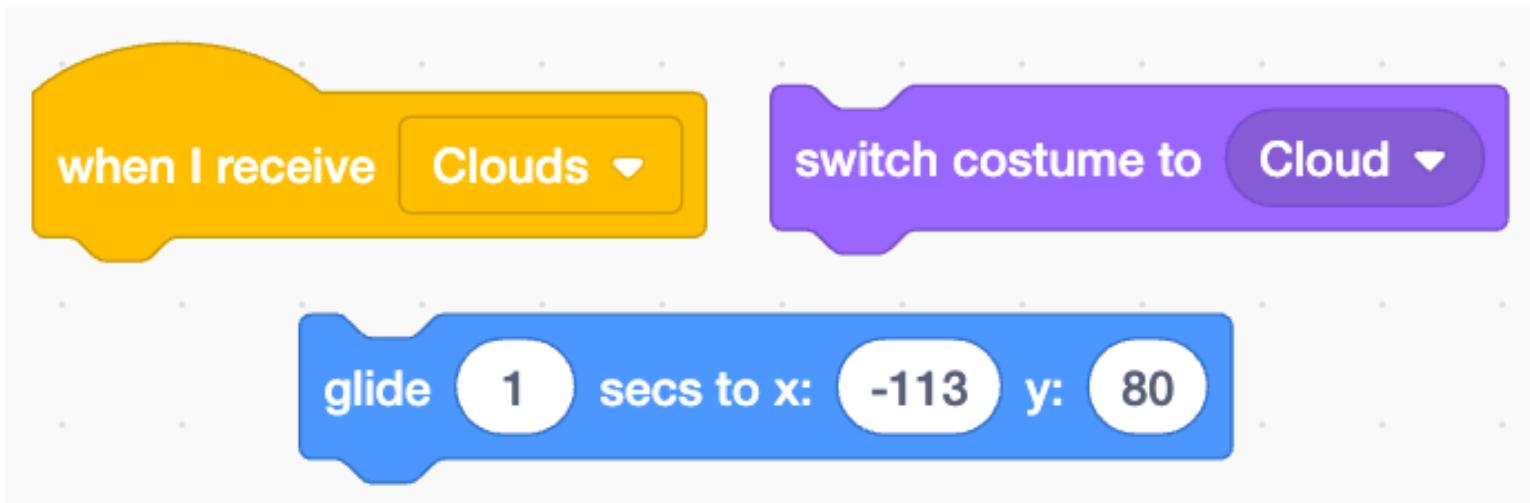
Water Cycle - Evaporation



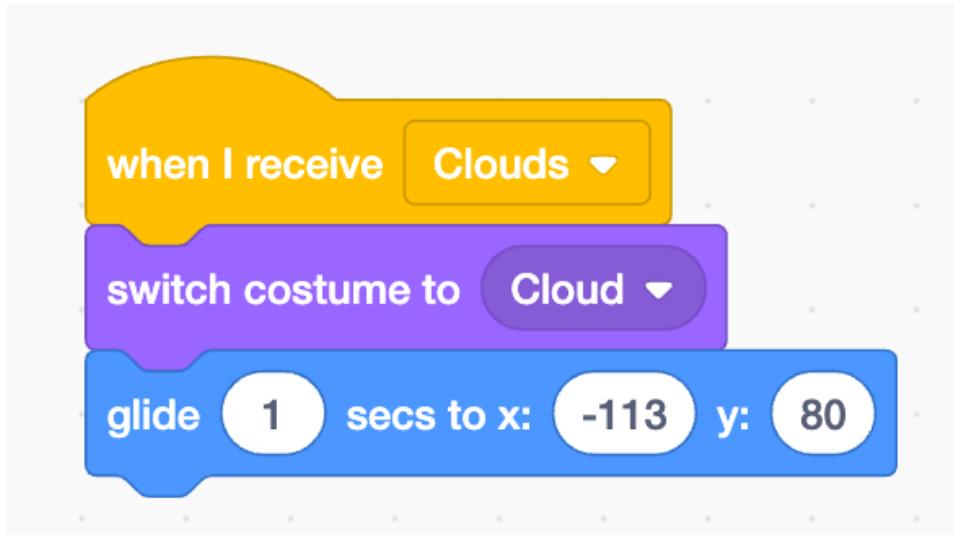
Water Cycle - Evaporation



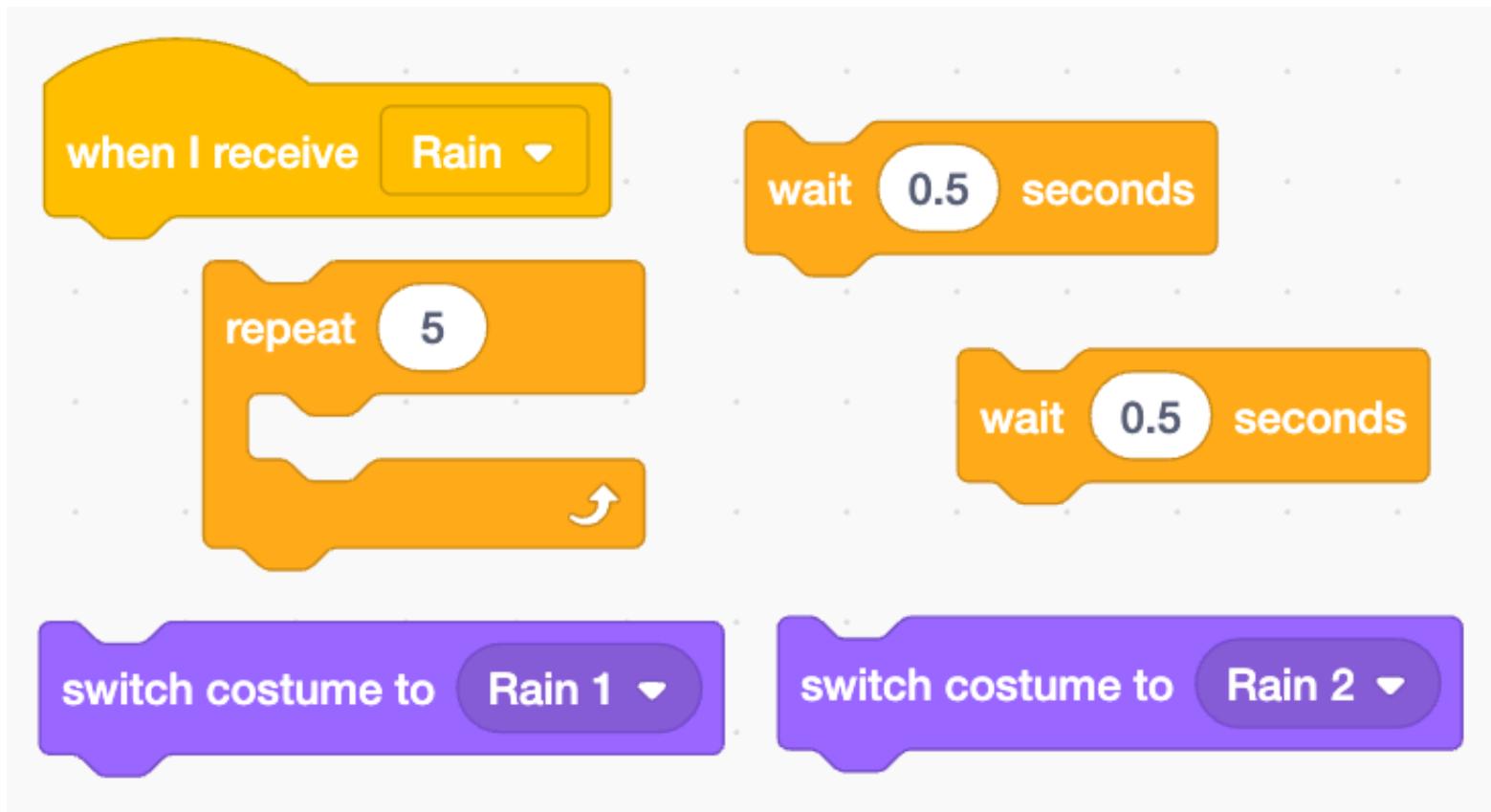
Water Cycle - Clouds



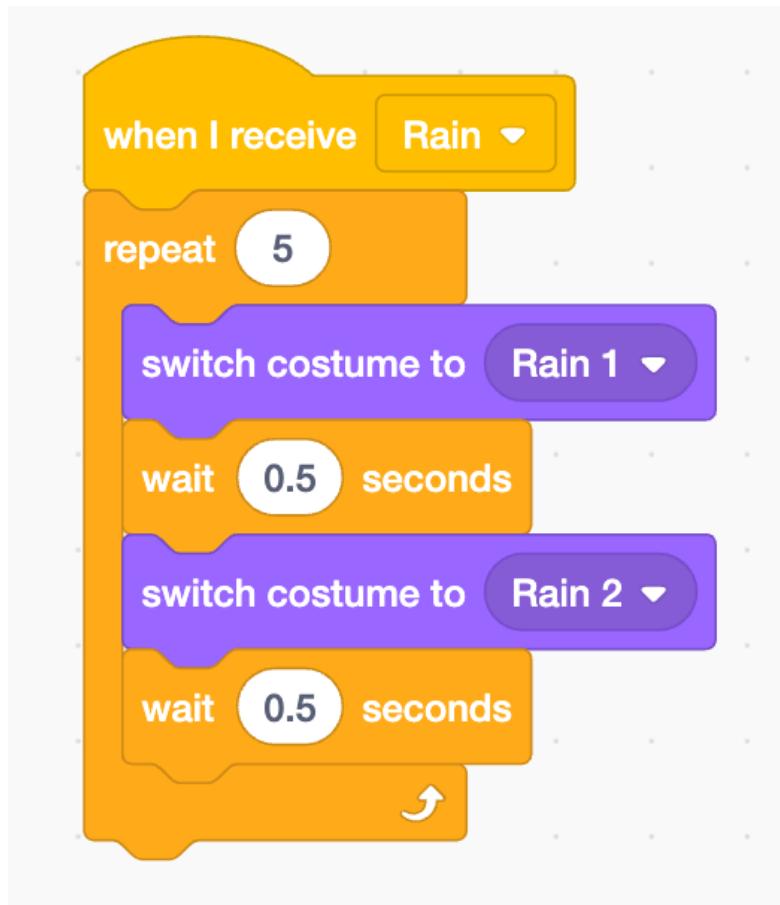
Water Cycle - Clouds



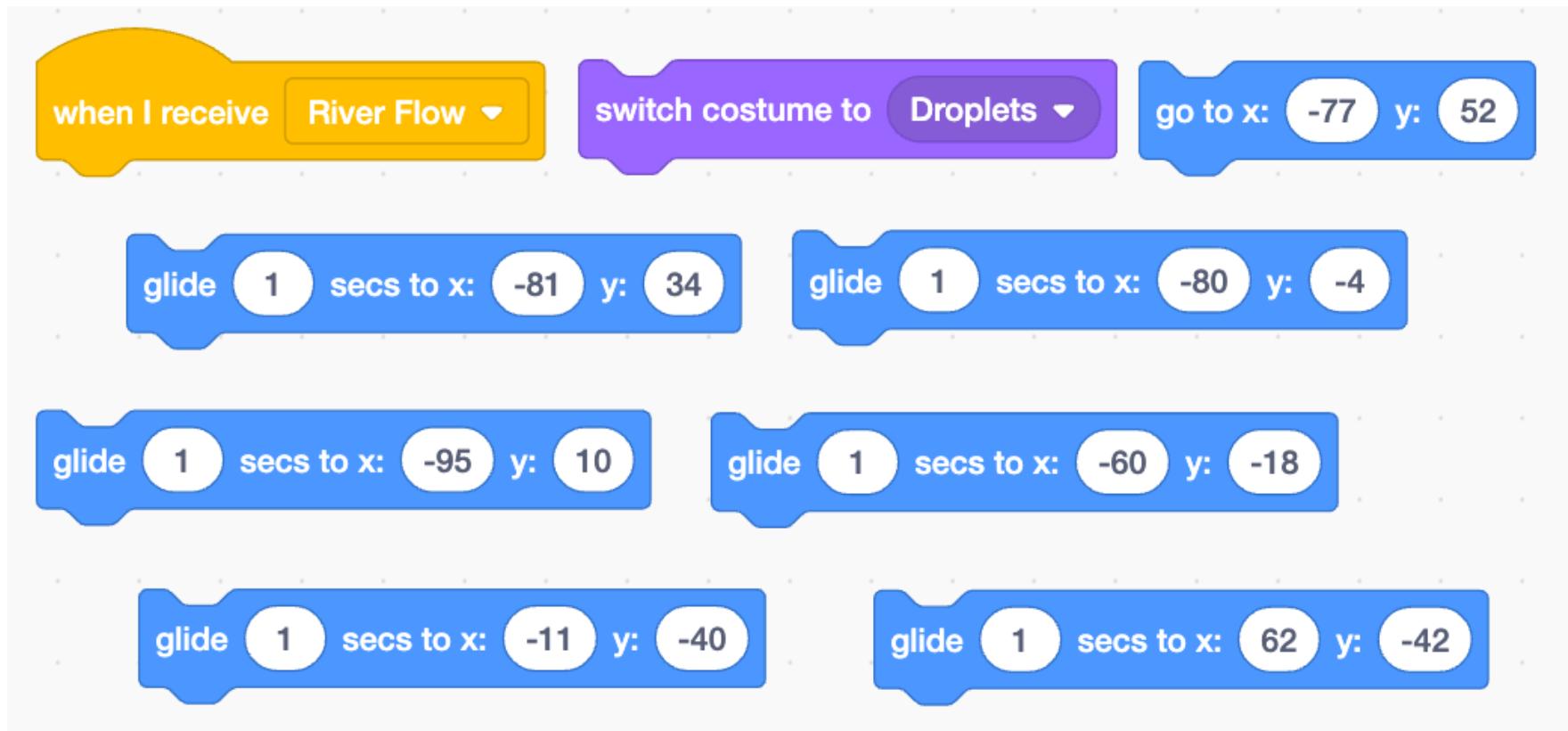
Water Cycle - Rain



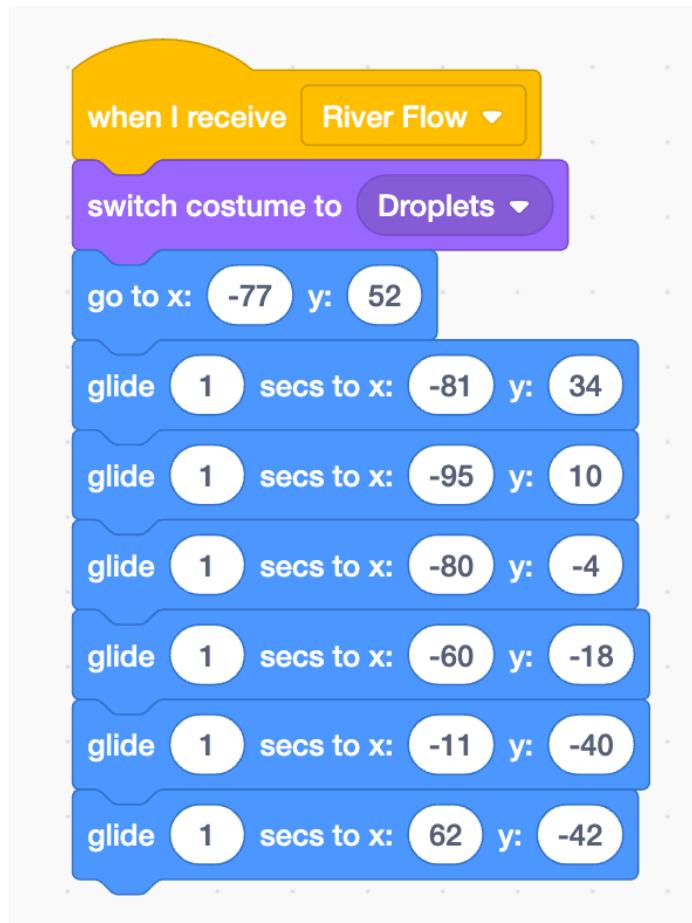
Water Cycle - Rain



Water Cycle – River Flow



Water Cycle – River Flow





Migration - Scratch

Migration



Migration

Create a background that looks like a map for your people to migrate across.

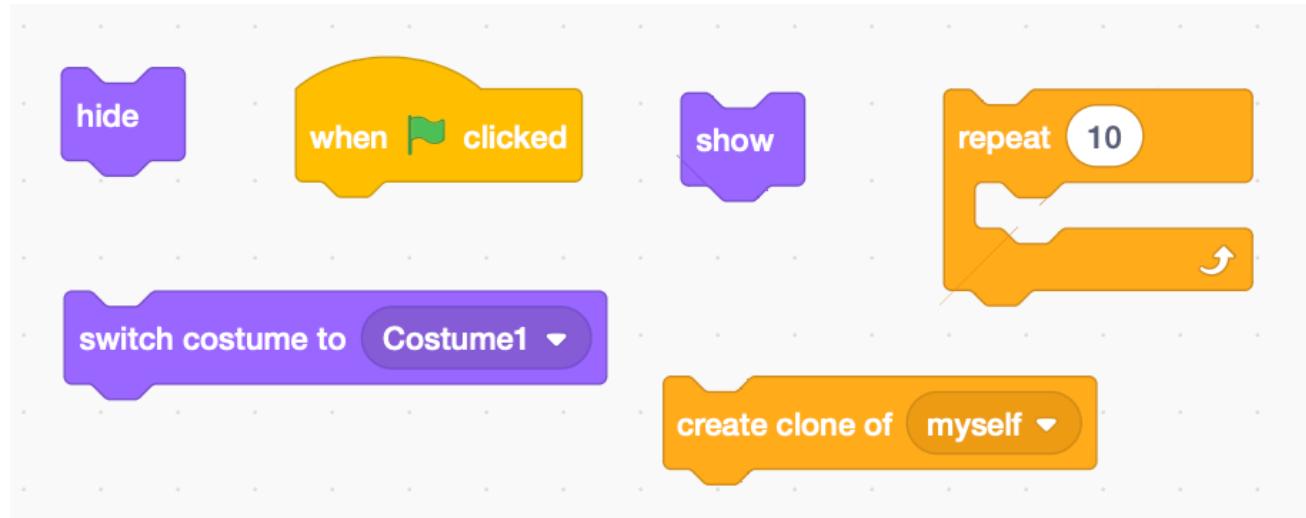


Migration - Clones

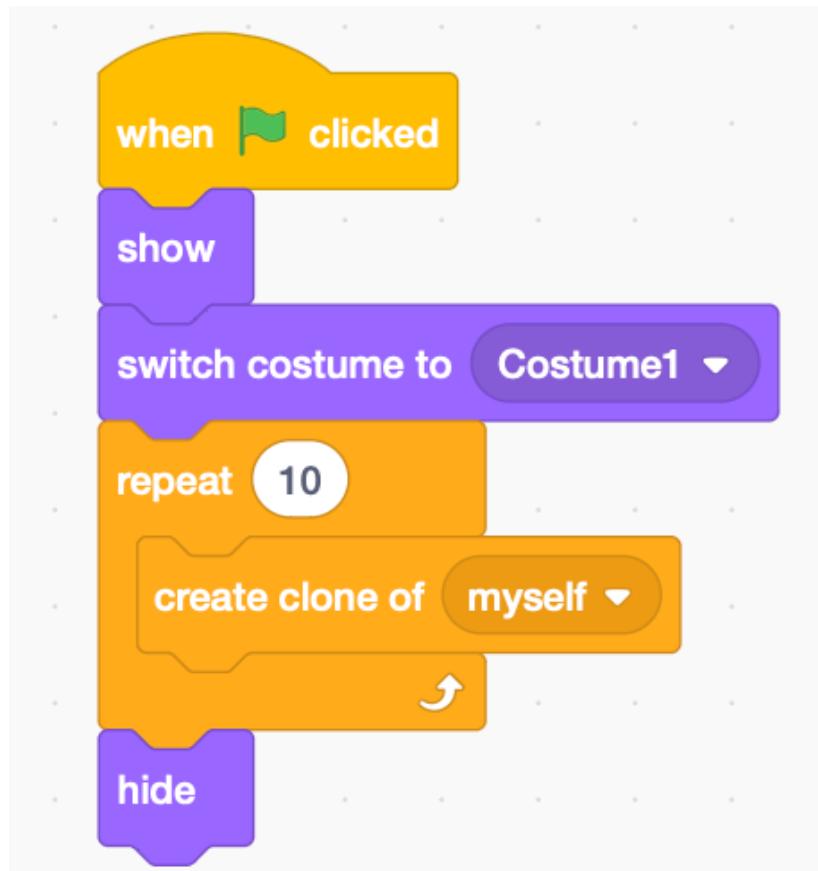
Create a new
Sprite for your
people



Find these blocks to code the cloning
of your sprite and populate the world.



Migration - Clones



Migration - War

Create a new
Sprite for war



Find these blocks to code the war.



Migration - War

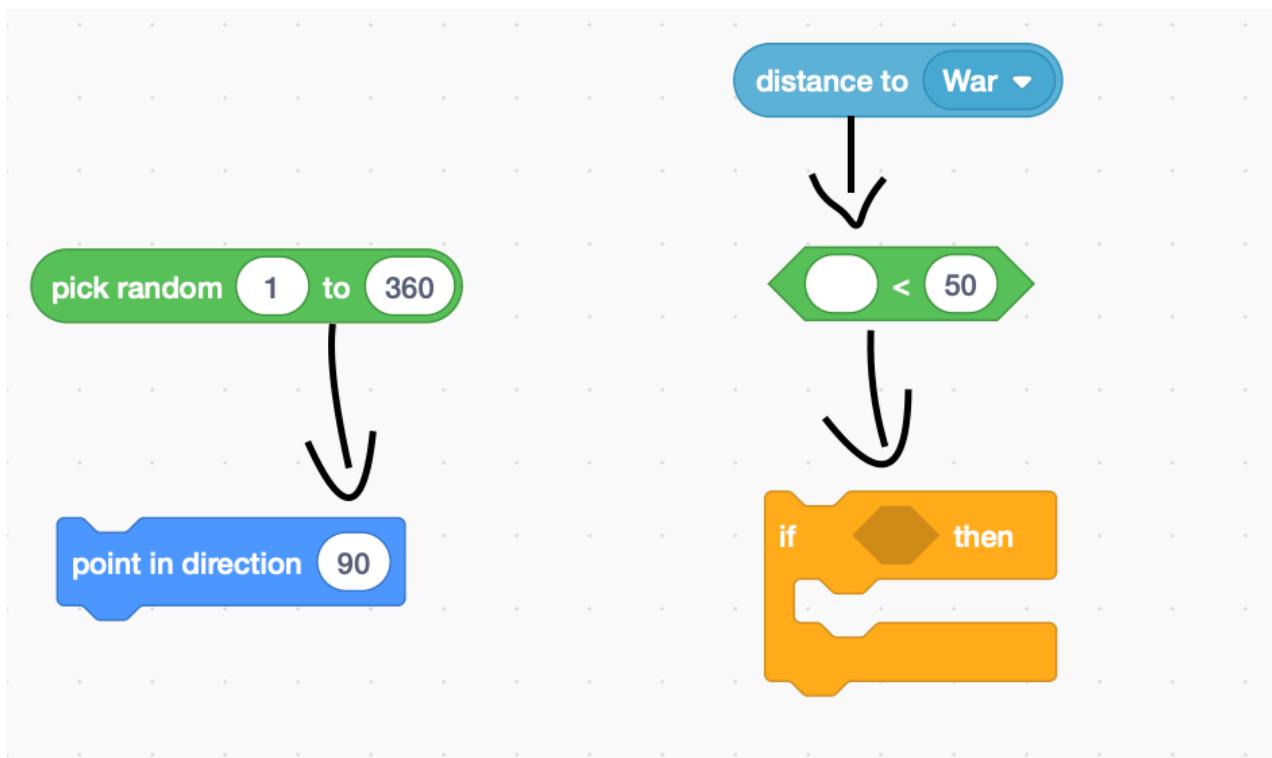


Migration – Move from War

Find these blocks to code the movement of people away from war.

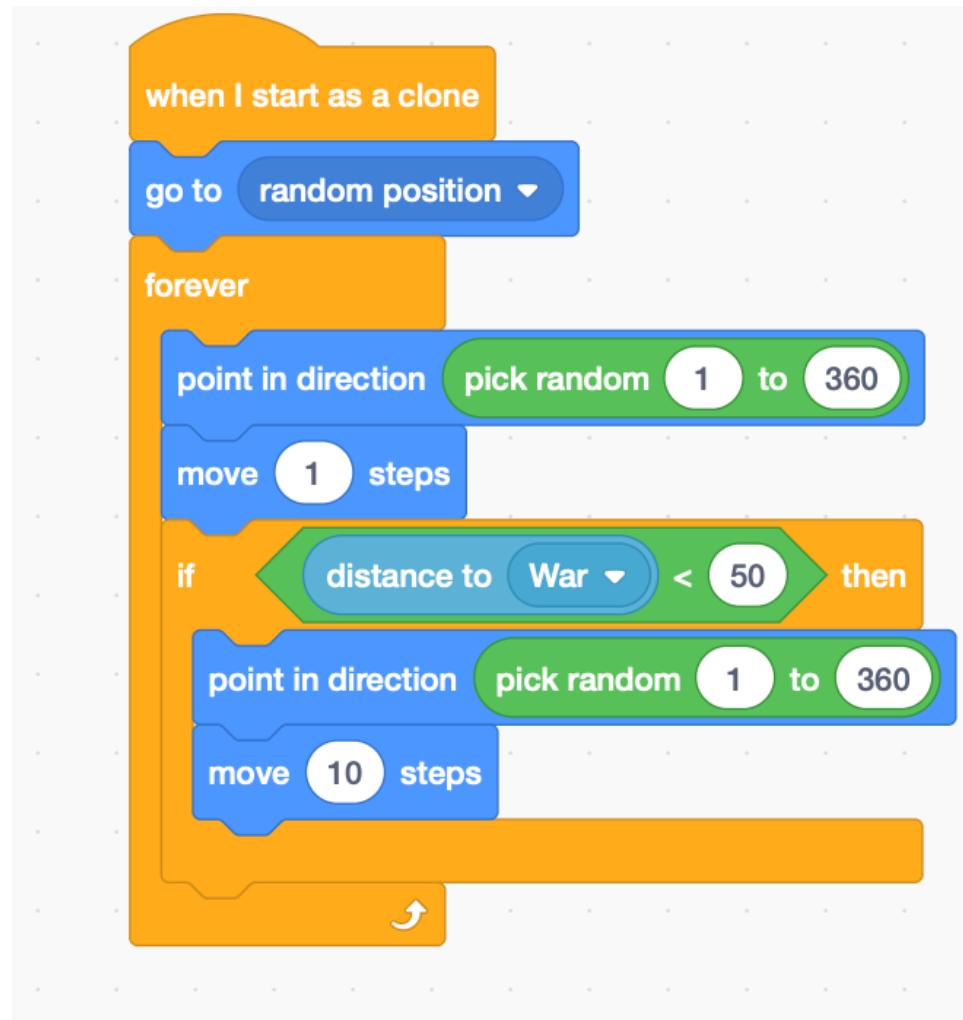


Migration – Move from War



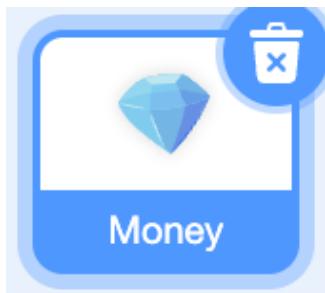
Migration – Move from War

Assemble these blocks in this order to code the movement away from war.



Migration - Money

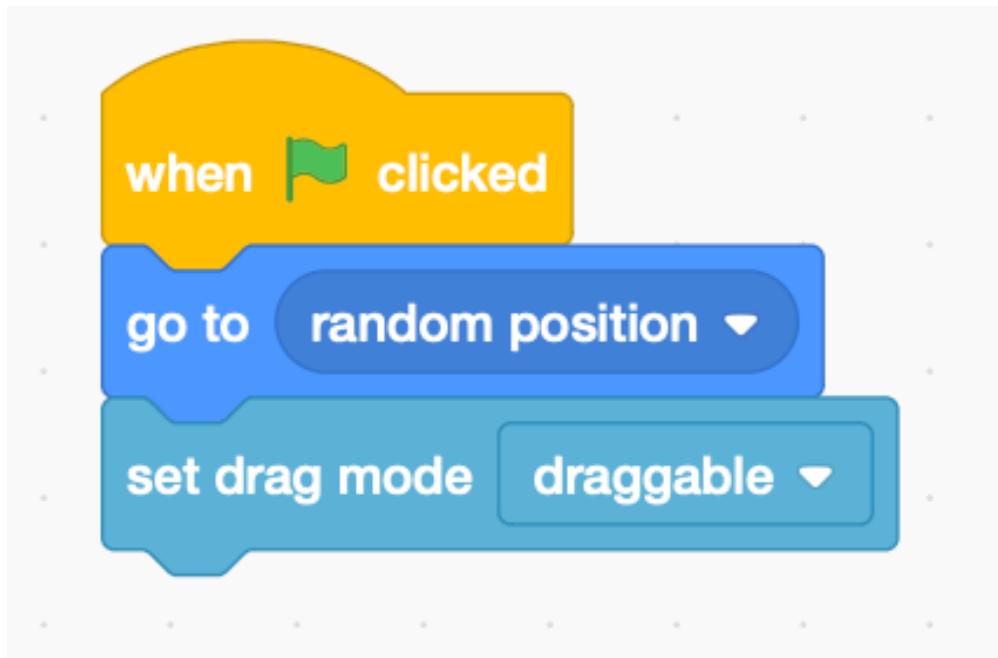
Create a new Sprite for money
(i.e. cities)



Find these blocks to code the money.



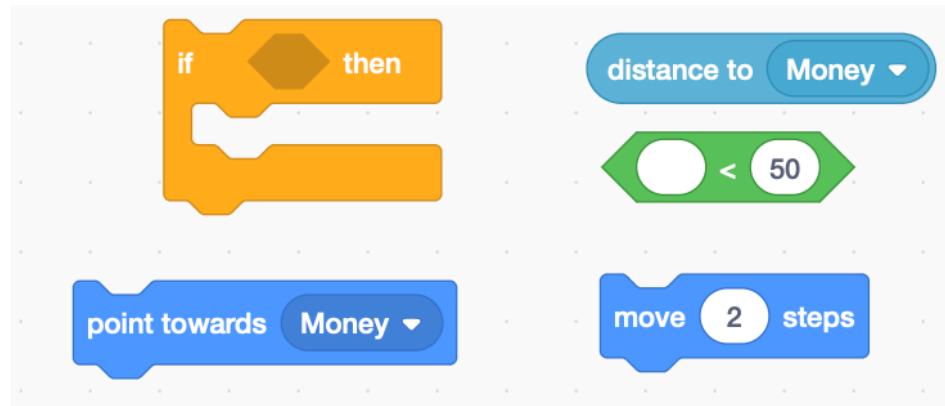
Migration - Money



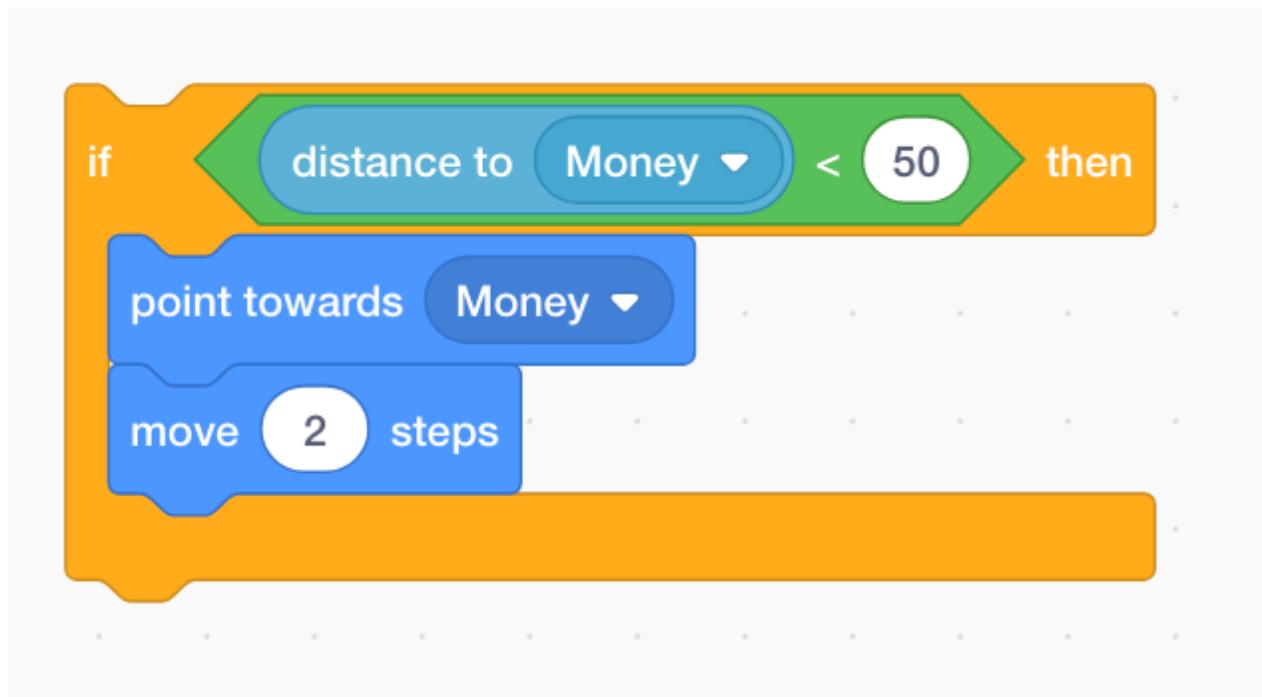
Migration – Move to Money



Find these blocks to code the movement of people toward money.

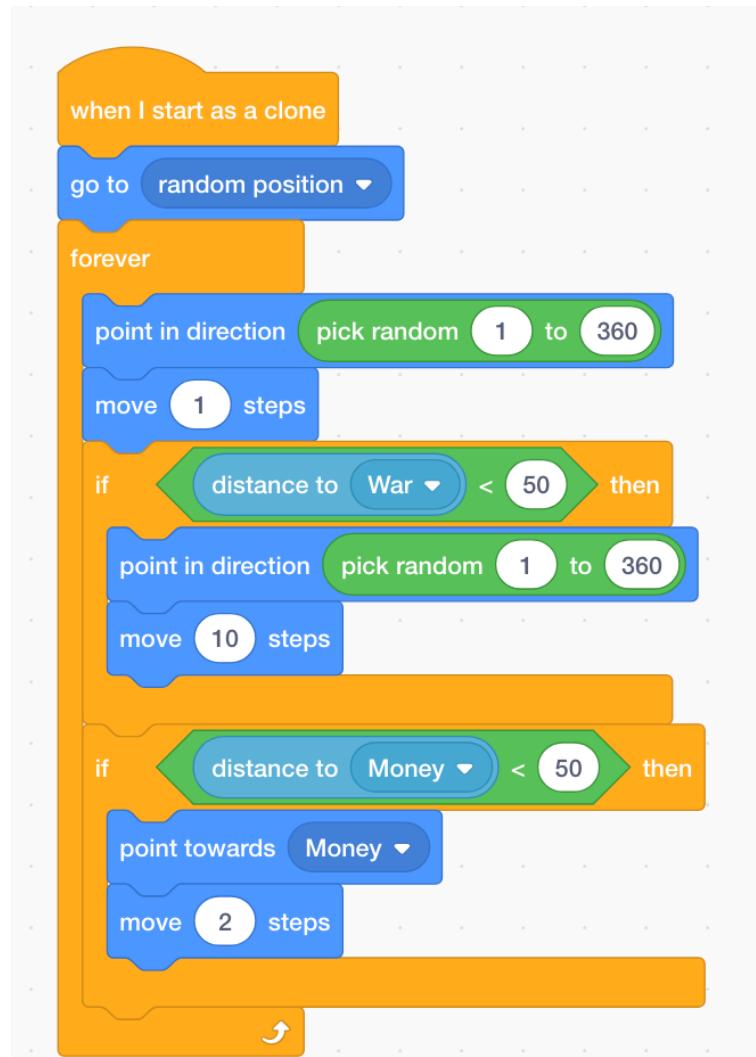
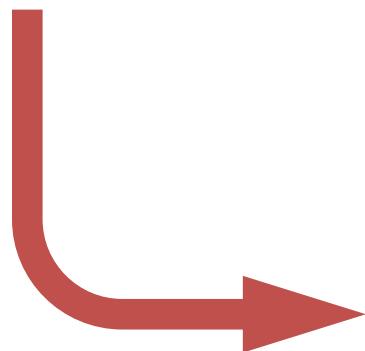


Migration – Move to Money



Migration – Move to Money

Add these blocks to the code built for moving away from war to code the movement toward money.



```
when I start as a clone
  go to [random position v]
  forever
    point in direction [pick random 1 to 360 v]
    move [1] steps
    if [distance to War < 50] then
      point in direction [pick random 1 to 360 v]
      move [10] steps
    if [distance to Money < 50] then
      point towards Money
      move [2] steps
  end
end
```

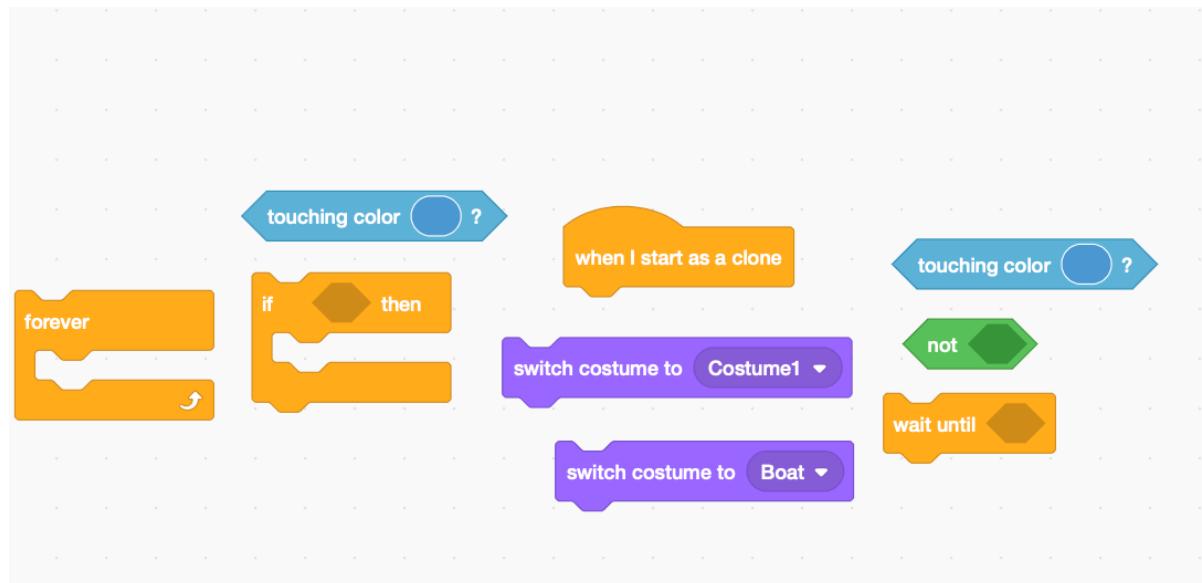
Migration - Boat Travel



Create a new costume for the people sprite when on water.

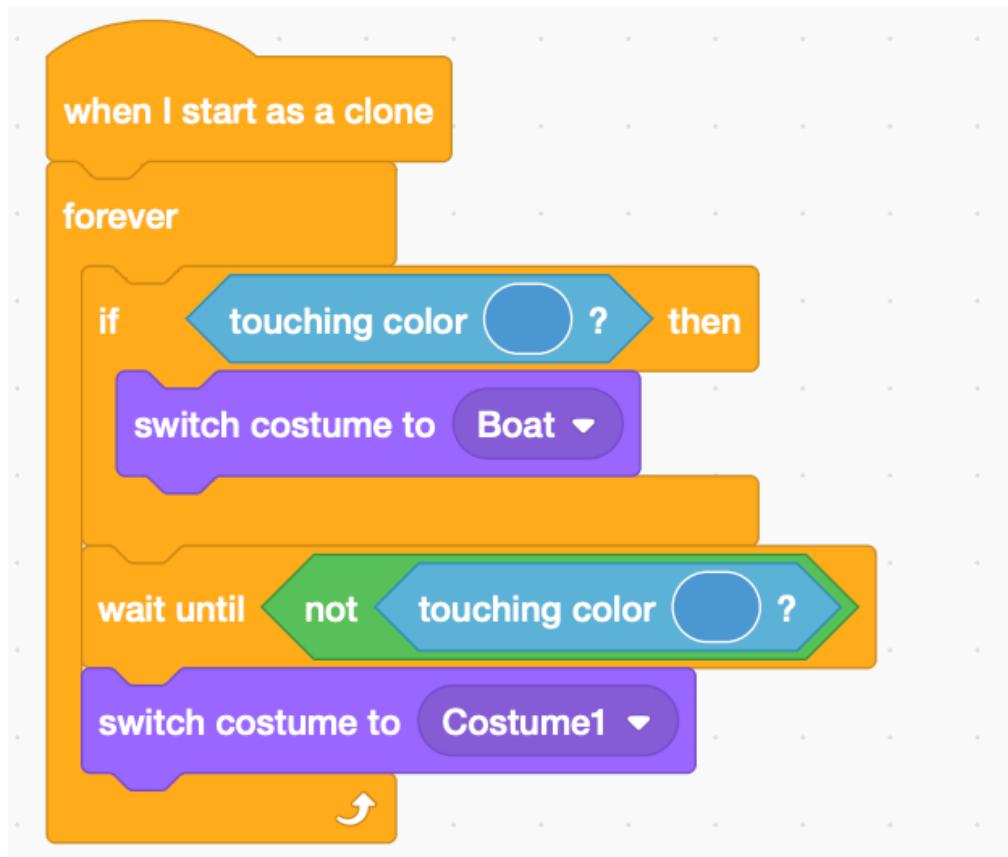


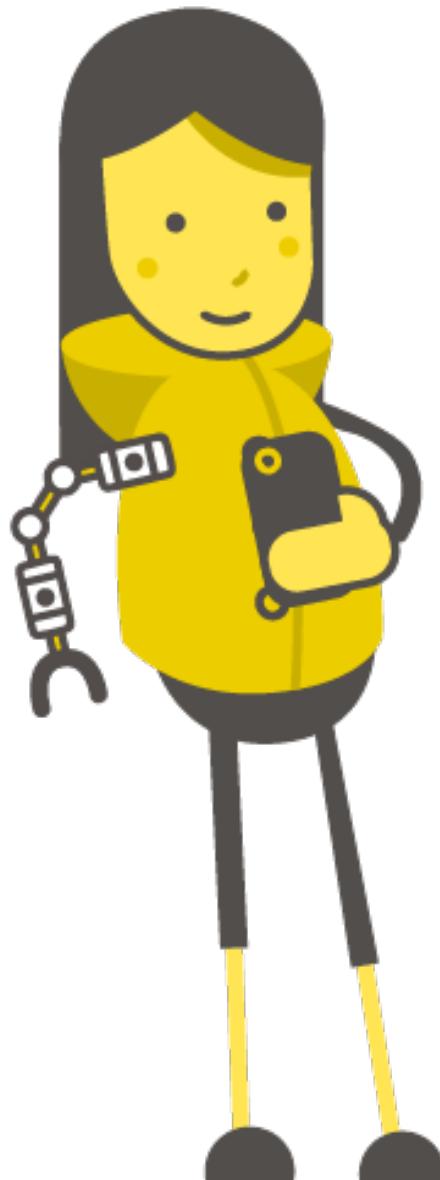
Find these blocks to code the costume change on water.



Migration - Boat Travel

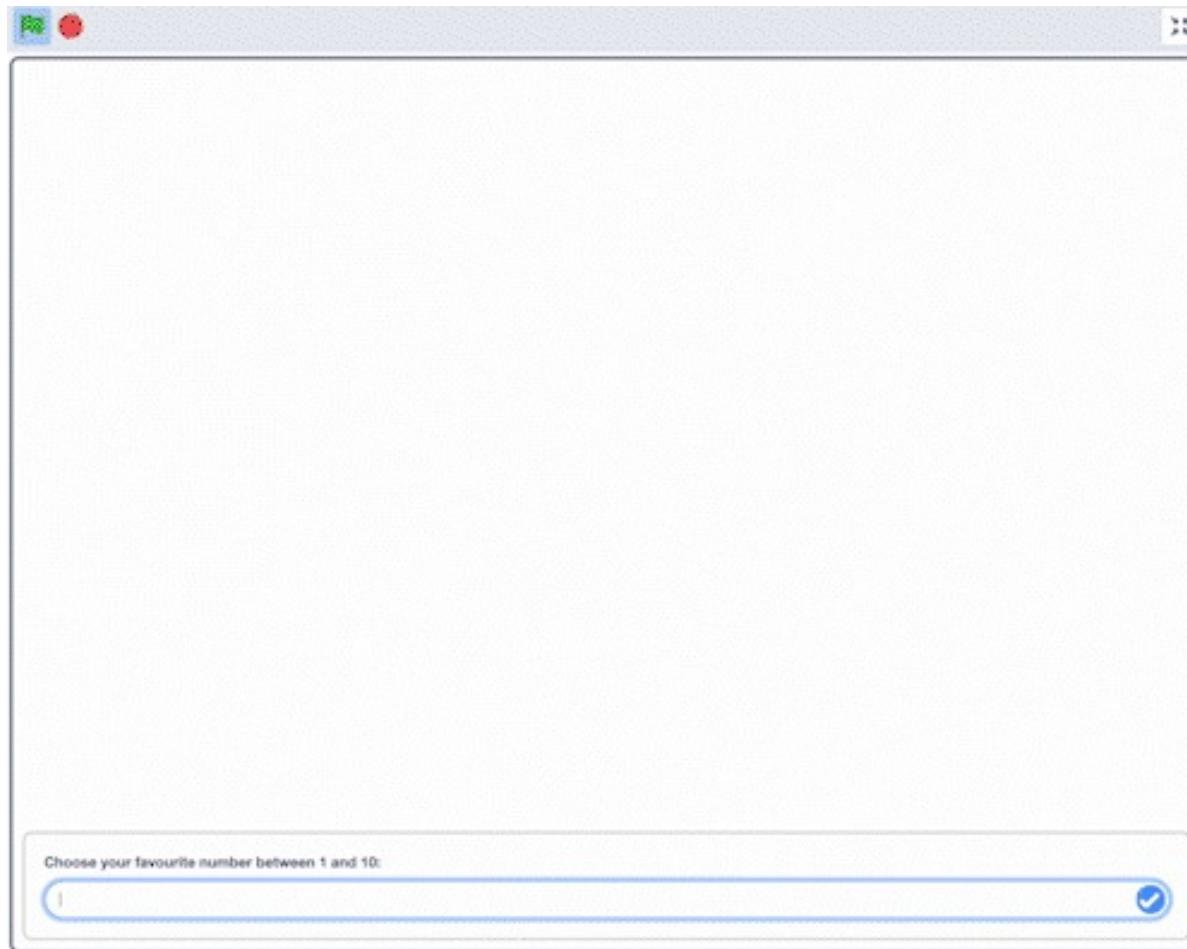
Assemble these blocks in this order to code for the costume change to boats on water.



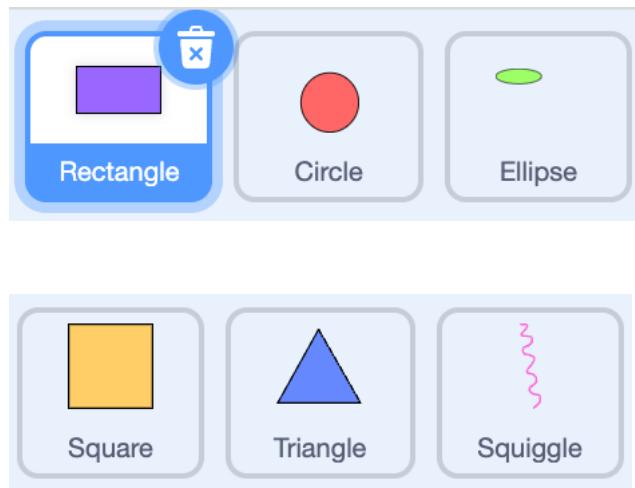


Algorithm Art - Scratch

Algorithm Art



Algorithm Art



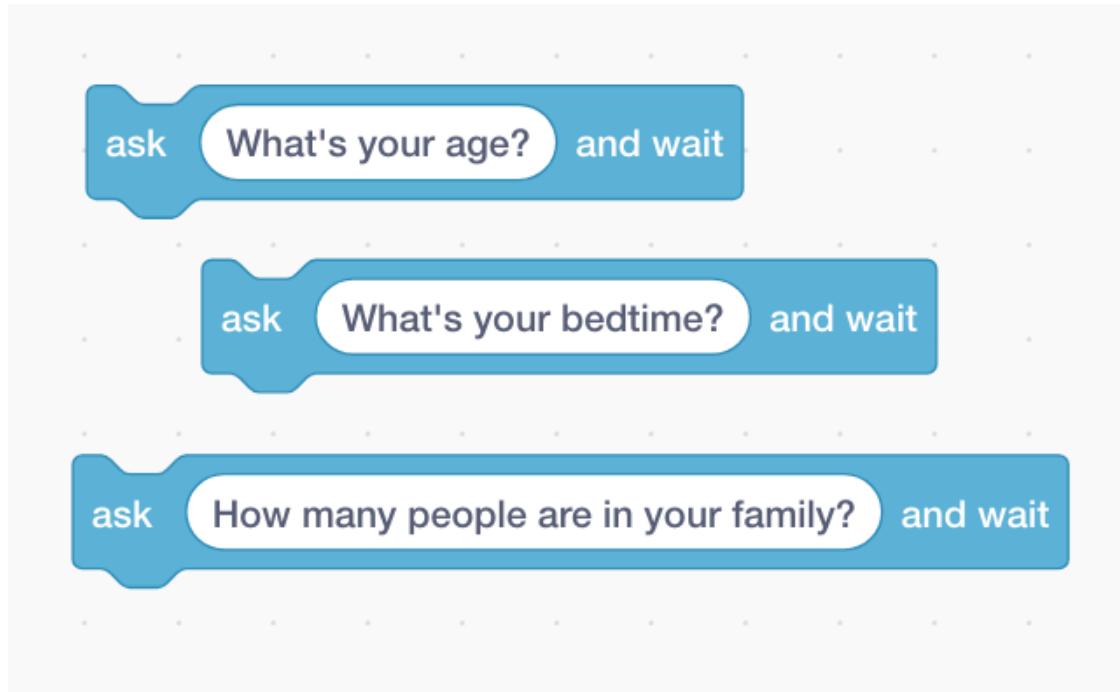
Create sprites of various shapes.

The size and colour of these will be altered by the algorithm to add diversity, so only distinctly different shapes are needed.

The same code will be copied into each shape.

Algorithm Art - Questions

Produce 3 questions to give number values, these will be used to create our art:



Algorithm Art- Variables



Make four new variables to begin. These will be user inputs to create the art, name them appropriately:

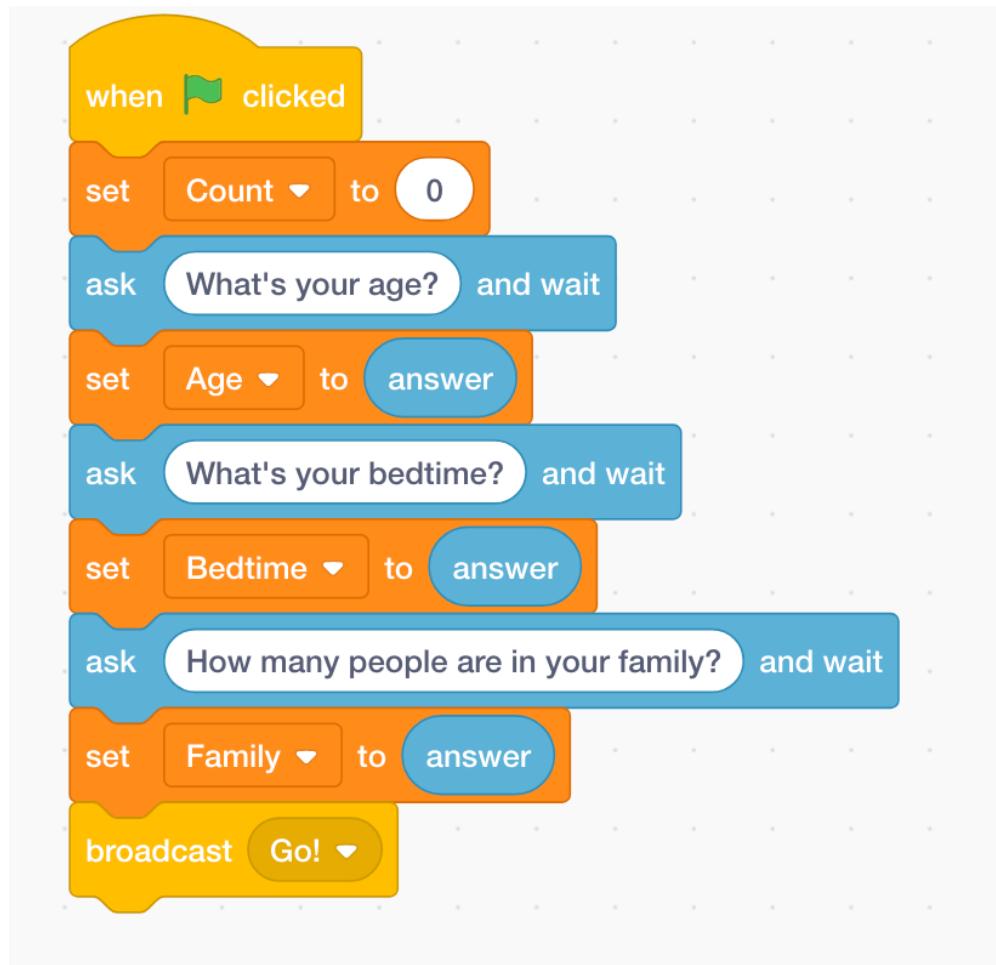
**count, answer 1,
answer 2 and
answer 3**

**These could be
Age, Bedtime
and Family**

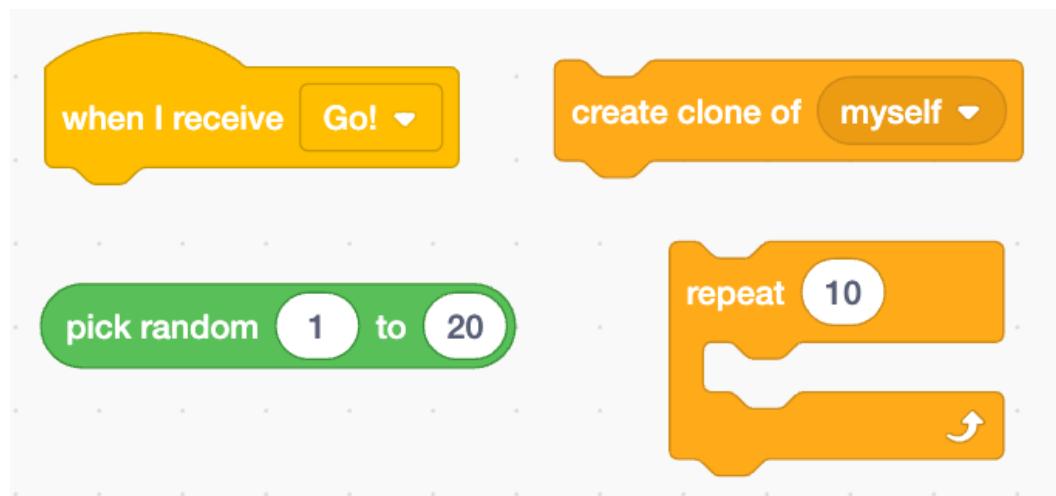
Algorithm Art – Answers



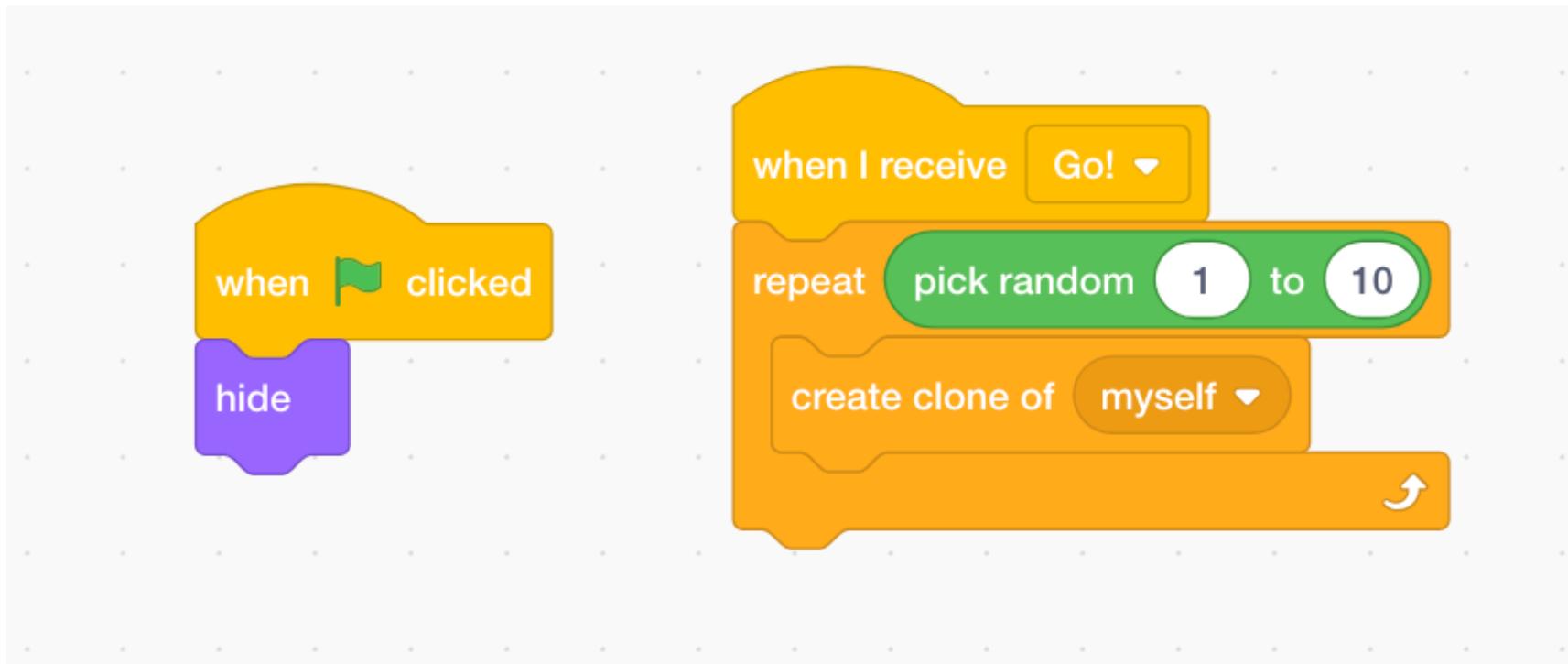
Algorithm Art – Question/Answer



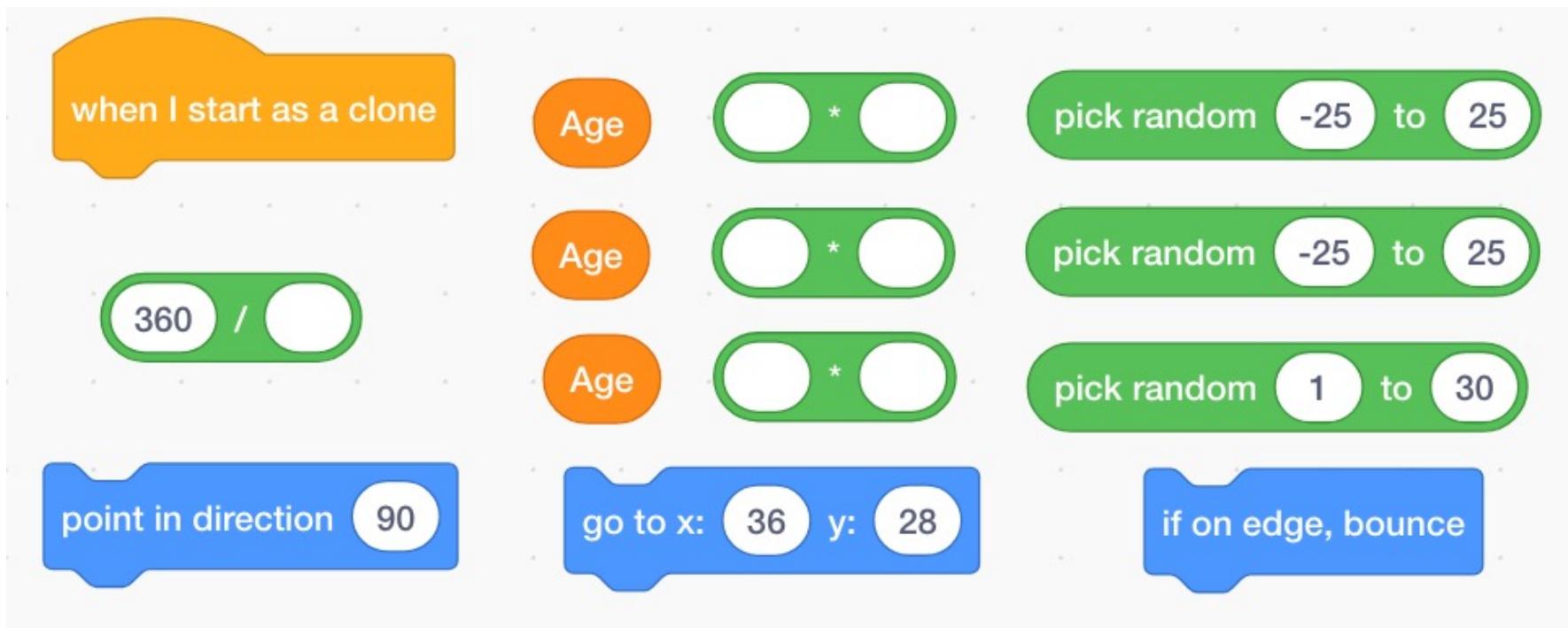
Algorithm Art – Start Sprite



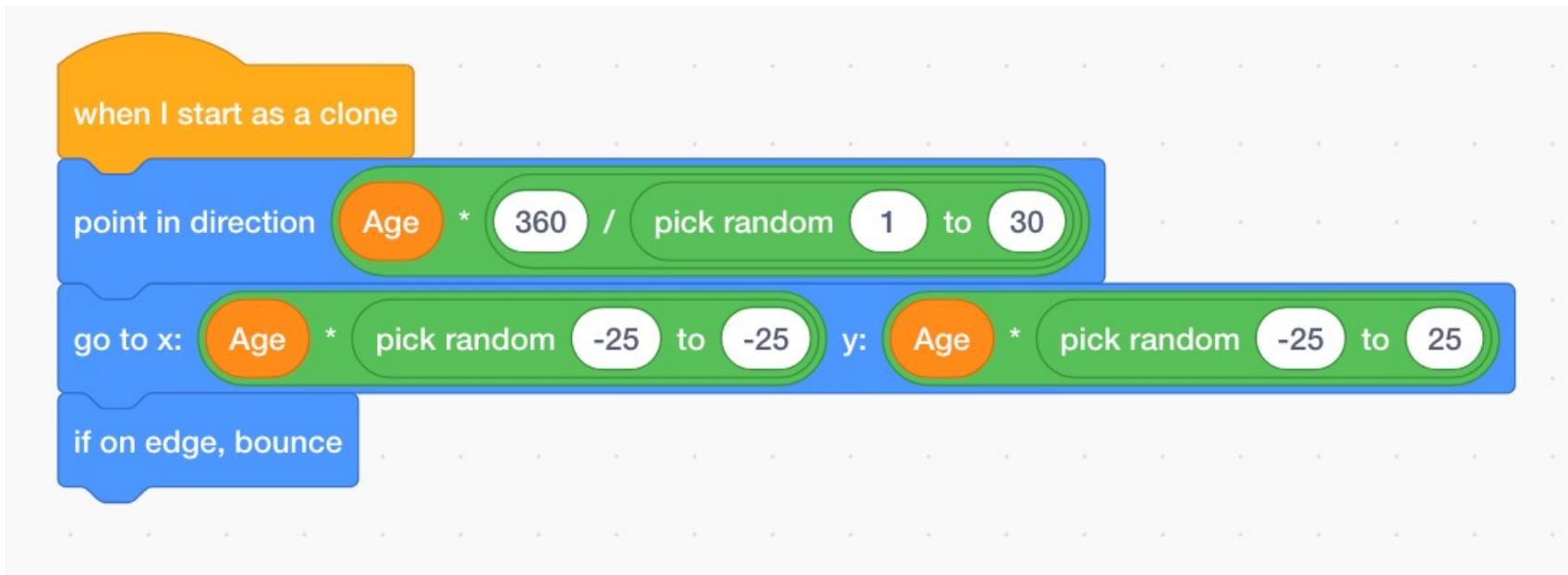
Algorithm Art – Clones



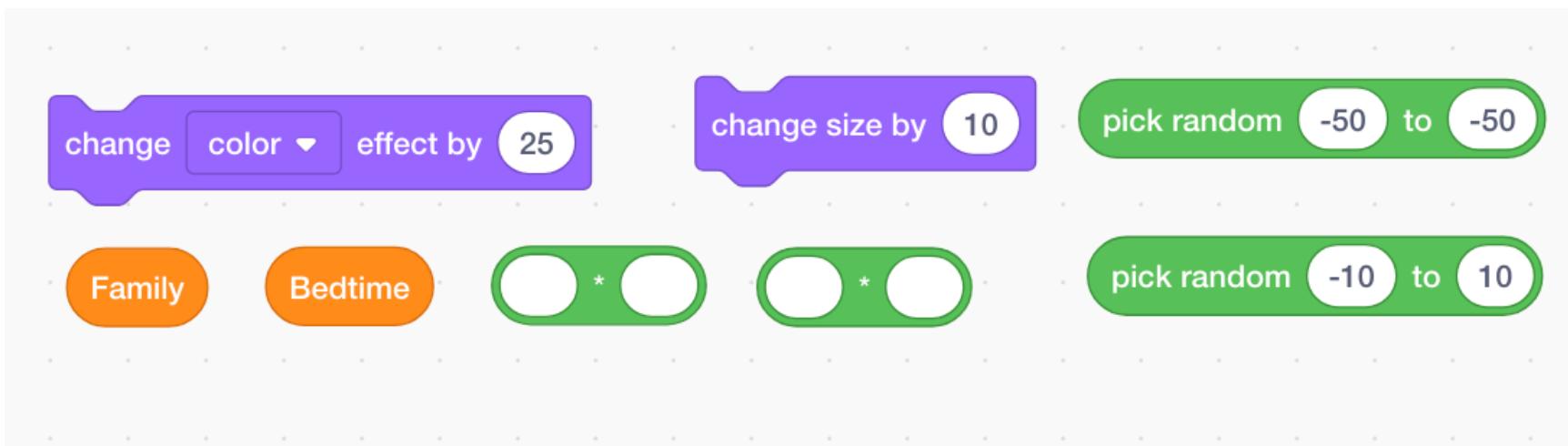
Algorithm Art – Position



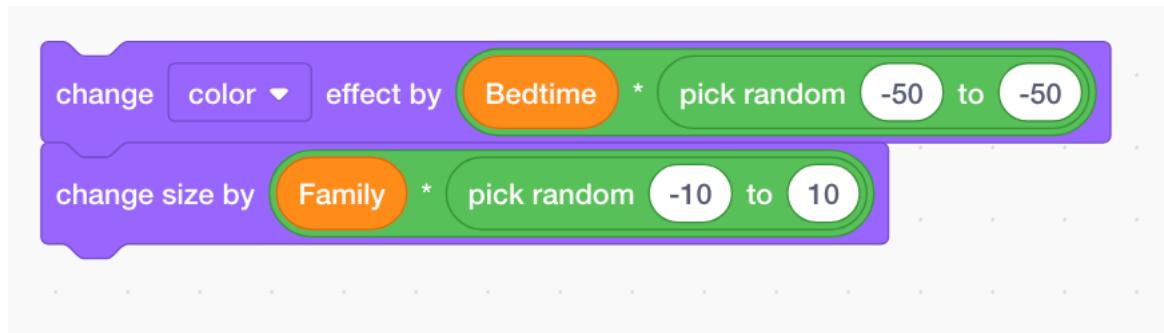
Algorithm Art – Position



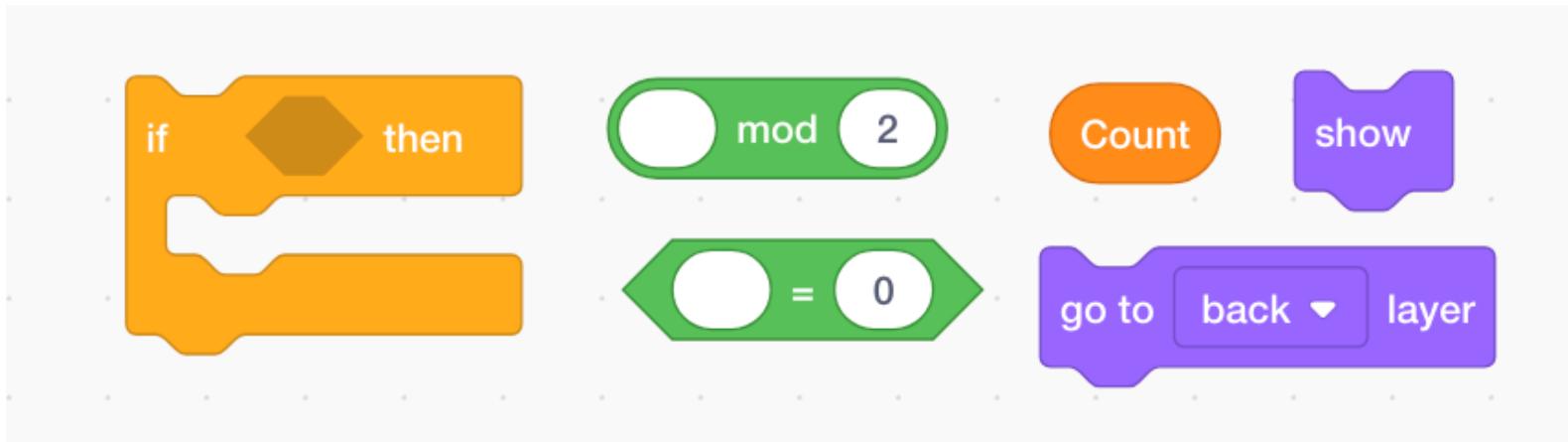
Algorithm Art – Colour and Size



Algorithm Art – Colour and Size

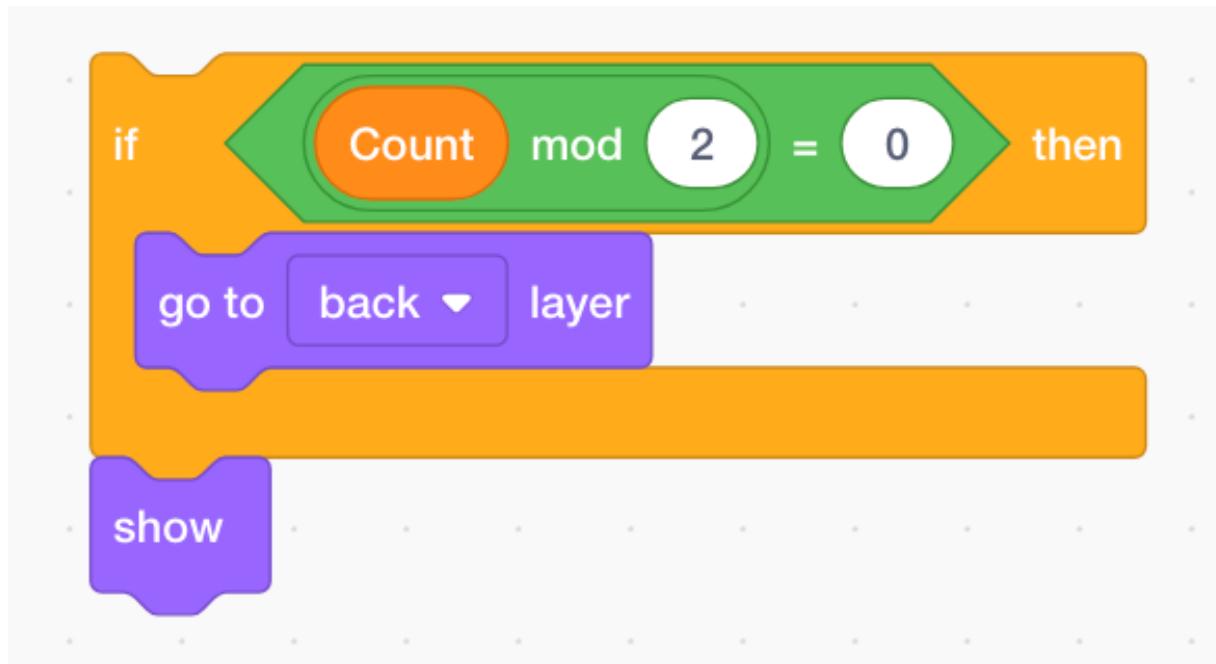


Algorithm Art – Layers

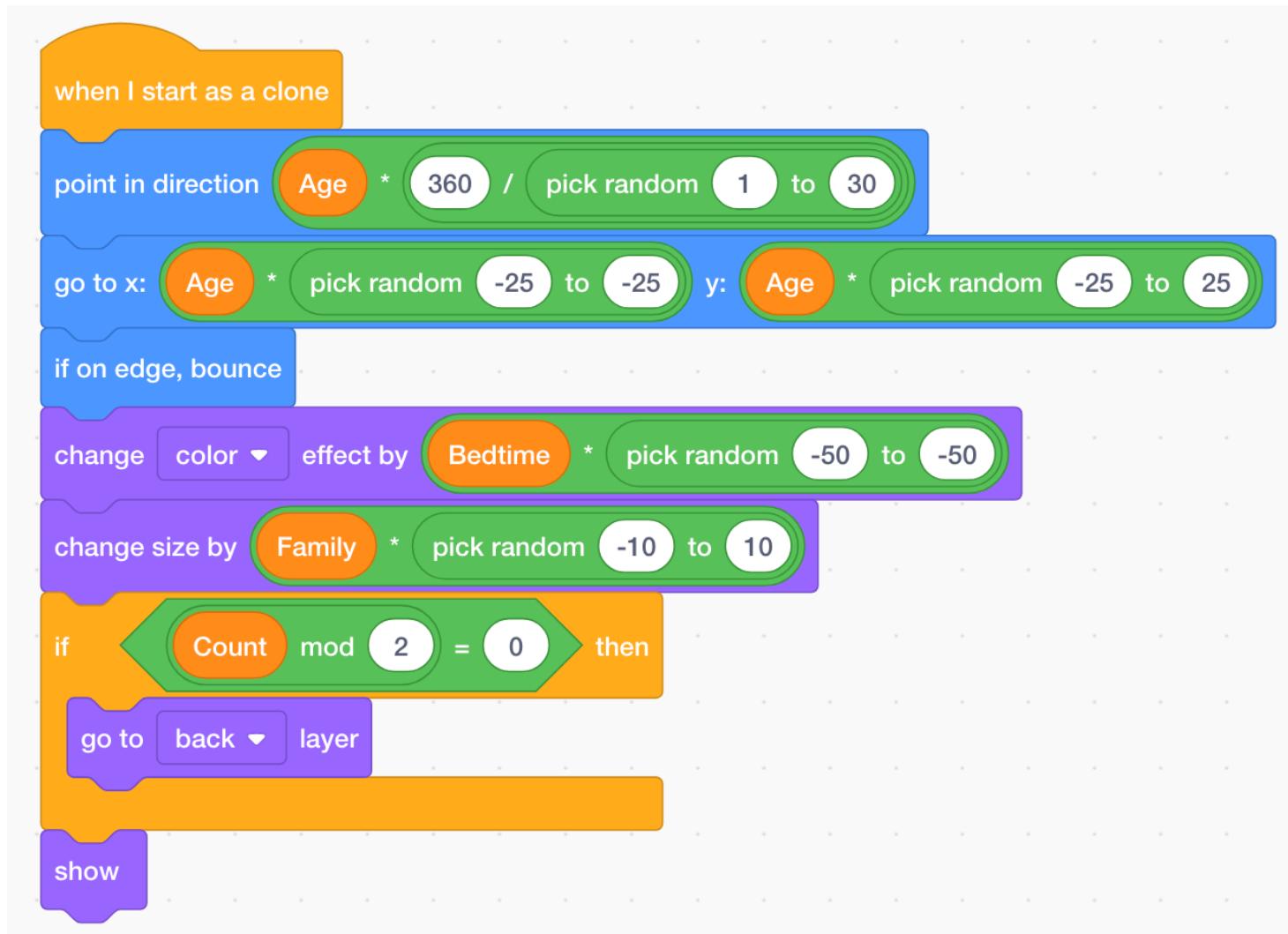


Mae'r bloc "mod 2" yn dychwelyd y gweddill sydd ar ol wrth i'r mewnbwn cael ei rhanu gyda 2. Hynny yw, os nad oes gweddill, mae'r rhif mewnbwn yn eilrif.

Algorithm Art – Layers



Algorithm Art – Full Clone Code



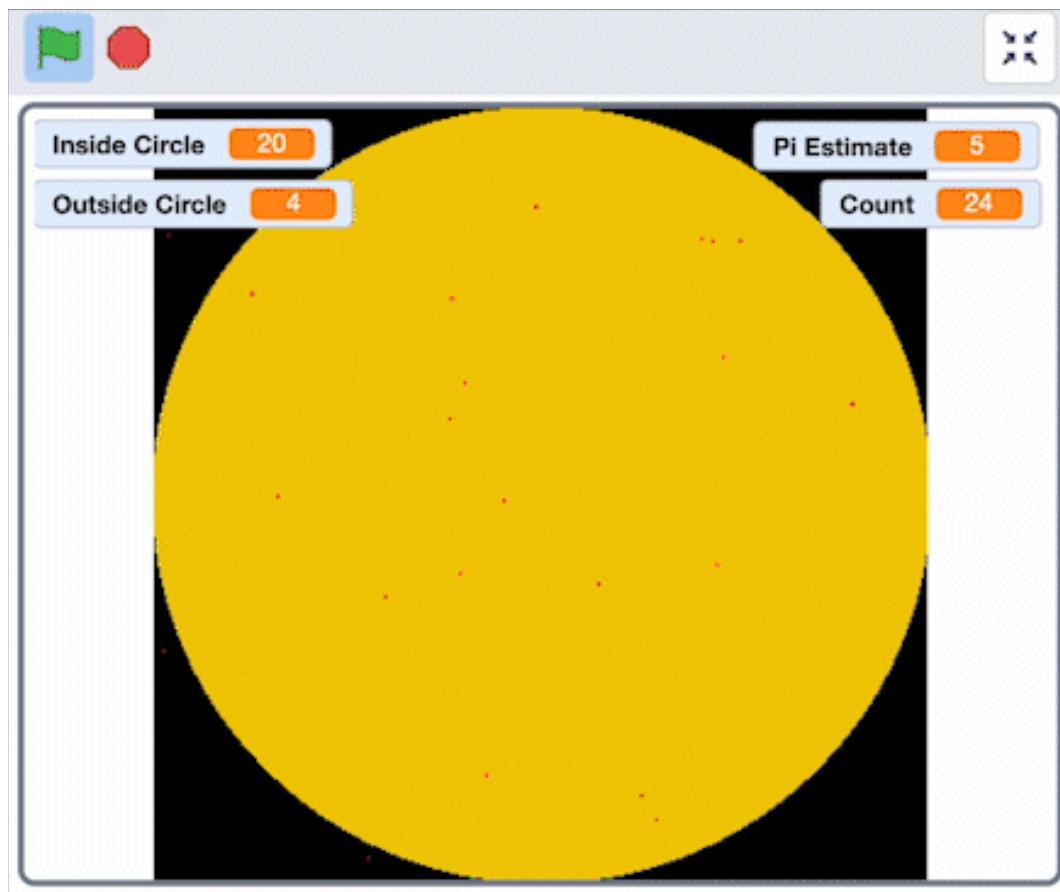
A Scratch script consisting of the following blocks:

- when I start as a clone
- point in direction $(\text{Age} * 360) / \text{pick random } 1 \text{ to } 30$
- go to x: $\text{Age} * \text{pick random } -25 \text{ to } -25$ y: $\text{Age} * \text{pick random } -25 \text{ to } 25$
- if on edge, bounce
- change color effect by $\text{Bedtime} * \text{pick random } -50 \text{ to } -50$
- change size by $\text{Family} * \text{pick random } -10 \text{ to } 10$
- if $\text{Count} \text{ mod } 2 = 0$ then
- go to back layer
- show

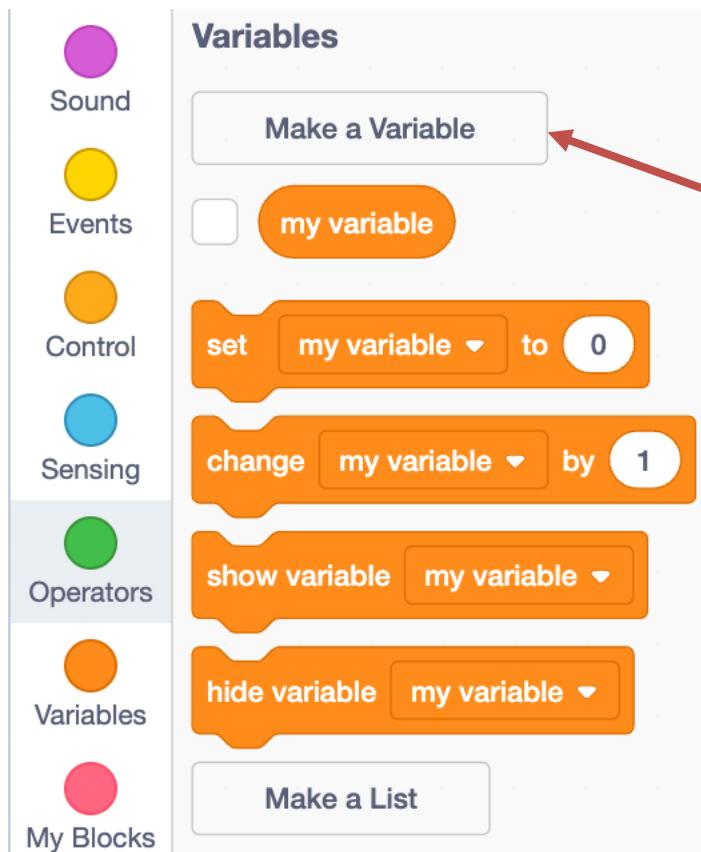
Pi Estimation - Scratch



Pi Estimation



Pi Estimation - Variables

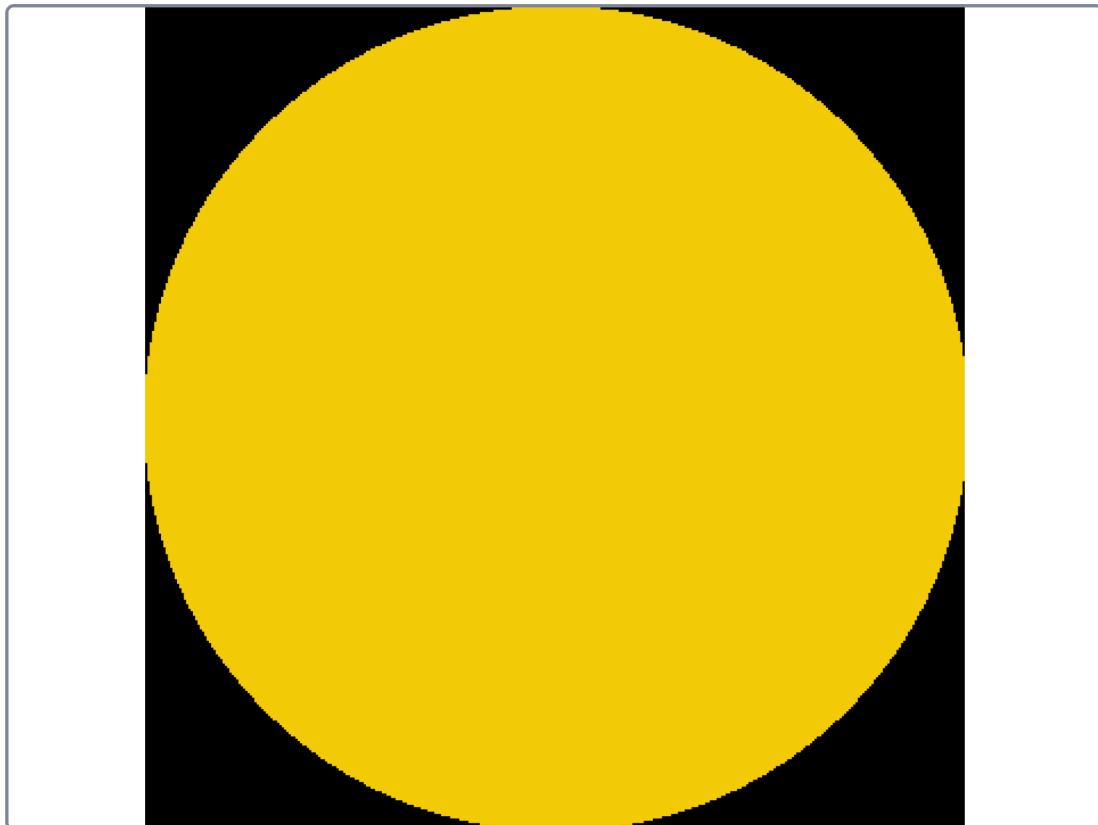


Make three new variables called:

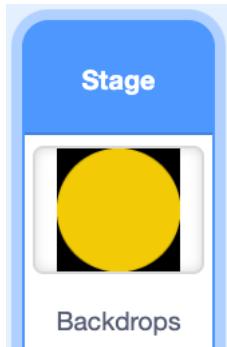
inside circle,
outside circle
 and **pi estimate**

Pi Estimation - Background

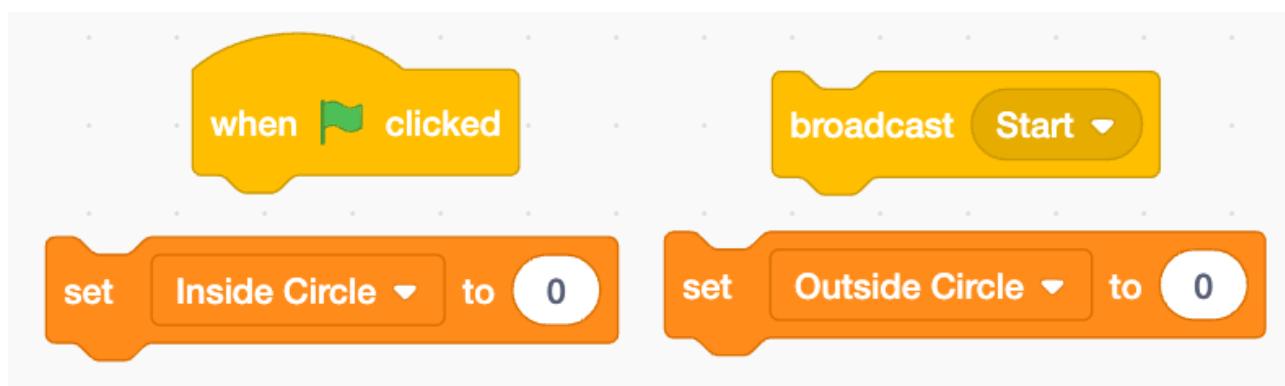
Make a background
of a square with a
circle of equal
diameter inside.



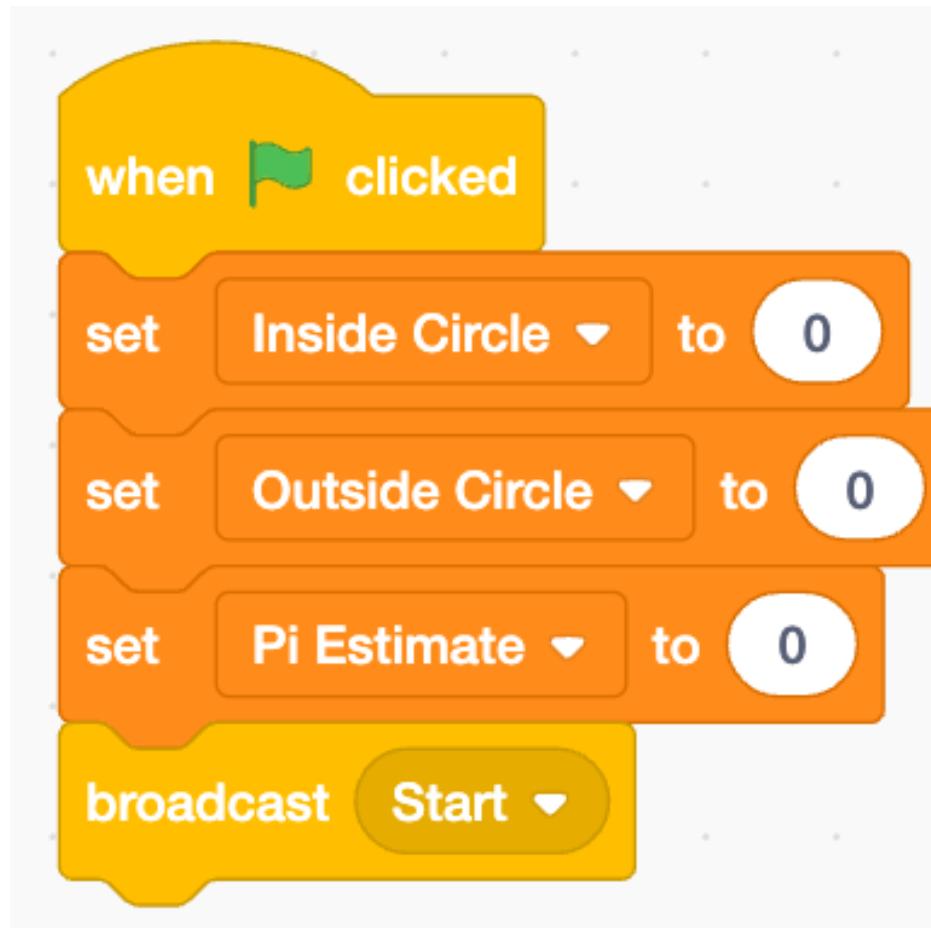
Pi Estimation - Background



Find these blocks to code the starting conditions.



Pi Estimation - Background

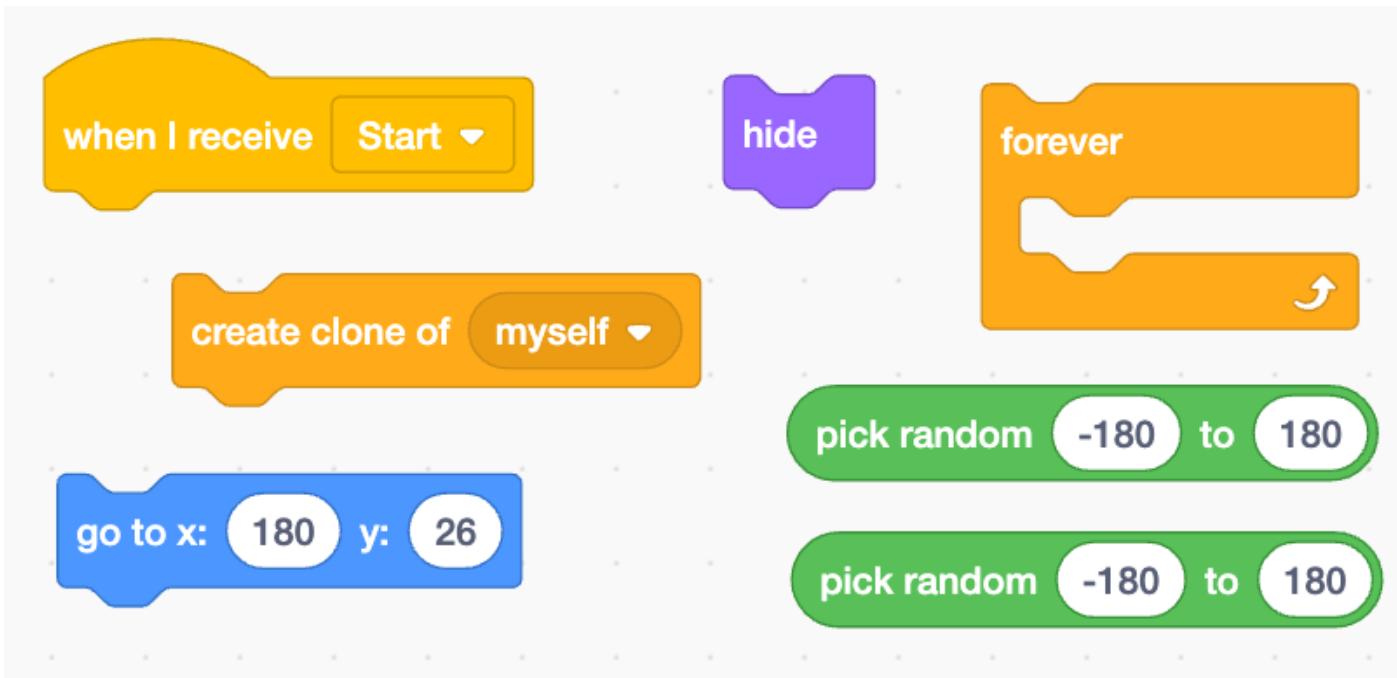


Pi Estimation - Clones

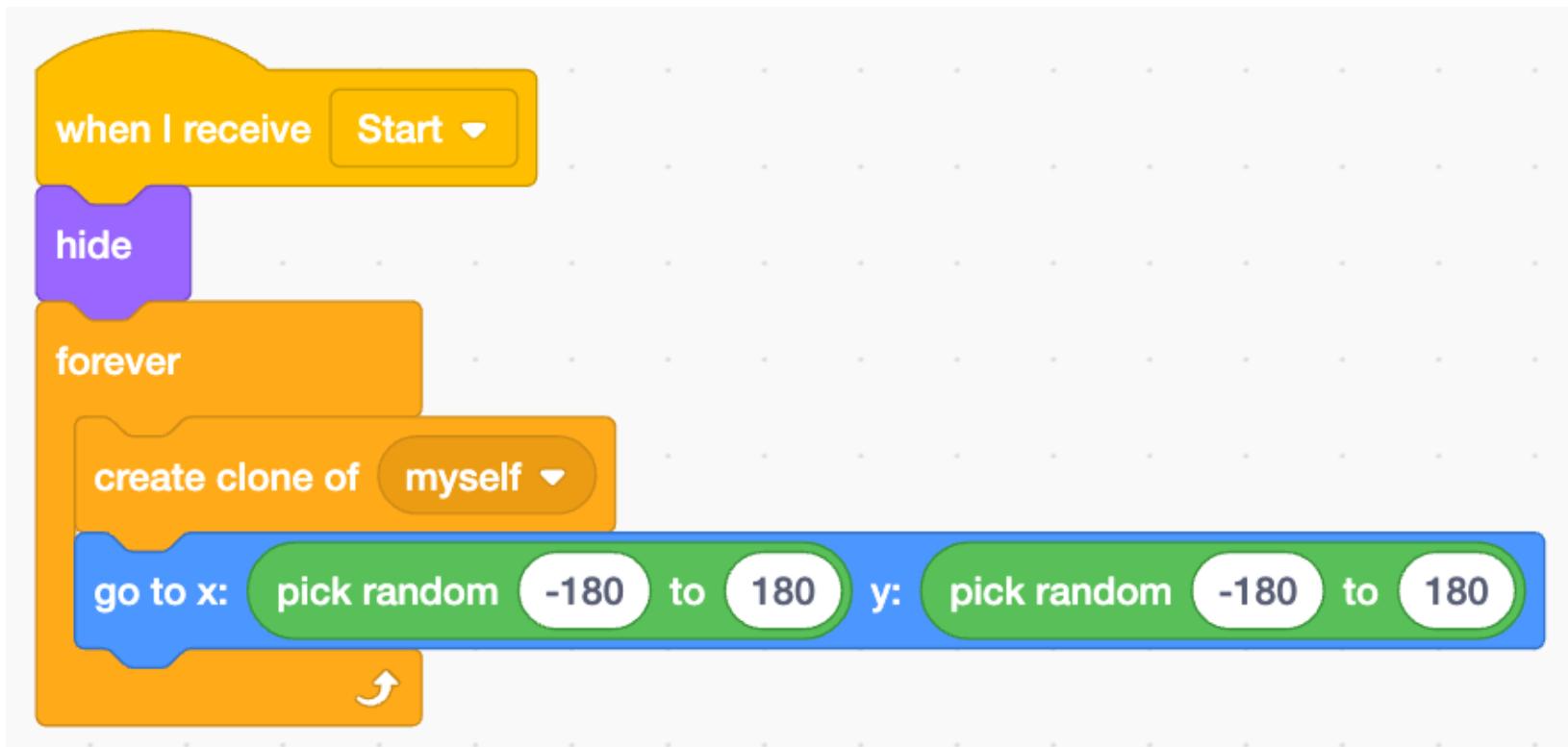


Create a sprite of a very small circle (to minimize its area).

Then find these blocks to code the cloning of this sprite.

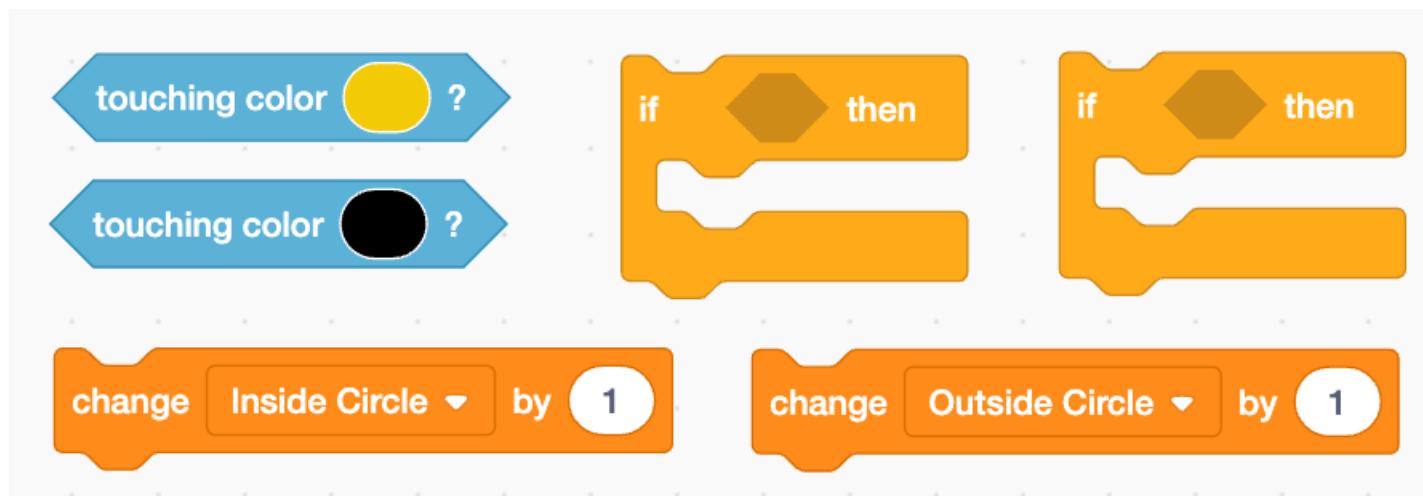


Pi Estimation - Clones

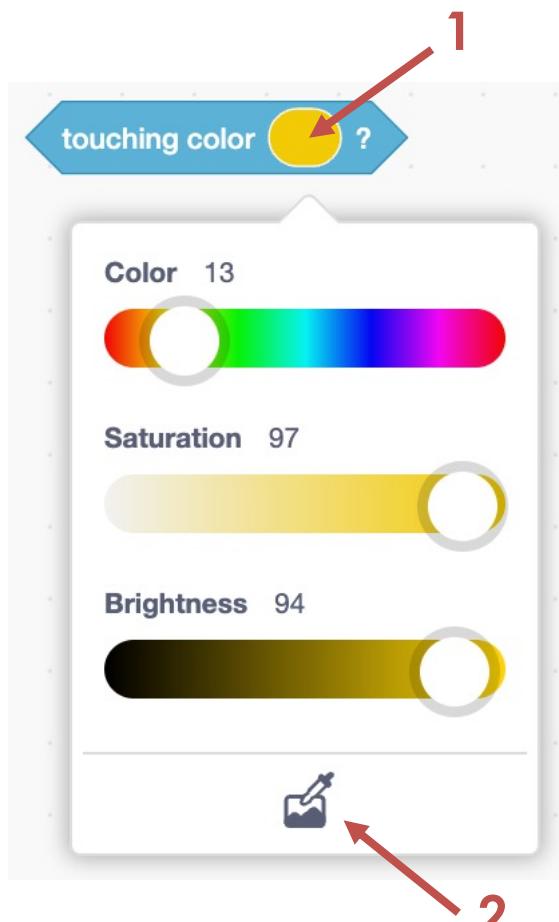


Pi Estimation – Inside/Outside

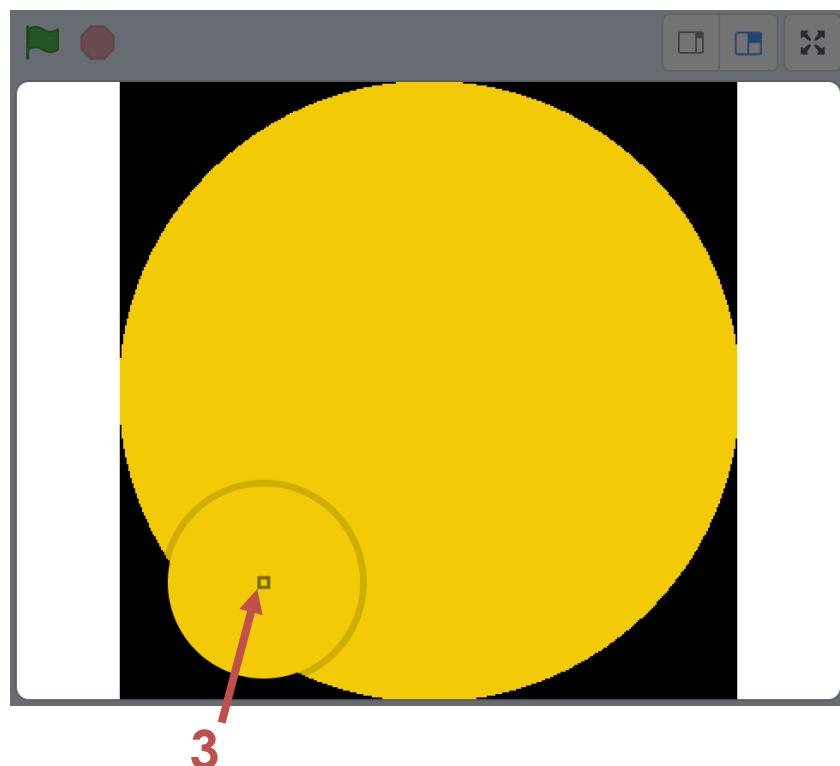
Find these blocks to code the detection of whether the clone landed inside or outside the circle.



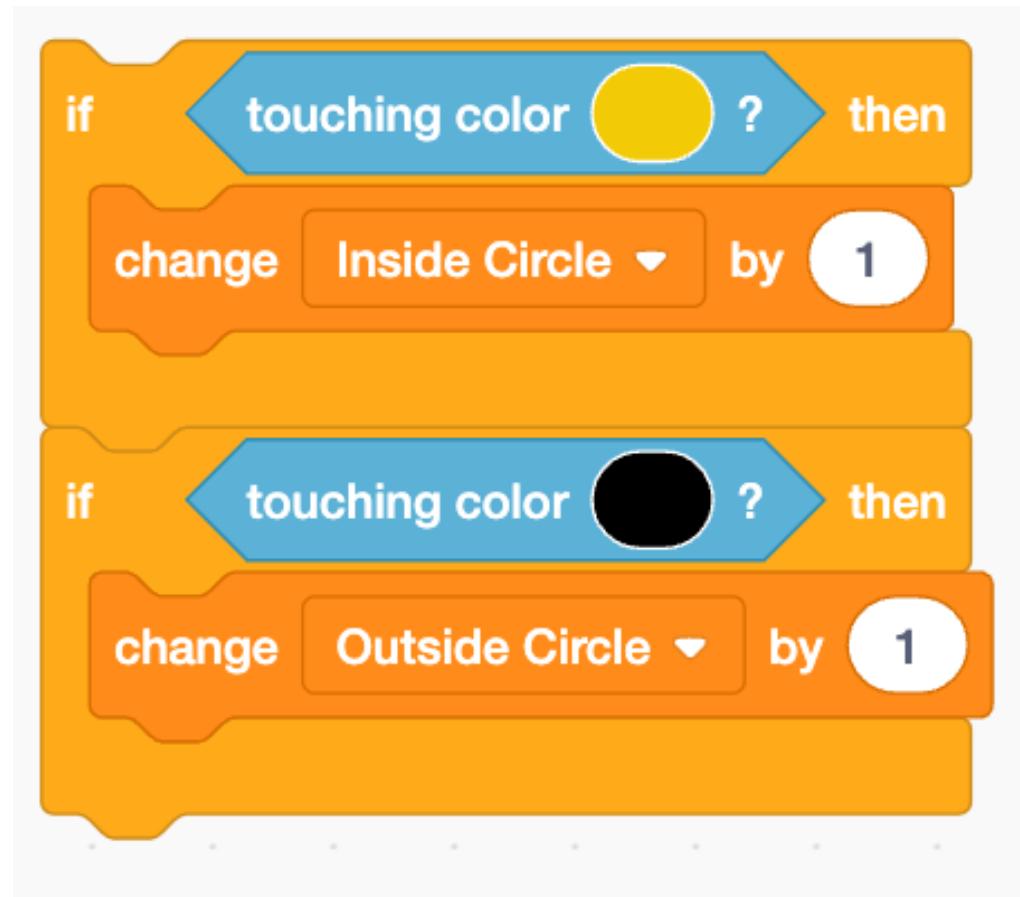
Pi Estimation – Inside/Outside



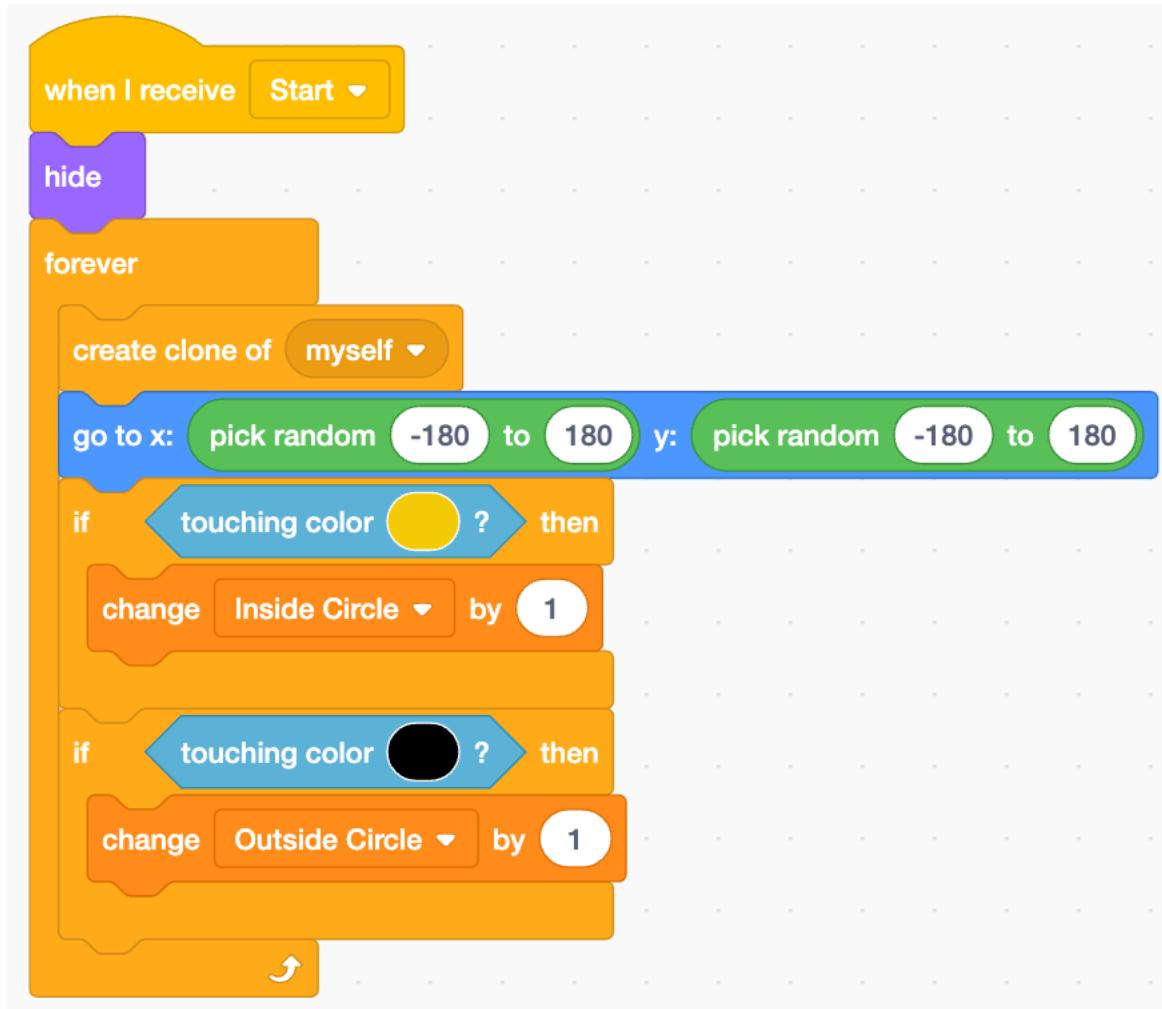
Use the colour picker tool to ensure the right colour.



Pi Estimation – Inside/Outside

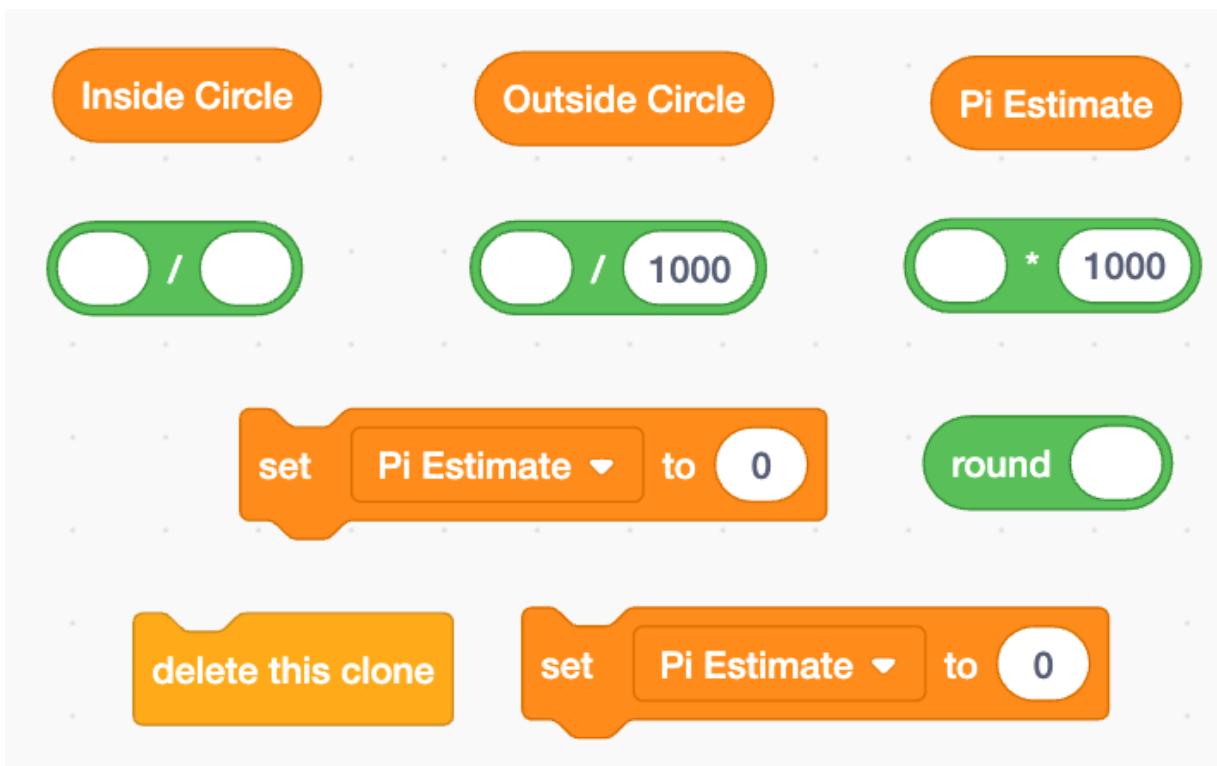


Pi Estimation – Inside/Outside

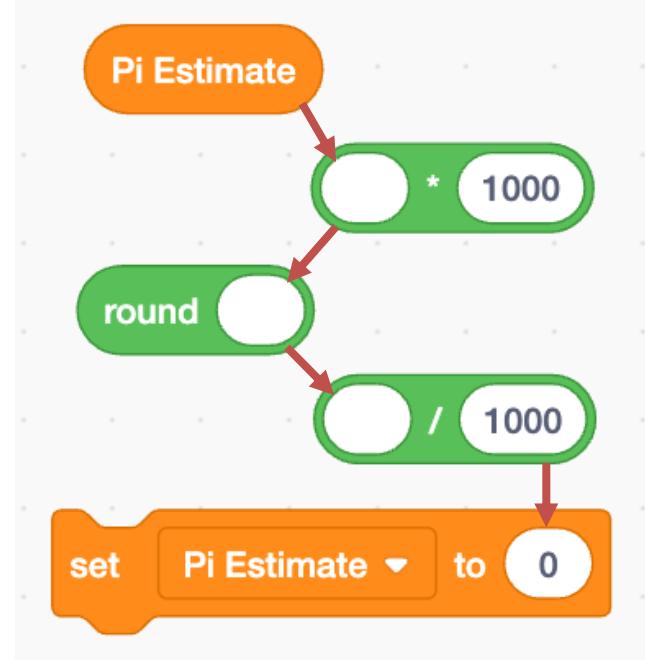
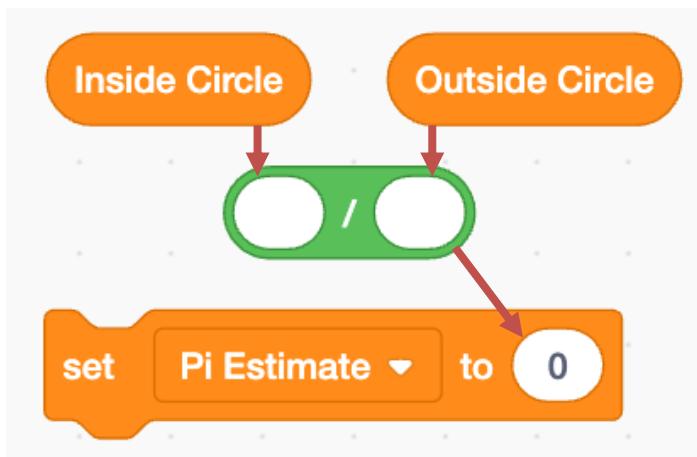


Pi Estimation - Ratio

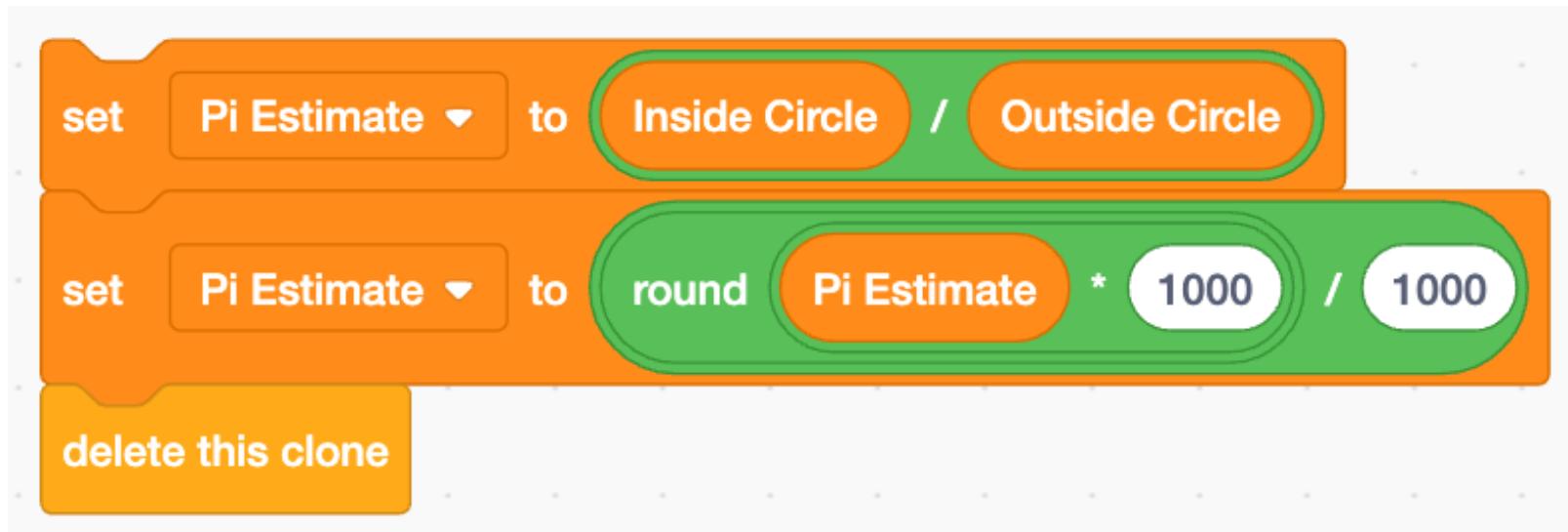
Find these blocks to code the mathematics that will take the ratio of points inside and outside the circle. This ratio can be shown to be equal to pi.



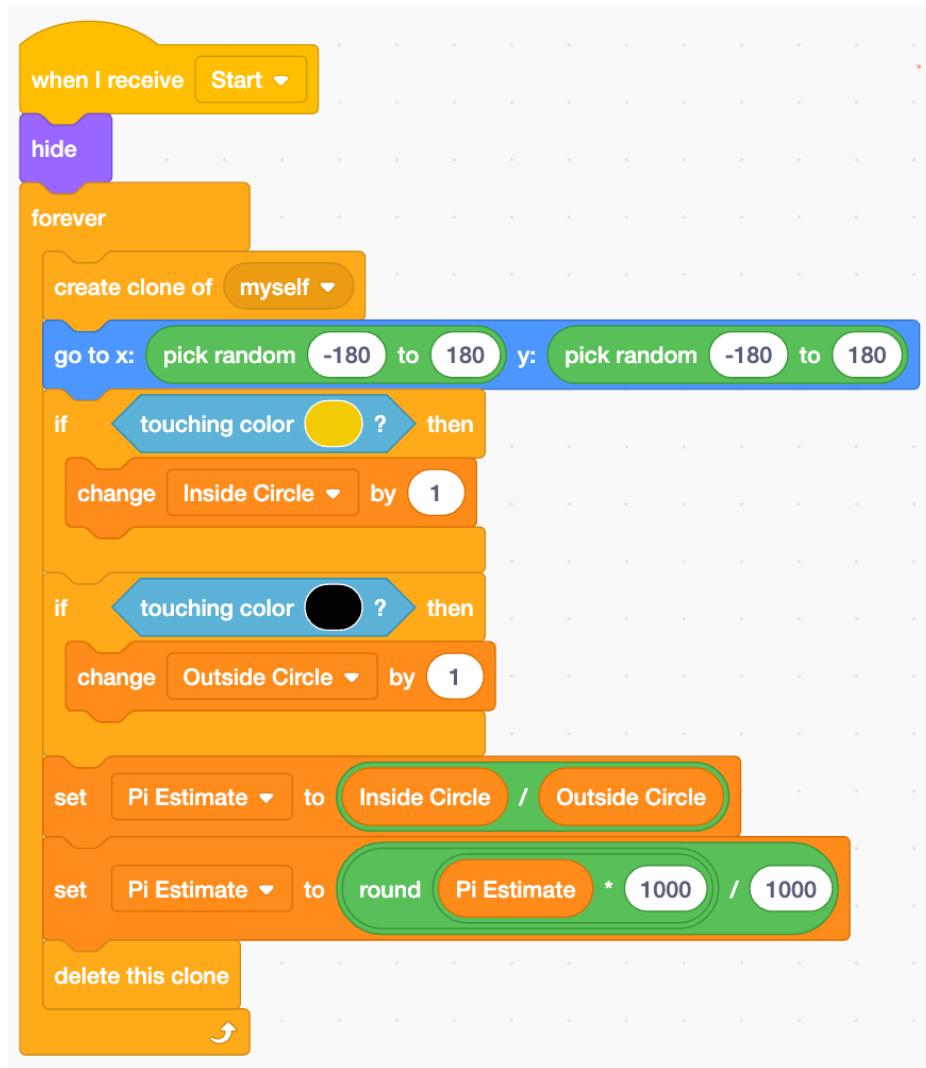
Pi Estimation - Ratio



Pi Estimation - Ratio



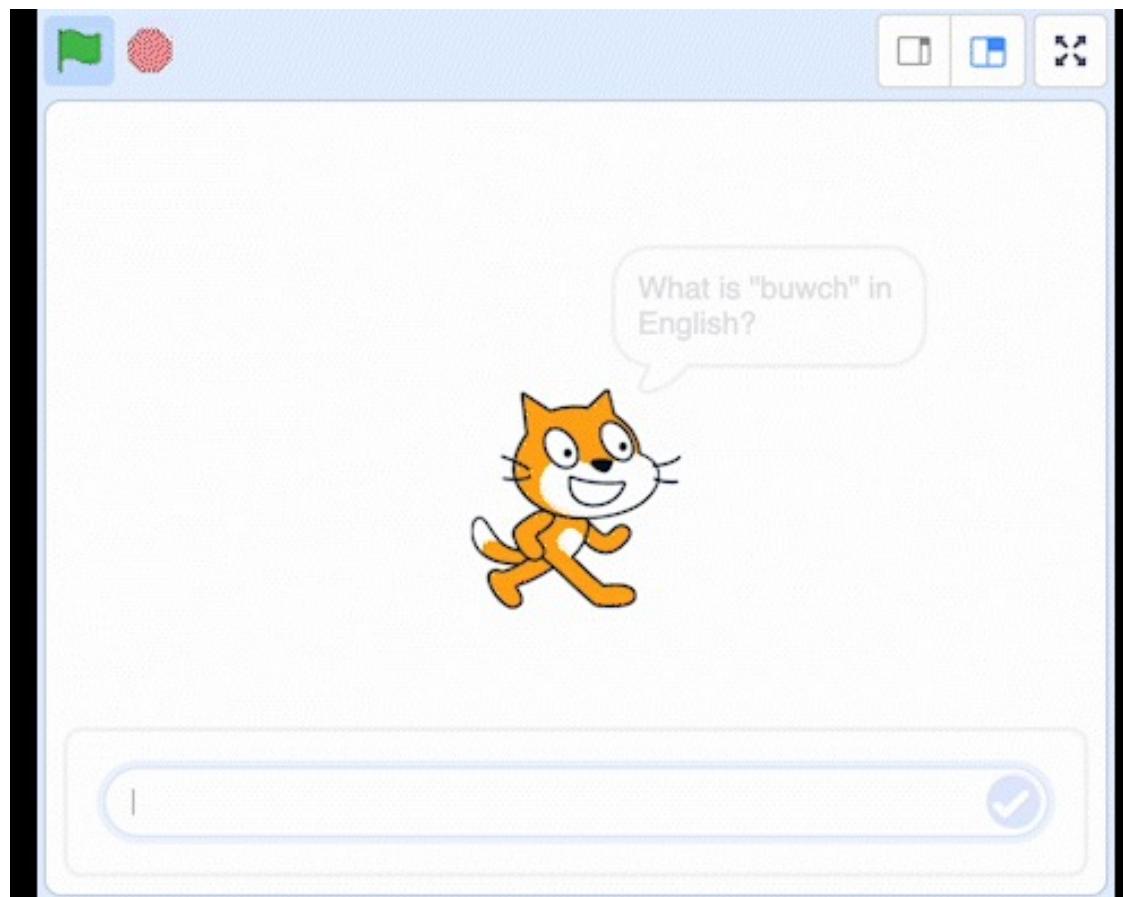
Pi Estimation





Translating Game - Scratch

Translating Game



Translating Game - Variables

Variables

-  Sound
-  Events
-  Control
-  Sensing
-  Operators
-  Variables
-  My Blocks

Make a Variable

my variable

set **my variable** to 0

change **my variable** by 1

show variable **my variable**

hide variable **my variable**

Make a List

Make a new variable called "word"

New Variable

New variable name: word

For all sprites For this sprite only

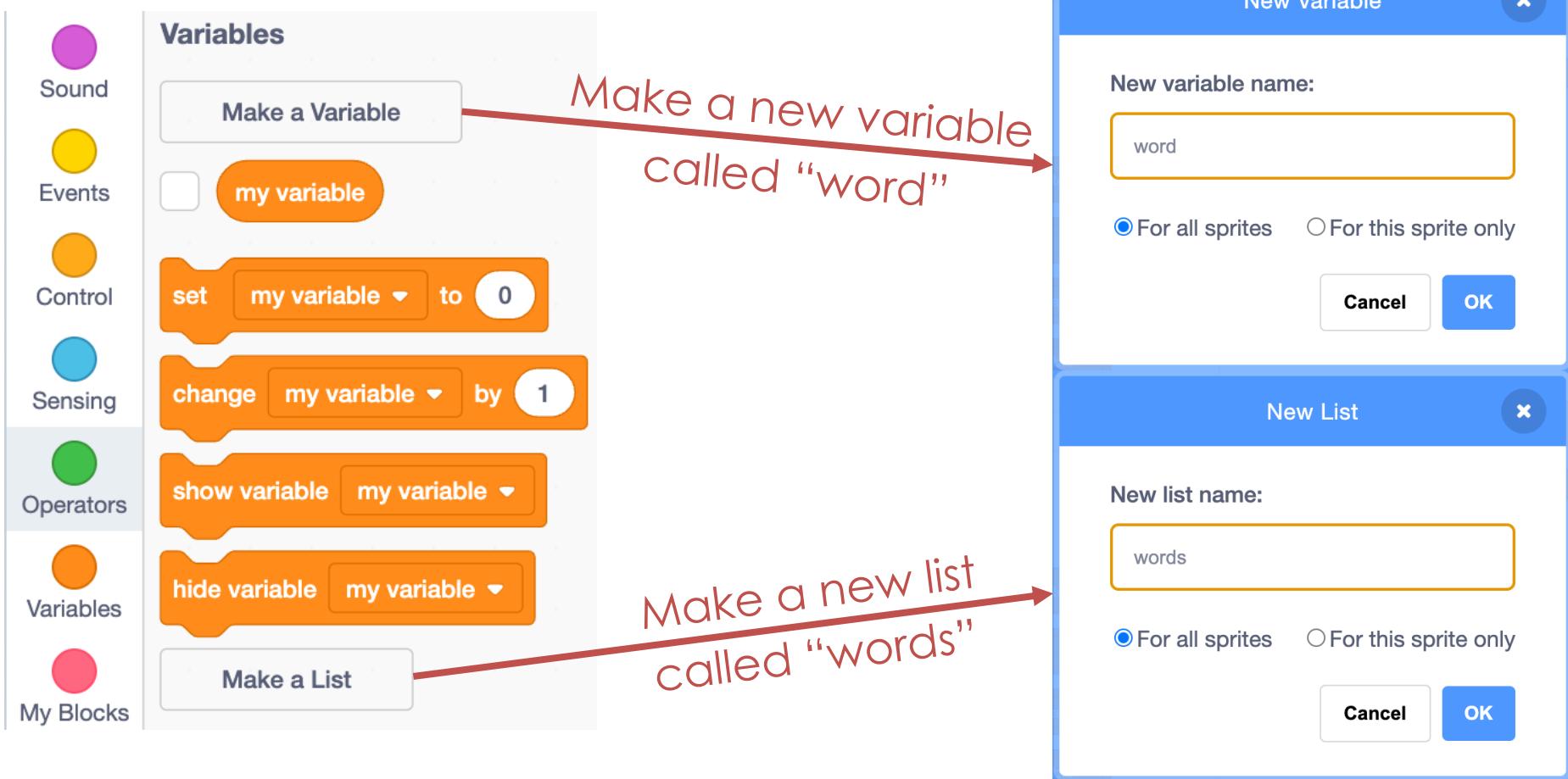
Cancel **OK**

New List

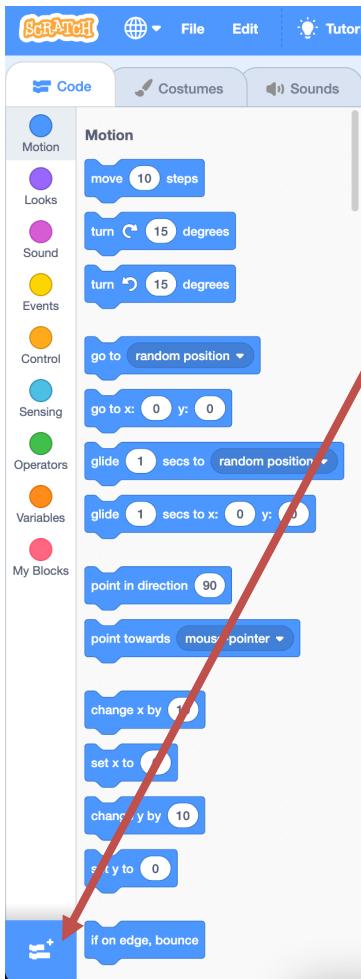
New list name: words

For all sprites For this sprite only

Cancel **OK**

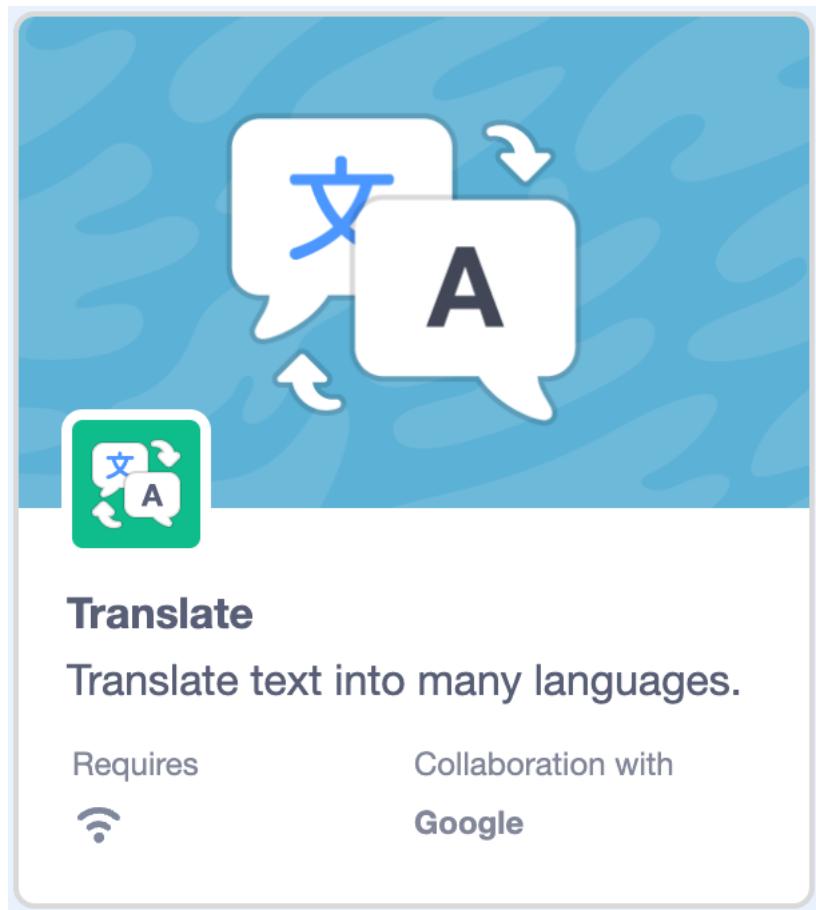


Translating Game - Extensions

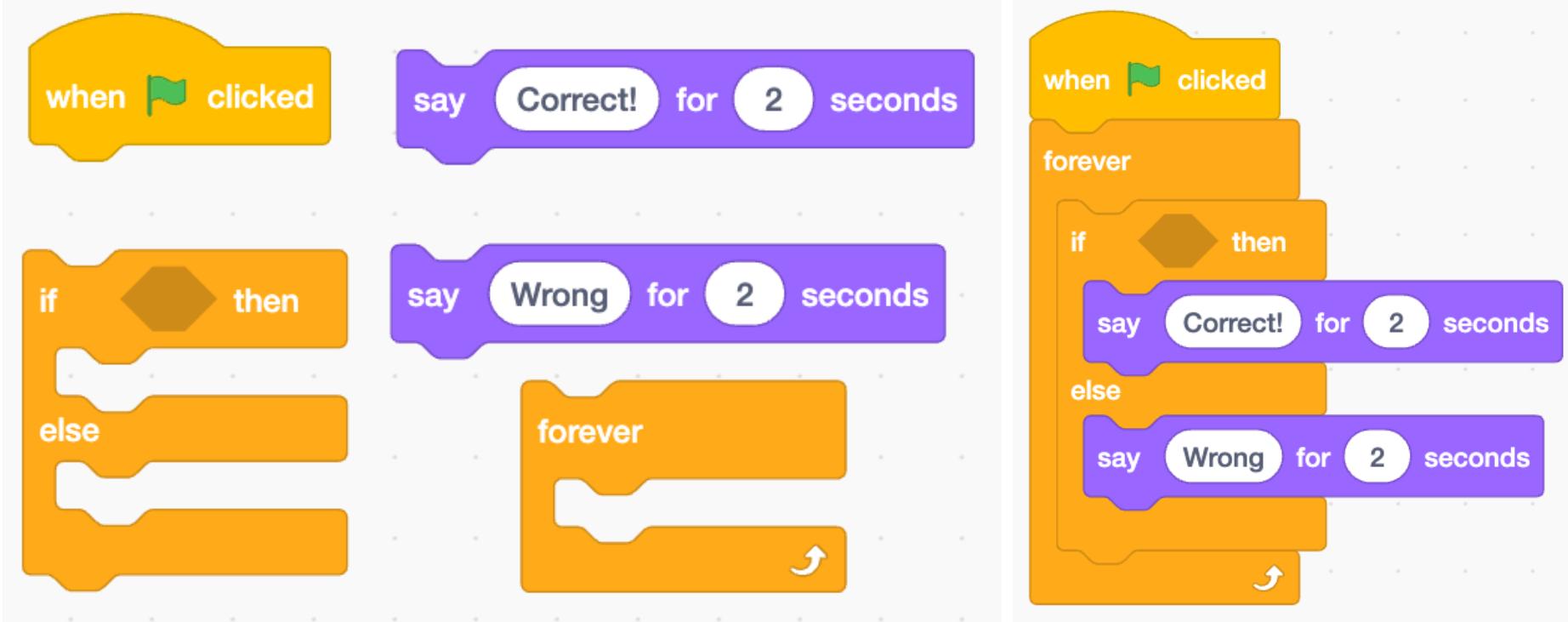


Click here to add an extension to Scratch,

scroll down to find the Translate extension which will allow you to use Google Translate within your program

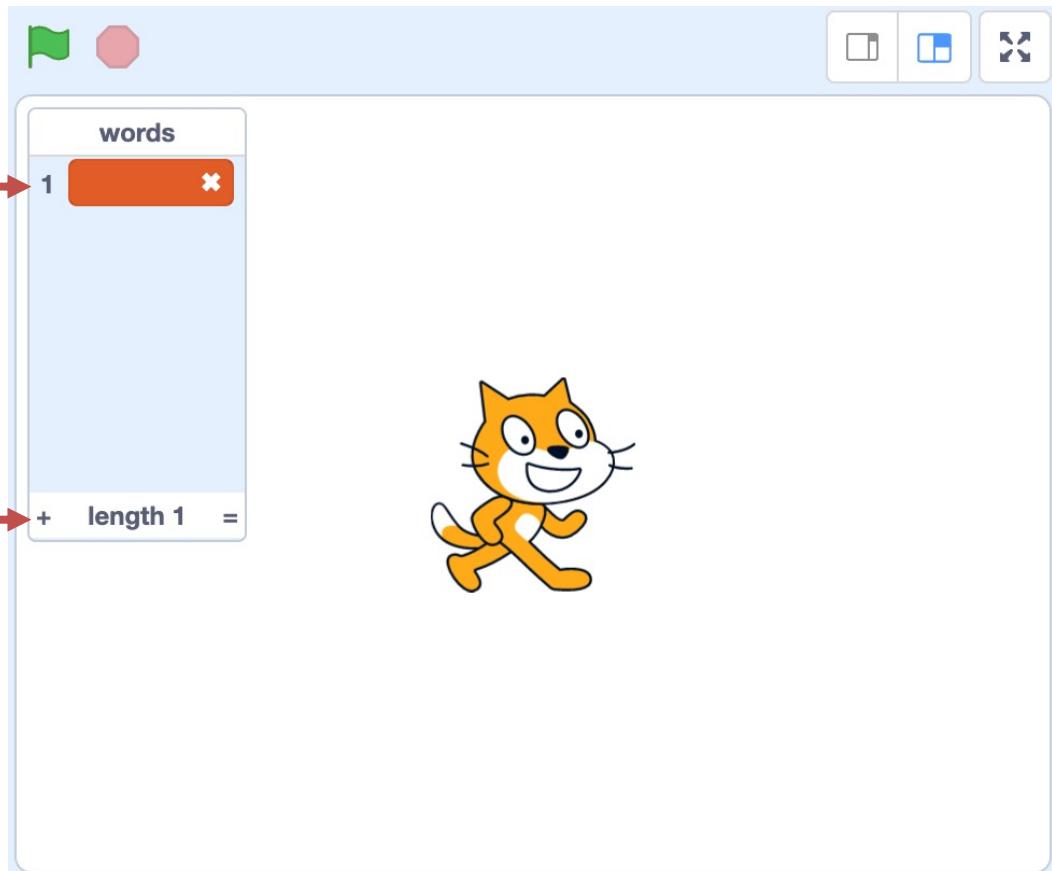


Translating Game - If



Translating Game - Lists

Click here to type in
a new word



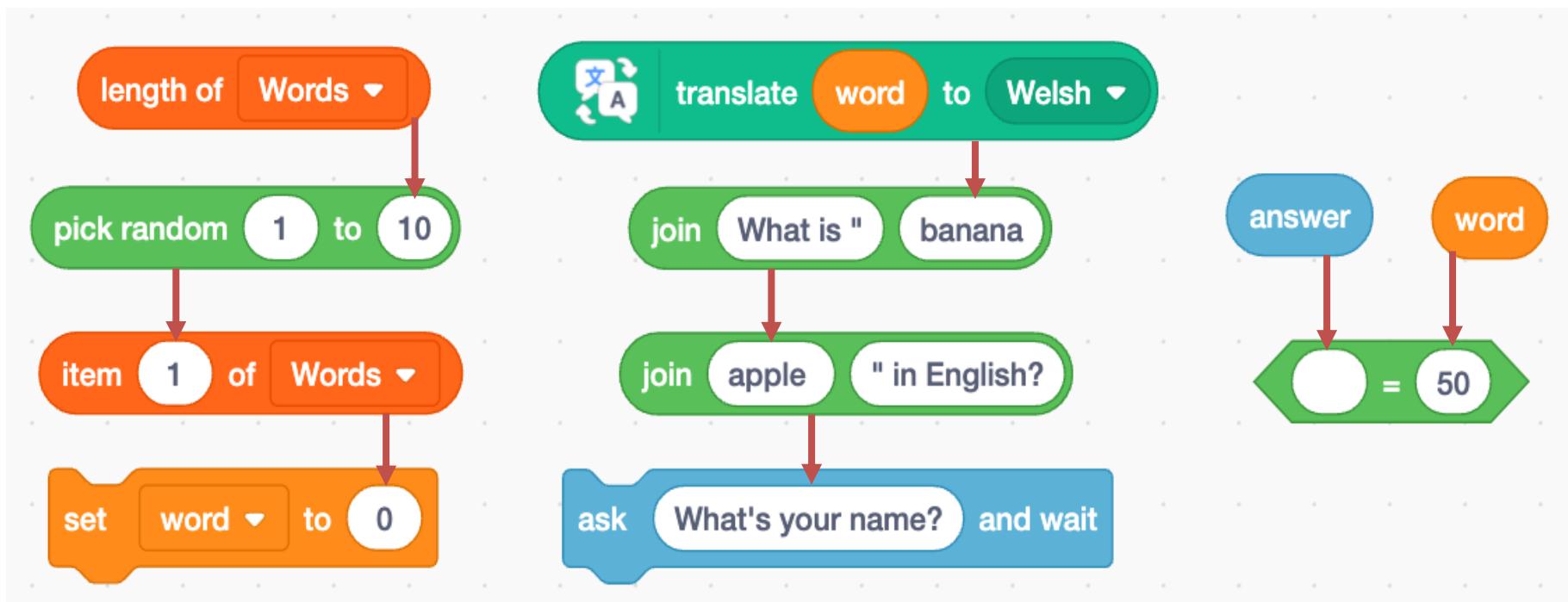
Click here to add a
new word to your list

Translating Game - Translating

A Scratch script consisting of the following blocks:

- Control: set word to [0 v] (orange)
- Control: item [1 v] of [Words v] (orange)
- Control: length of [Words v] (orange)
- Control: word (orange)
- Control: ask [What's your name? v] and wait (blue)
- Control: answer (blue)
- Control: pick random [1 v] to [10 v] (green)
- Control: join [What is " v] [banana v] (green)
- Control: join [apple v] [" in English? v] (green)
- Control: (empty green arrow) = [50 v] (green)
- Control: translate [word v] to [Welsh v] (green)

Translating Game - Translating



Translating Game - Translating



Translating Game

