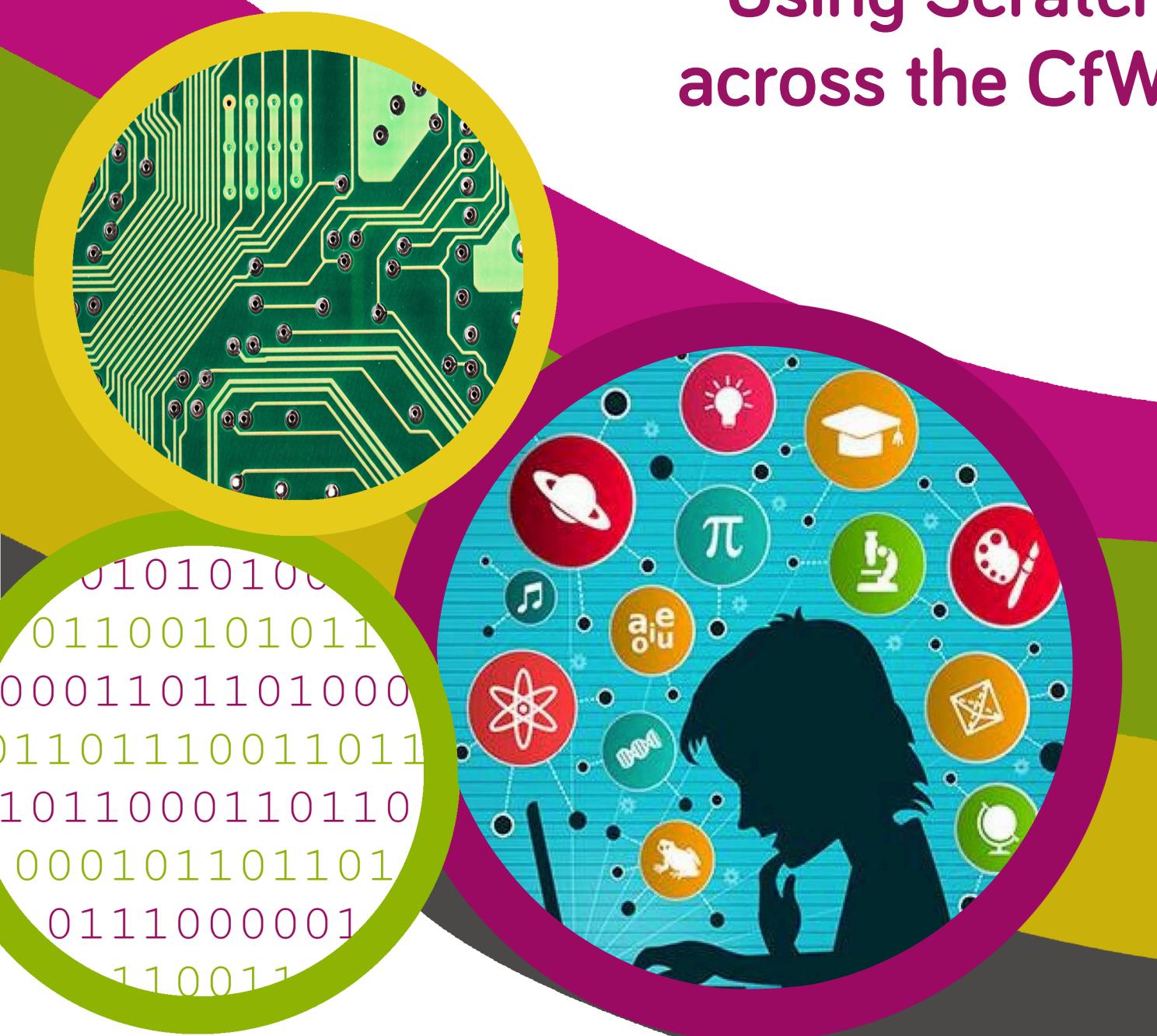


technocamps

Using Scratch across the CfW



Cronfa Gymdeithasol Ewrop
European Social Fund



Prifysgol
Abertawe
Swansea
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PRIFYSGOL
glyndŵr
Wrecsam | Wrexham
glyndŵr
UNIVERSITY

University of
South Wales
Prifysgol
De Cymru

Introduction

Overview

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.

Digital Resources:

<https://tc1.me/educonf22resources>

Youtube Tutorials:

<https://tc1.me/progacrosscurriculum>

Online Resources

More Ideas to Program



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

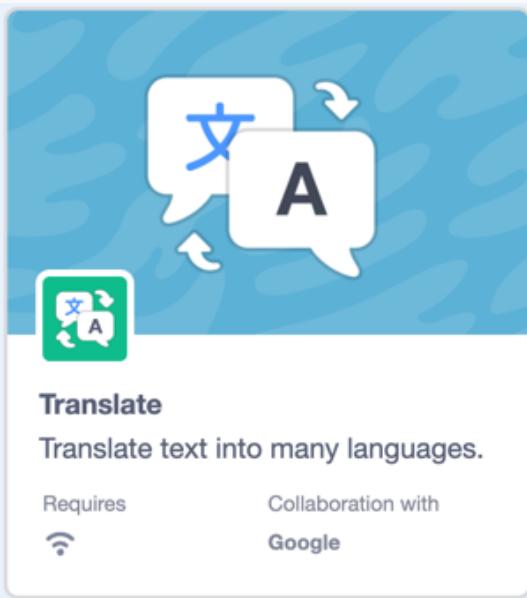


Humanities

- Interactive Timeline
- Migration Simulation

Translating Game

Extensions

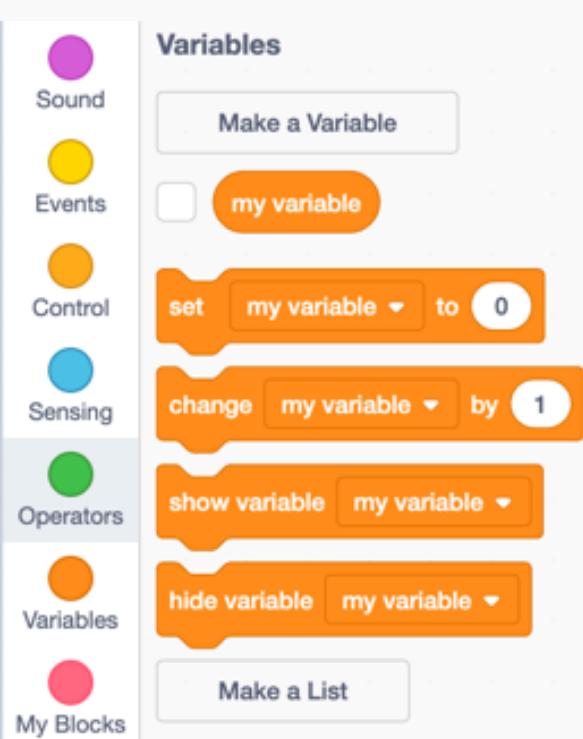


Extensions can be added into Scratch to give us additional blocks that help us accomplish specific tasks.

One of these extensions makes use of Google Translate to translate text between languages.

We can add this extension by clicking in the **bottom left corner** of Scratch and searching through the Extensions.

Variables and Lists



We will have to create both a variable and a list for this program. These can be added under the variables tab.

Make a variable called **word**, this will hold the word that is currently displayed on-screen.

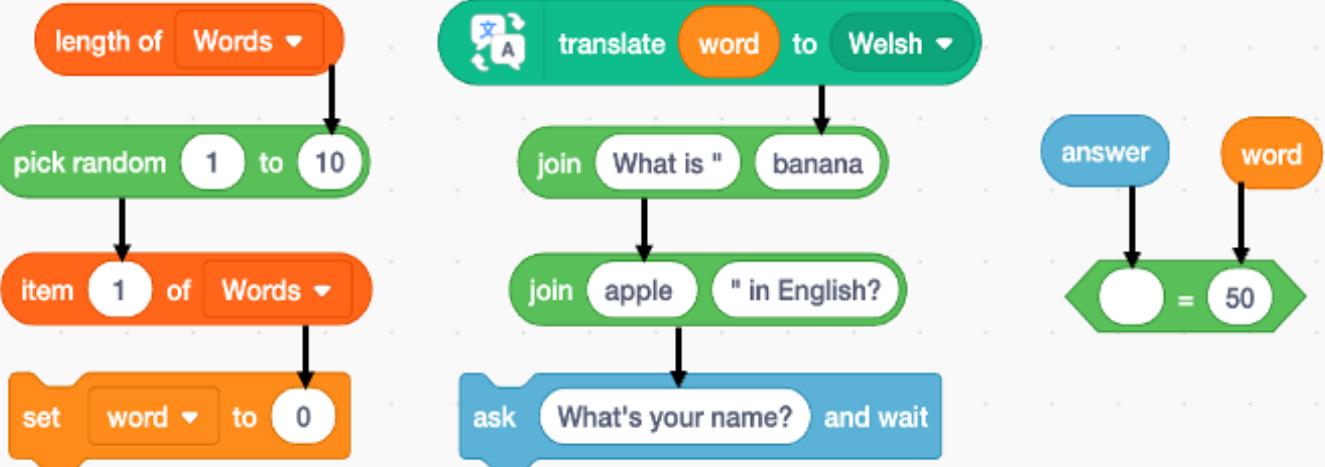
Make a list called **words**, this will hold all the words that will appear to be translated. Words can be added to the list on the game screen, and then hidden from view in the variables tab.

Translating Game

Translator Blocks



Assembling Translator



Translating Game

If Statement

when green flag clicked

say Correct! for 2 seconds

if [diamond] then

say Wrong for 2 seconds

else

forever

when green flag clicked

forever

if [diamond] then

say Correct! for 2 seconds

else

say Wrong for 2 seconds

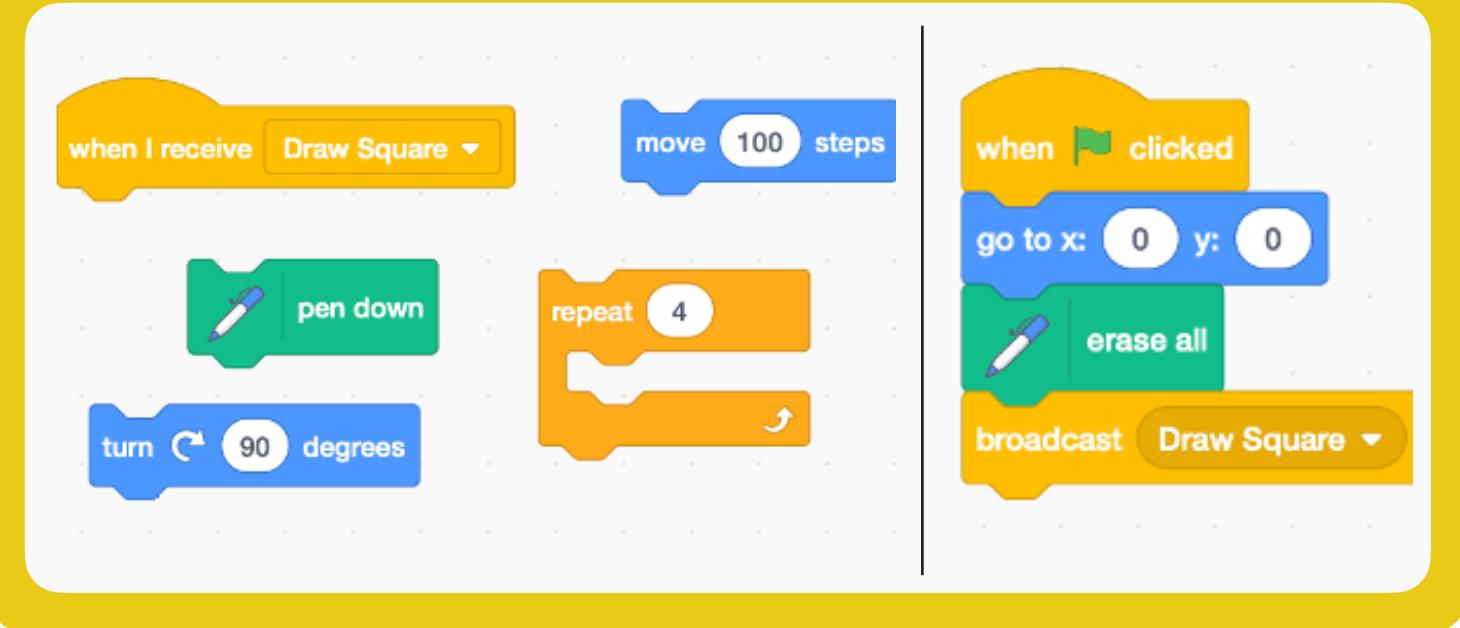
Full Code

```

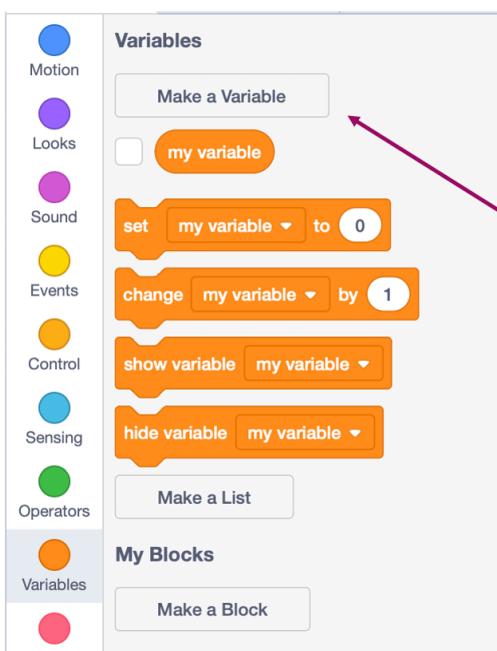
when green flag clicked
forever
  set word to item pick random 1 to length of Words of Words
  ask join join "What is " [translate word to Welsh] " in English?" and wait
  if answer = word then
    say Correct! for 2 seconds
  else
    say Wrong for 2 seconds
  end
end
  
```

Pen Shapes

Drawing a Square

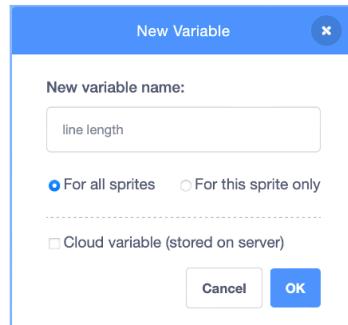


Variable Patterns



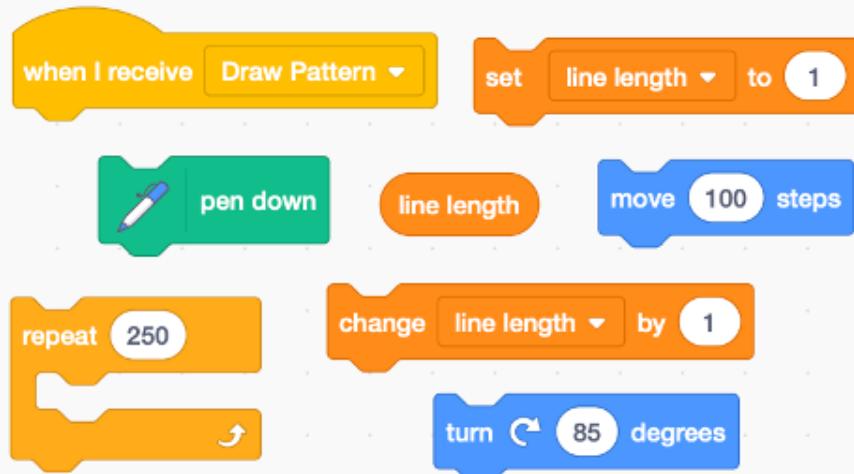
Using a variable with a value that changes as we loop, we can make some unique patterns.

Create a variable named "line length".



Pen Shapes

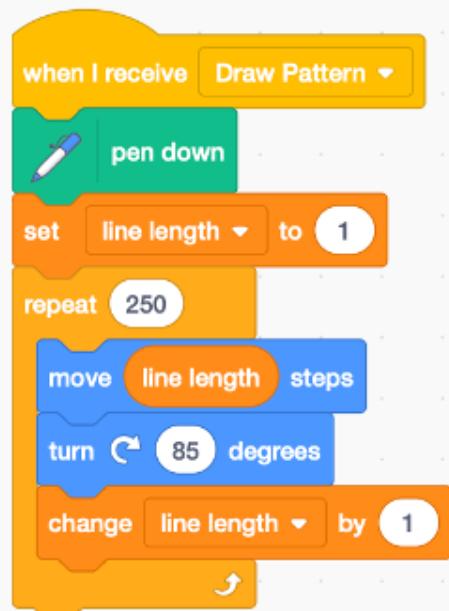
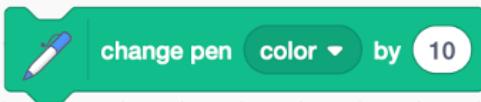
Variable Patterns



Variable Patterns

By editing the values inside the loop, (particularly the angle) you will see different patterns emerge.

You can also use the change colour block to add some more colour to the patterns.



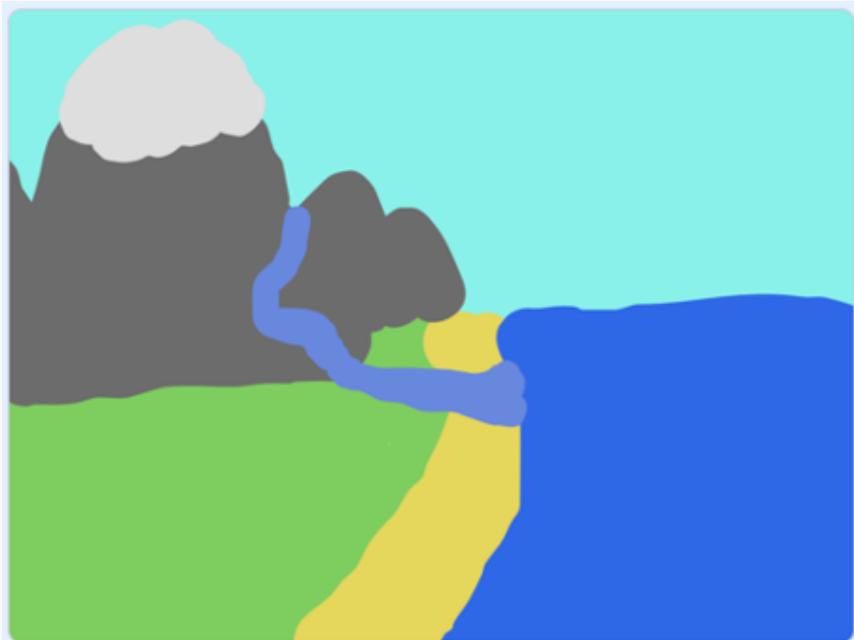
Water Cycle

Background

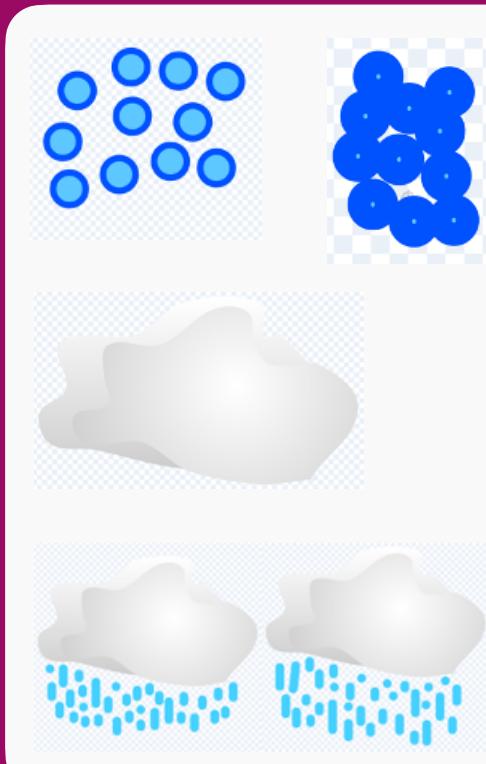
Begin by making a background that includes land, sea, mountains and a river.

These are the key components that we're going to need to create an animation of the water cycle.

The positional values in the code below will depend on the drawing.



Costumes



We're going to need 5 costumes to switch between in this animation.

Water Vapour - to demonstrate evaporation

Clouds

2x Rainclouds - to animate the rainfall

River Flow - to show the rain water returning to the sea.

Water Cycle

Sprite - Evaporation

when I receive Evaporation ▾

switch costume to Vapour ▾

go to x: 113 y: -75

glide 1 secs to x: 113 y: 80

Sprite - Clouds

when I receive Clouds ▾

switch costume to Cloud ▾

glide 1 secs to x: -113 y: 80

Sprite - Rain

when I receive Rain ▾

wait 0.5 seconds

repeat 5

wait 0.5 seconds

switch costume to Rain 1 ▾

switch costume to Rain 2 ▾

Water Cycle

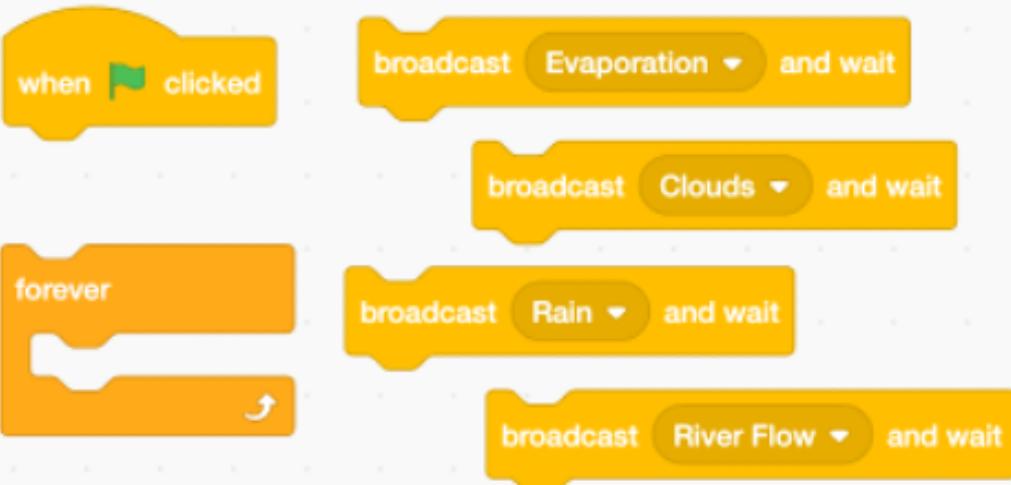
Sprite - River Flow



A Scratch script for the "River Flow" sprite:

- when I receive [River Flow v] (yellow)
- switch costume to [Droplets v] (purple)
- go to x: -77 y: 52 (blue)
- glide (1) secs to x: -81 y: 34 (blue)
- glide (1) secs to x: -80 y: -4 (blue)
- glide (1) secs to x: -95 y: 10 (blue)
- glide (1) secs to x: -60 y: -18 (blue)
- glide (1) secs to x: -11 y: -40 (blue)
- glide (1) secs to x: 62 y: -42 (blue)

Background - Animating



A Scratch script for the background:

- when green flag clicked (yellow)
- broadcast [Evaporation v] and wait (yellow)
- broadcast [Clouds v] and wait (yellow)
- forever (orange)
- broadcast [Rain v] and wait (yellow)
- broadcast [River Flow v] and wait (yellow)

Water Cycle

10

Sprite - Full Code

```
when I receive [Evaporation]
  go to x: 113 y: -75
  switch costume to [Vapour]
  glide [1] secs to x: 113 y: 80
```

```
when I receive [Clouds]
  switch costume to [Cloud]
  glide [1] secs to x: -113 y: 80
```

```
when I receive [Rain]
  repeat (5)
    switch costume to [Rain 1]
    wait [0.5] seconds
    switch costume to [Rain 2]
    wait [0.5] seconds
```

```
when I receive [River Flow]
  switch costume to [Droplets]
  go to x: -77 y: 52
  glide [1] secs to x: -81 y: 34
  glide [1] secs to x: -95 y: 10
  glide [1] secs to x: -80 y: -4
  glide [1] secs to x: -60 y: -18
  glide [1] secs to x: -11 y: -40
  glide [1] secs to x: 62 y: -42
```

Background - Full Code

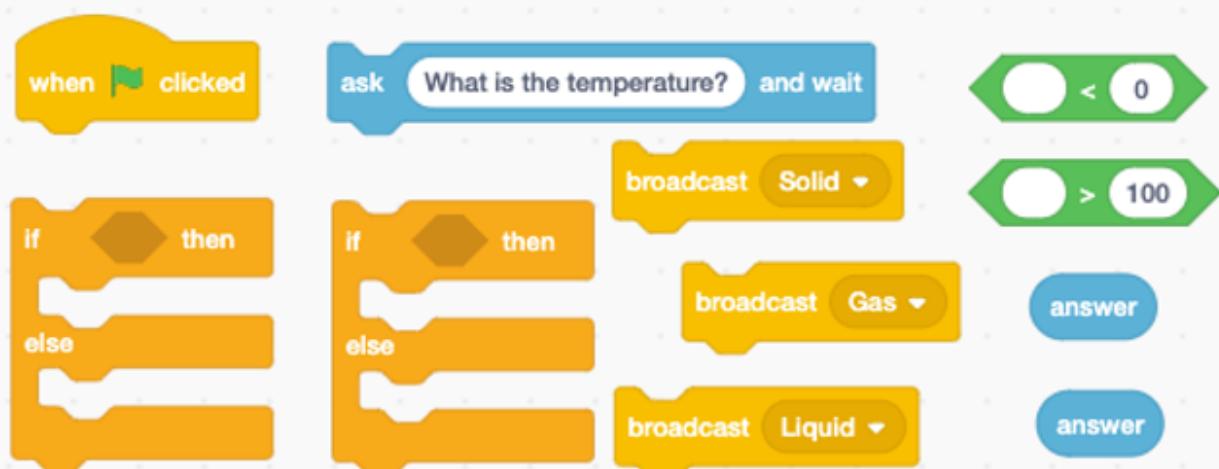
```
when green flag clicked
  forever
    broadcast [Evaporation] and wait
    broadcast [Clouds] and wait
    broadcast [Rain] and wait
    broadcast [River Flow] and wait
```

Sprites

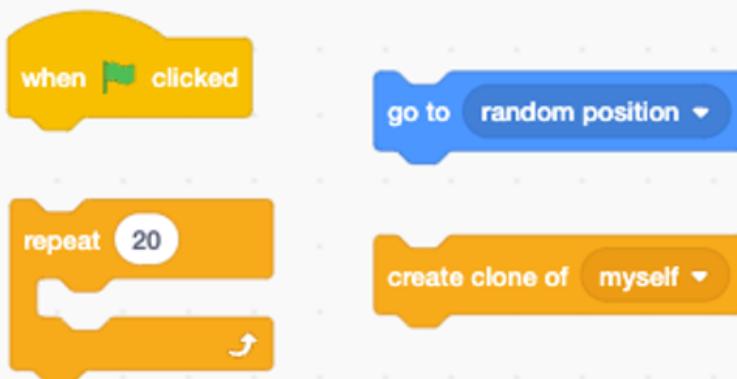


Create a simple circular sprite to represent an atom. If you prefer this could be a molecule instead.
We will only require 1 sprite as it will be cloned.

Background



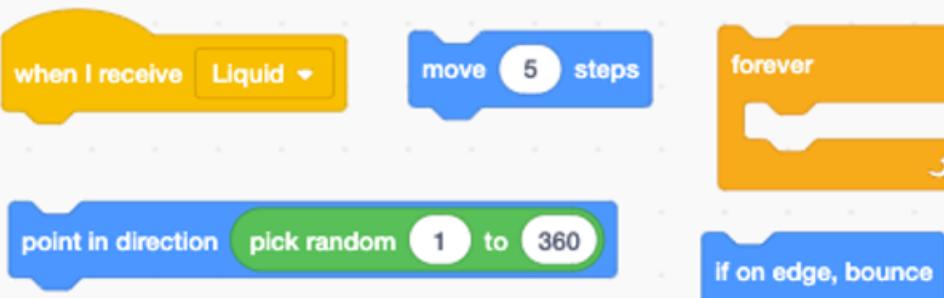
Sprite - Clones



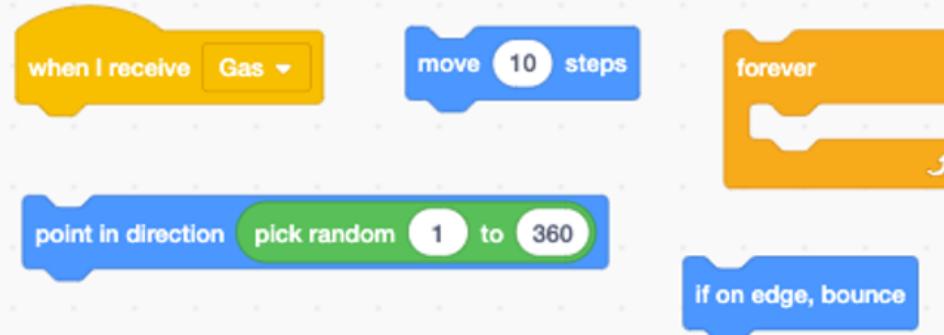
Sprite - Solid



Sprite - Liquid



Sprite - Gas



States of Matter

13

Background - Full Code

```
when green flag clicked
ask [What is the temperature?] and wait
if [answer] < [0] then
  broadcast [Solid v]
else
  if [answer] > [100] then
    broadcast [Gas v]
  else
    broadcast [Liquid v]
```

Sprite - Full Code

```
when green flag clicked
repeat (20)
  go to [random position v]
  create clone of [myself v]
```

```
when I receive [Liquid v]
point in direction [pick random 1 to 360 v]
forever
  move [5 steps]
  if on edge, bounce
```

```
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]
```

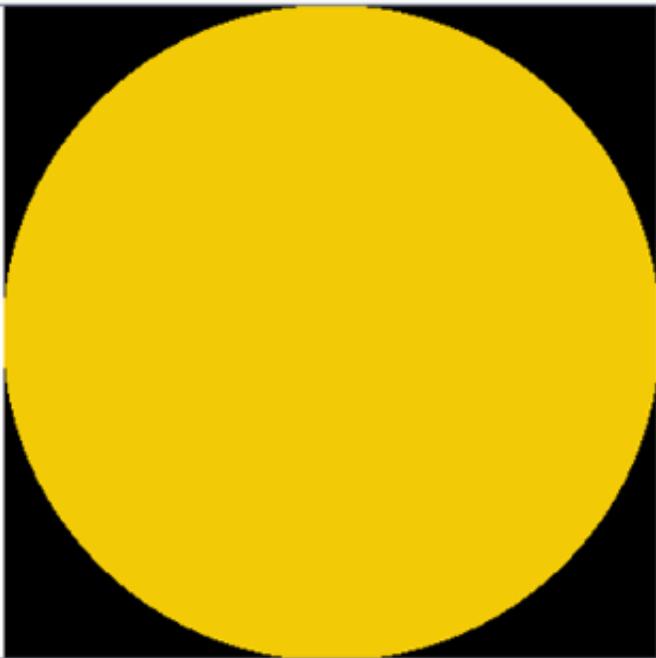
```
when I receive [Gas v]
point in direction [pick random 1 to 360 v]
forever
  move [10 steps]
  if on edge, bounce
```

Background

Begin by making a background consisting of a square with a circle of equal diameter inside.

Make them different colours as this is how we will calculate the ratio of areas and pi.

The colours you choose will be used throughout the code.



Variables

The image shows the Scratch script editor interface. On the left is a palette with categories: Sound, Events, Control, Sensing, Operators, Variables, and My Blocks. The Variables category is selected, showing a list of variables and a 'Make a Variable' button. A variable named 'my variable' is created and selected. Below it, four script blocks are shown: 'set [my variable v] to [0]', 'change [my variable v] by [1]', 'show variable [my variable v]', and 'hide variable [my variable v]'. At the bottom is a 'Make a List' button.

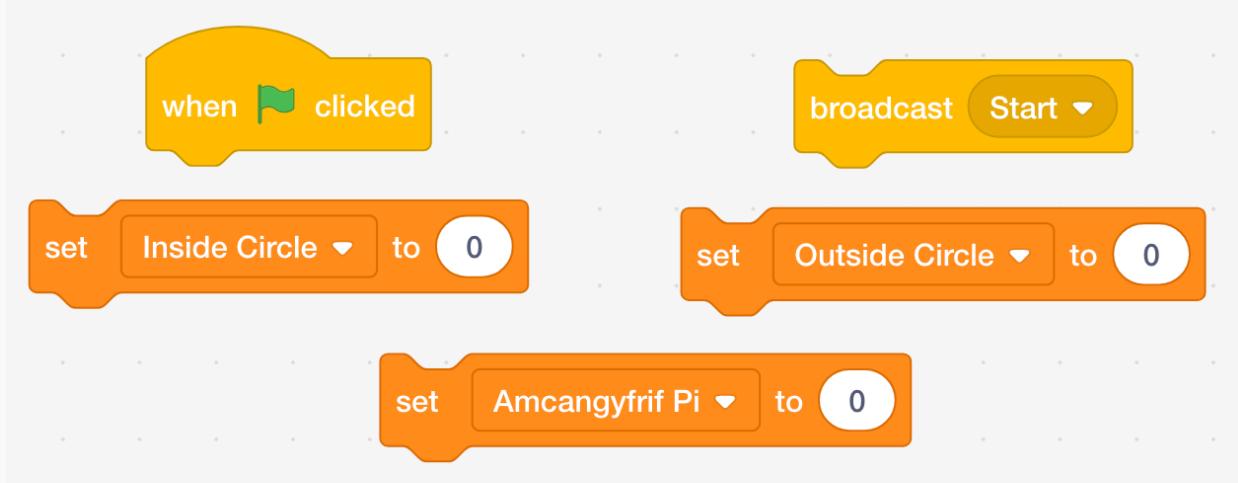
We will have to create three variables to allow us to calculate pi in this program.

Inside Circle - will count the number of times the sprite lands inside the circle.

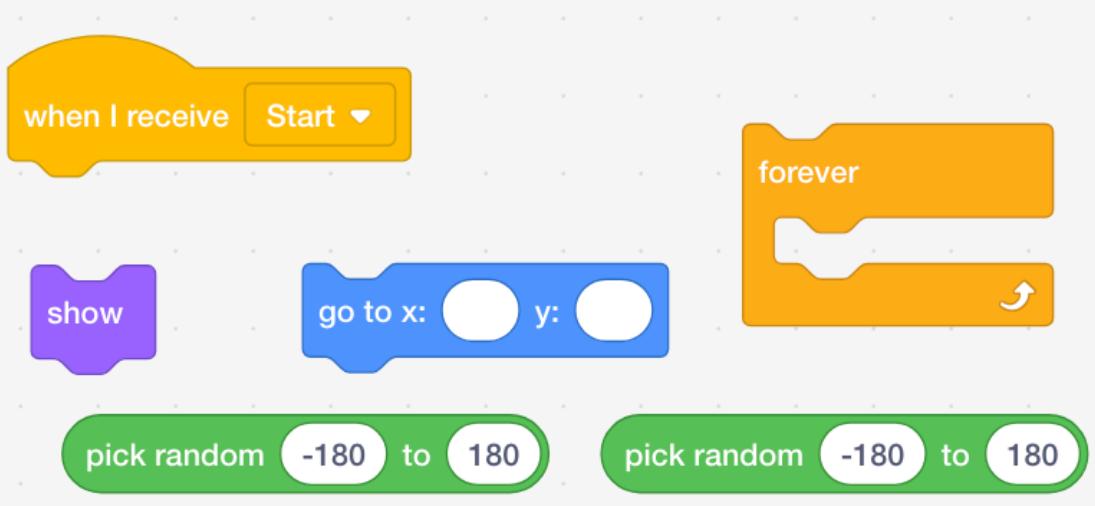
Outside Circle - will count the number of times the sprite lands inside the square.

Pi Estimation - will be the ratio of times inside and outside the circle, which is equal to pi.

Background - Starting Conditions

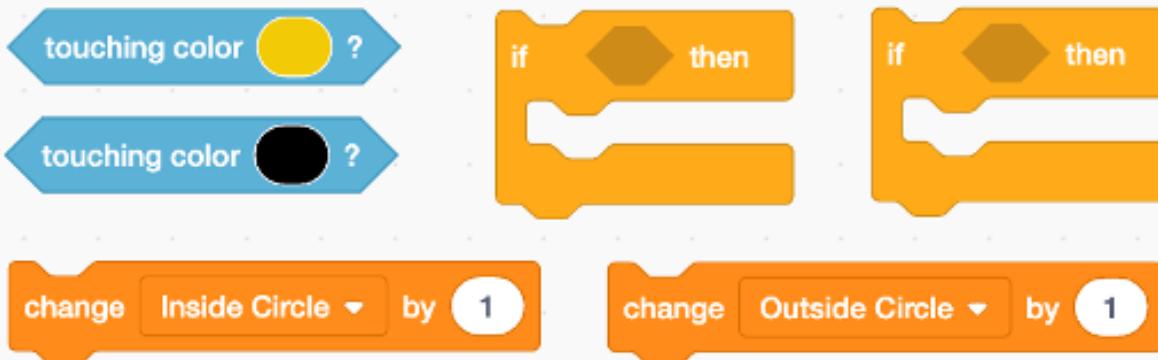


Sprite - Random Movement



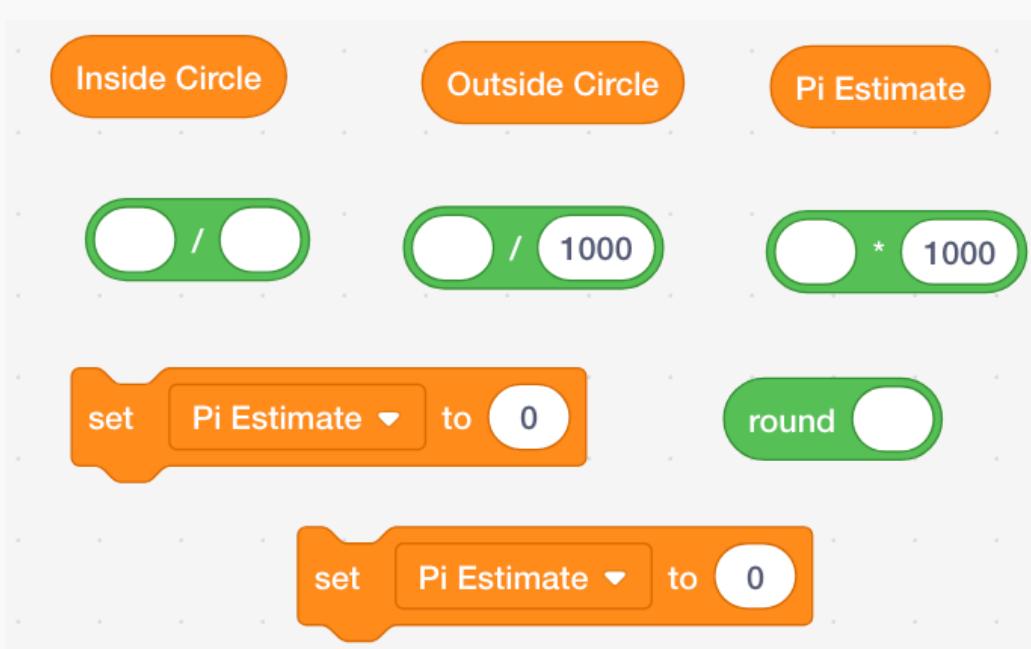
Pi Estimation

Sprite - Inside or Outside?



Use the colour chooser to select the colours from your background.

Sprite - Calculating the Ratio



Background - Full Code

```
when green flag clicked
  set [Inside Circle v] to [0]
  set [Outside Circle v] to [0]
  set [Pi Estimate v] to [0]
  broadcast [Start v]
```

Sprite - Full Code

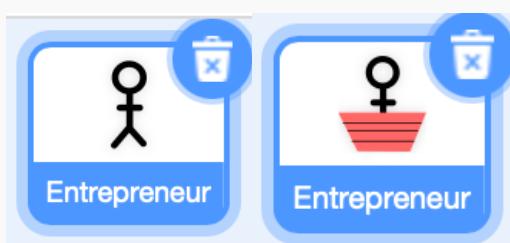
```
when I receive [Start v]
show
forever
  go to x: [pick random (-180) to 180] y: [pick random (-180) to 180]
  if [touching color [yellow] ?] then
    change [Inside Circle v] by [1]
  end
  if [touching color [black] ?] then
    change [Outside Circle v] by [1]
  end
  set [Pi Estimate v] to [Inside Circle / Outside Circle]
  set [Pi Estimate v] to [round (Pi Estimate * 1000) / 1000]
```

Background

Begin by making a background that looks like a map for your people to migrate across.



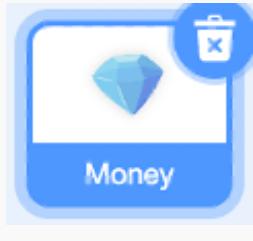
Costumes



We're going to need 3 different sprites for this simulation.



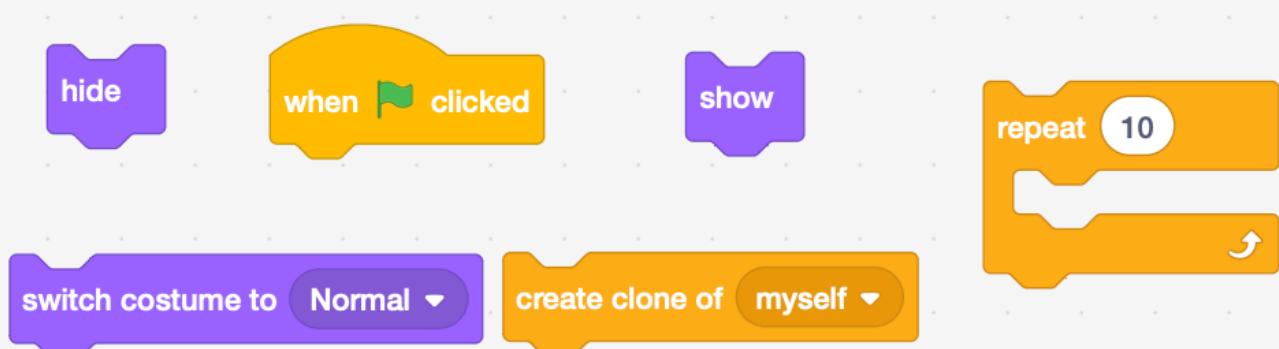
Entrepreneur - These will be our people migrating across the map, they will need a separate boat costume!



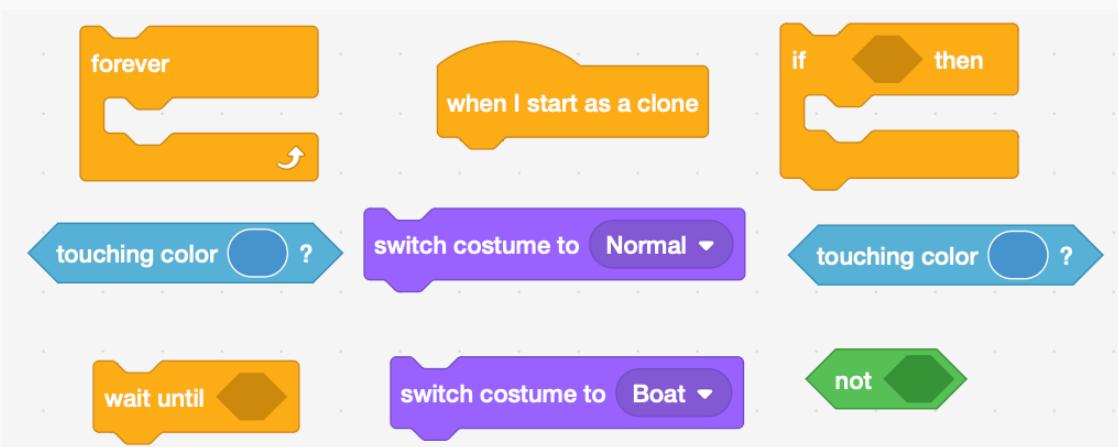
War - Our entrepreneurs will want to avoid any wars.

Money - Our entrepreneurs will be seeking out wealthy cities.

Entrepreneur - Cloning



Entrepreneur - Switching to Boat



War

set drag mode draggable ▾

when green flag clicked

go to random position ▾

Entrepreneur - Movement Close to War

when I start as a clone

go to random position ▾

forever

point in direction pick random 1 to 360

move 1 steps

if distance to War < 50 then

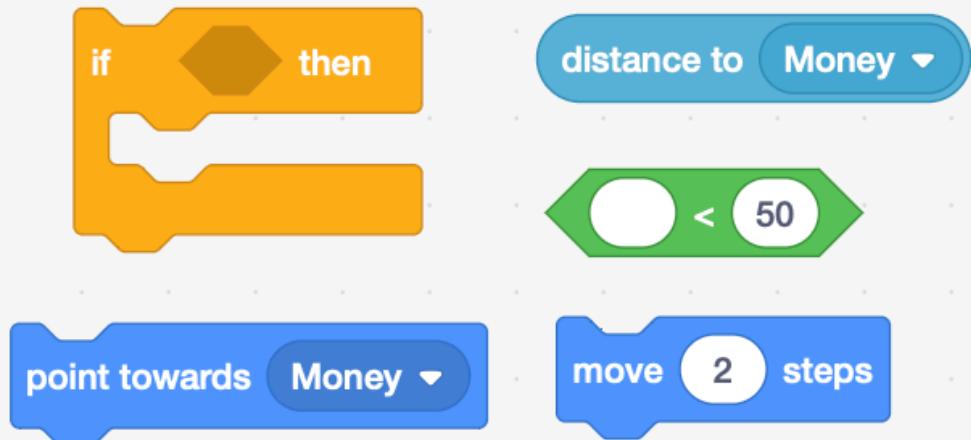
point in direction pick random 1 to 360

move 10 steps

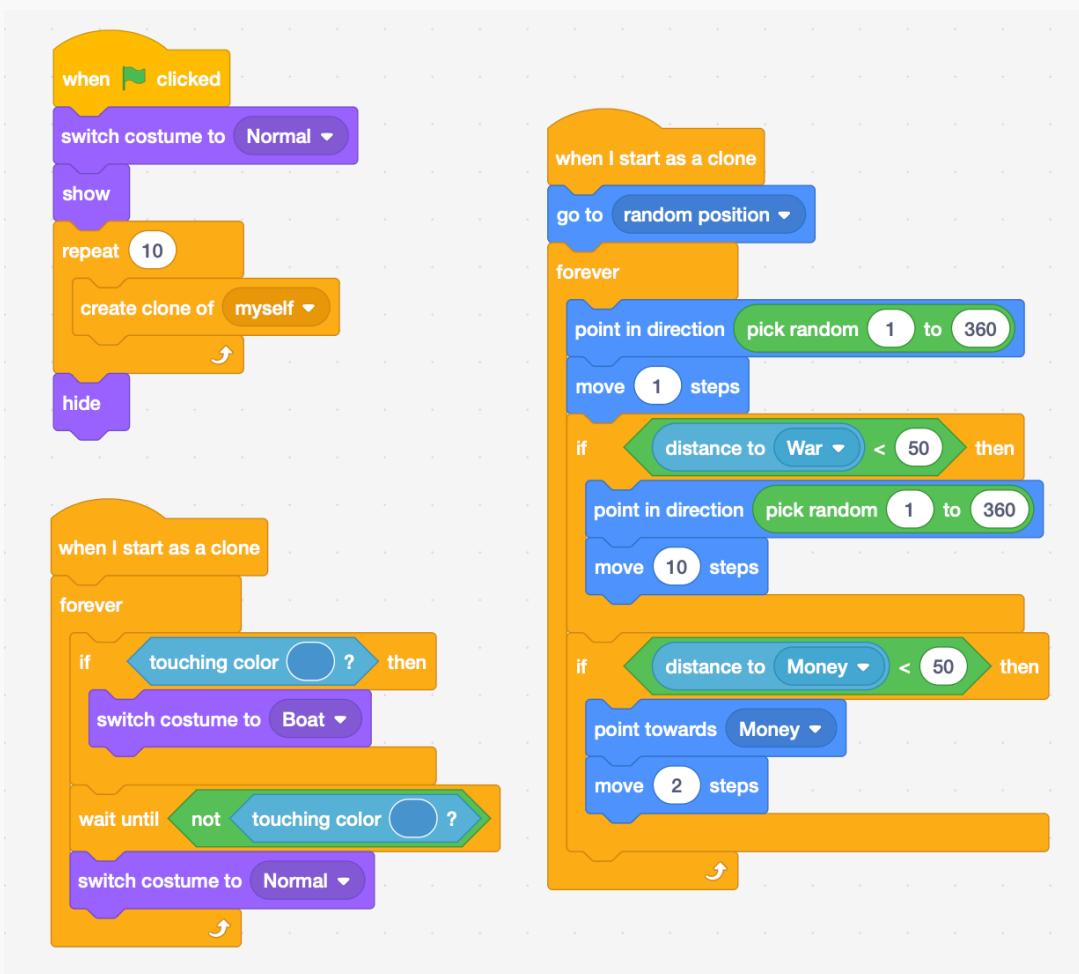
Money



Entrepreneur - Move Toward Money



Entrepreneur - Full Code



This Scratch script consists of two main sections: one for the entrepreneur and one for clones.

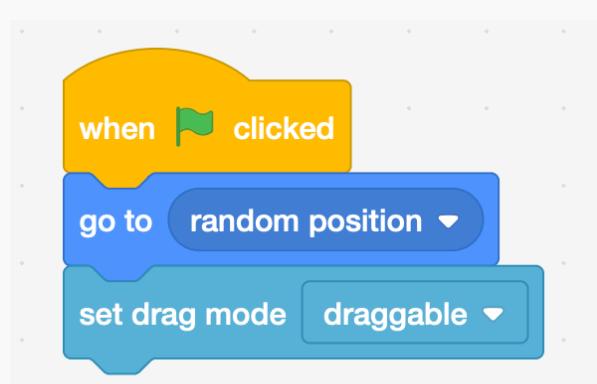
Entrepreneur Script:

- When green flag clicked:
 - Switch costume to Normal
 - Show
 - Repeat (10) [Create clone of myself]
 - Hide

Clones Script:

- When I start as a clone:
 - Go to random position
 - Forever:
 - Point in direction (pick random 1 to 360)
 - Move (1) steps
 - If distance to War < 50 then
 - Point in direction (pick random 1 to 360)
 - Move (10) steps
 - If distance to Money < 50 then
 - Point towards Money
 - Move (2) steps

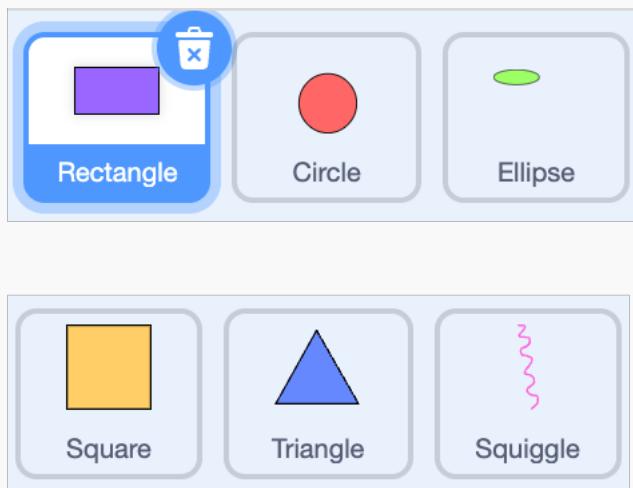
Money and War - Full Code



This Scratch script is triggered by the green flag.

- When green flag clicked:
 - Go to random position
 - Set drag mode to draggable

Sprites

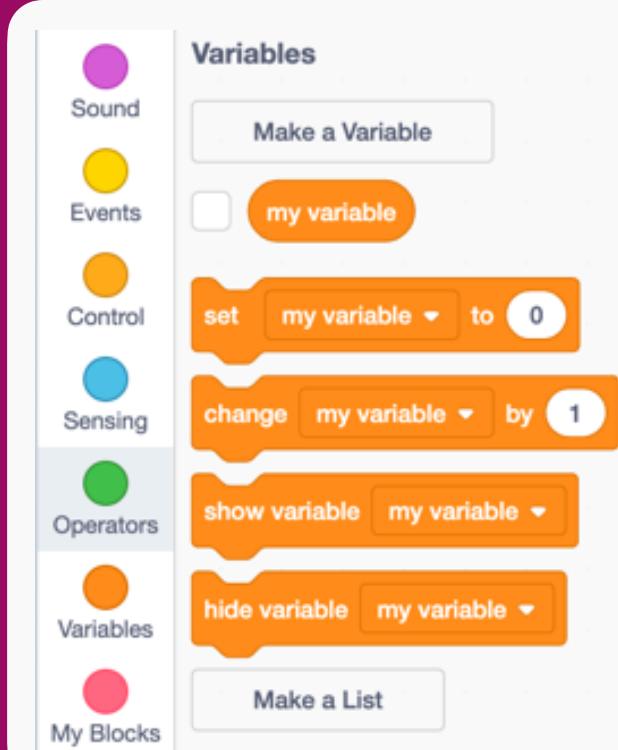


Create some sprites of various shapes.

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.

Variables



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

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

These could be Age, Bedtime and Family.

Questions - Stage

ask What's your age? and wait

ask What's your bedtime? and wait

ask How many people are in your family? and wait

Answers - Stage

when green flag clicked answer answer answer broadcast [Go! v]

set Count v to 0 ask What's your age? and wait

set Family v to 0

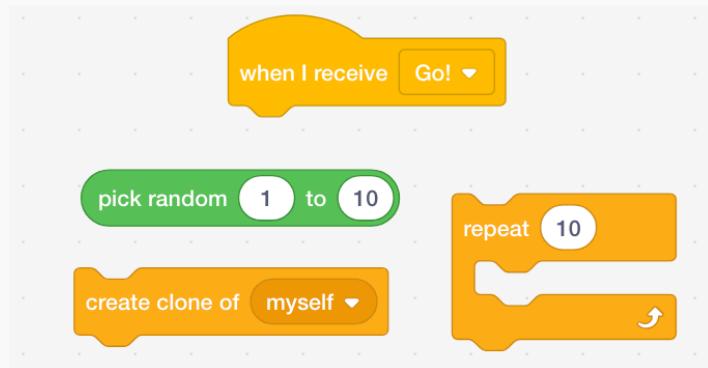
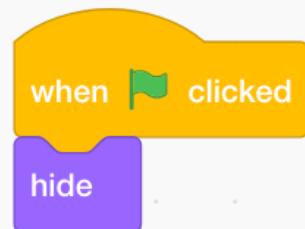
set Age v to 0

ask What's your bedtime? and wait

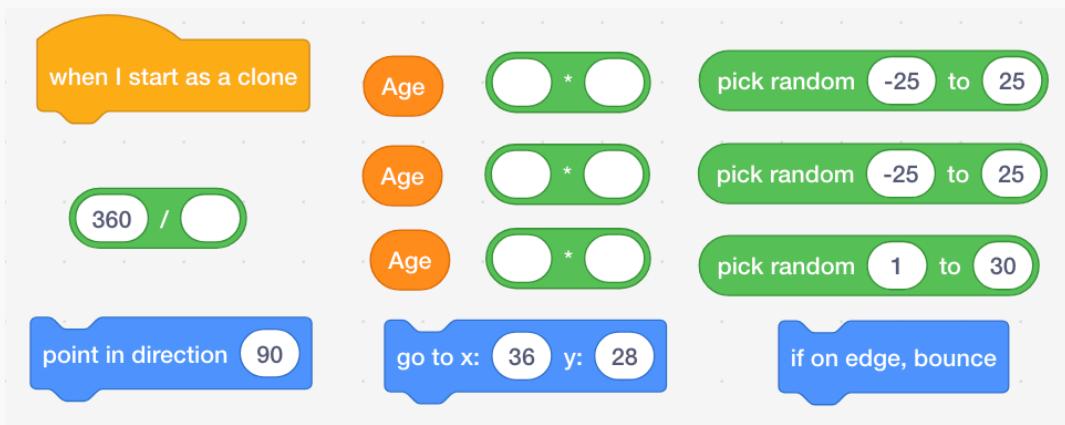
set Bedtime v to 0

ask How many people are in your family? and wait

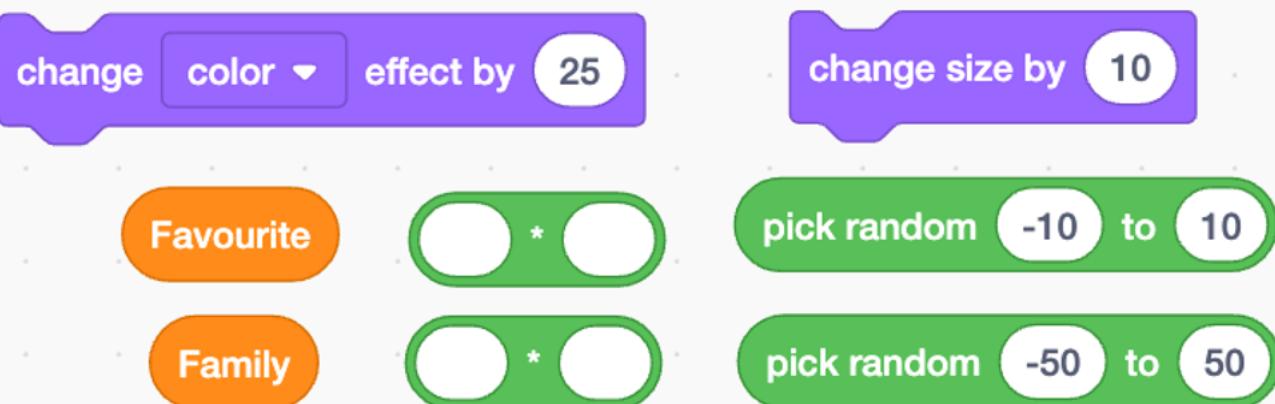
Starting Conditions - Sprite(s)



Position - Sprite(s)



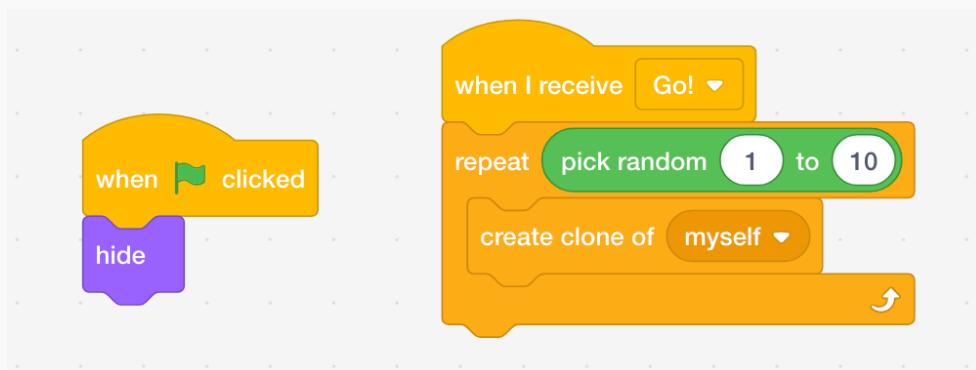
Colour and Size - Sprite(s)



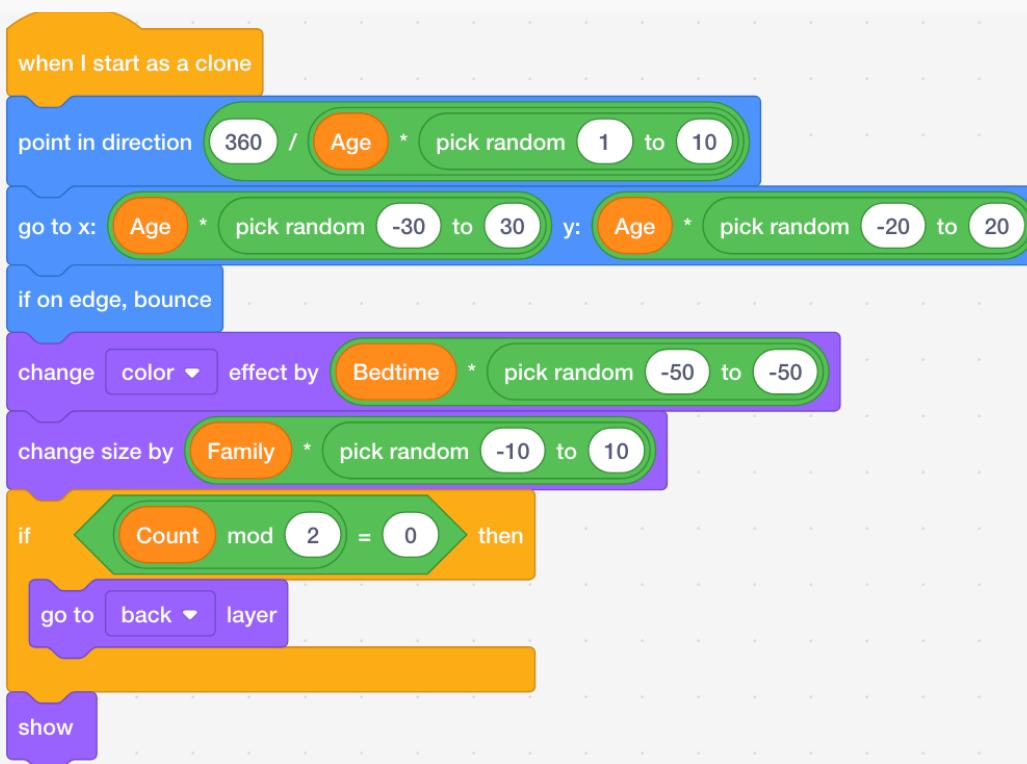
Layers - Sprite(s)



Sprite(s) - Full Code



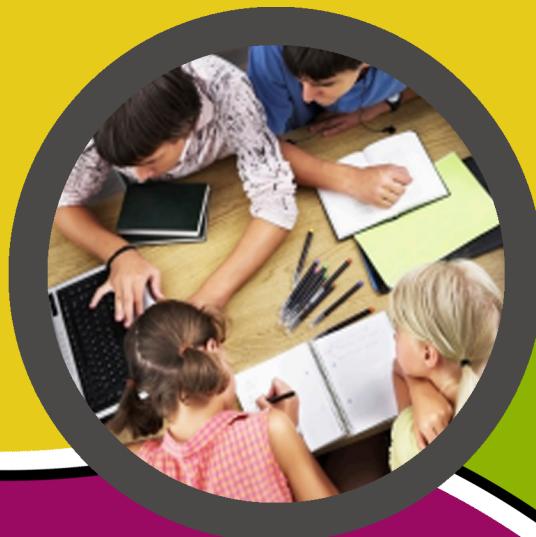
Sprite(s) - Clones - Full Code



Stage - Questions - Full Code



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