imagination box: digital making

In this Digital Making Resource we will be playing with:

- Stop Frame Animation
- Coding in Augmented Reality
- Gamification with Makecode Arcade

Go to ioi.london/imaginationbox to find more information about these activities.

Share your ideas, videos or pictures of your own experiments from the Imagination Box with us at imaginationhub@ioi.london or via social media. We would love to see what you come up with!

Twitter @ImaginationLdn
Instagram @instituteofimagination
Facebook /instituteofimagination

Brought to you by

institute of imagination

playing with stop frame animation
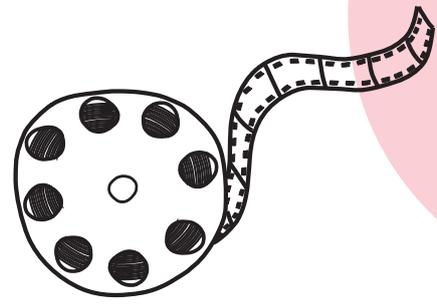
If you know movies like Wallace and Gromit or Shaun the Sheep, then you've already seen stop frame animation. Stop frame animation is a technique used to make any object appear to move on its own by taking many pictures of it and playing them all very quickly in sequence. The object is moved slightly in each picture so that, when the full sequence is shown, it seems to be moving. Ready to play with stop frame animation?

activity one:
fun friends film!

Step 1

To play with stop frame animation, download the free Stop Motion Studio app to your phone or tablet. This app will work with any smartphone or a tablet, such as an iPad.

Step 2:

For this activity, collect together an assortment of five to eight fun things from outside or inside the house. You can use anything, from plasticine to toy cars. The more fun to the touch the better!

Step 3:

Put all your objects in the spot where your film is going to take place. Think about what is going to happen in your film. I am going to have all these objects playing together and enjoying the way they are all different!

Make sure each object has nothing in common with the next and that they are all about the same size. I got a big leafy twig, a smooth stone, a fork, a small branch, a pepper and a hairbrush!
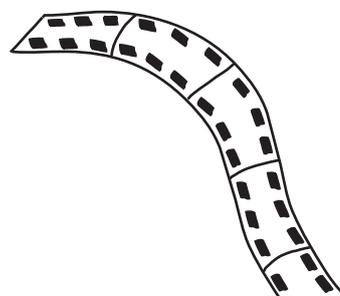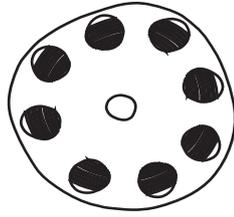
Step 4:

Decide where your film is going to take place and the best place for the tablet or phone camera to capture it. Get creative with making a stand for your tablet or phone. You can make one out of a wire hanger or you can get an overhead view using two piles of books and an iPad at an angle. I am going to go with an upright hold of the iPad using piles of books for my film!

Top tip
Make sure your tablet or phone is steady as this helps you take pics and makes your animation to go smoothly.

Step 5:

Place your objects at the start of the action and take your first picture. Now move all of the objects a tiny bit. Very tiny movements. Then go back and take another picture. Then move all the objects again, just a tiny bit, and take another picture.

And that's it! Just keep going. The more pictures, the longer the film! The smaller the movements of the objects, the smoother the film! Try and build up at least 30 pictures in your sequence. At any time, you can watch your film - simply click the 'PLAY' button to see how it is coming along!
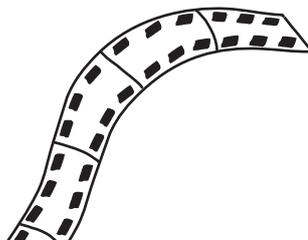
things to think about

If your objects were friends and were playing together, what would they do? For example, my pepper is going to go in a circle around the stone while the stone spins! My fork is going to play with the branch on the leafy twig while the brush watches! Try and tell the story of your objects as best friends!

Here are some other features within the Stop Motion Studio app on a smartphone:

BACK TO PROJECTS

CAPTURE IMAGES

RECORD VOICE OVER

ADD MEDIA

PROJECT SETTINGS

UNDO

HELP

PLAY

FRAME BY FRAME VIEW

TAP TO OPEN FRAME EDIT MENU

DOUPLE TAP FOR TIMELINE
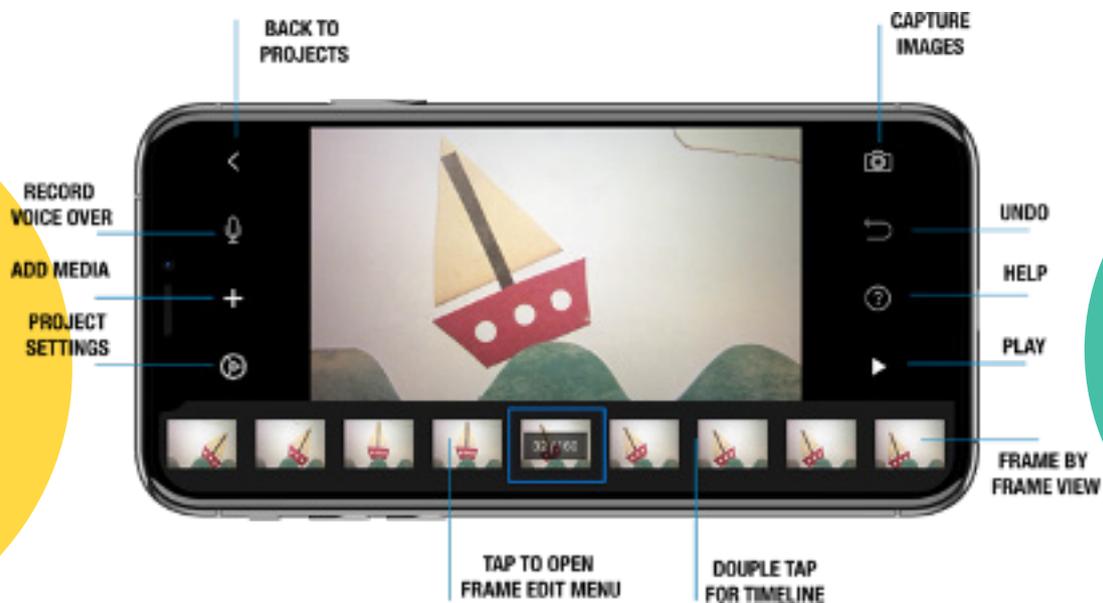
One of the best and most useful tools is what we call 'Onion Peel'. It's to the far left of the screen below. If you slide this you will be able to see the previous photo that you have just taken in layers, so that you can match up the image to make sure the camera stays steady.

Onion peel

CURRENT FRAME NUMBER

PLAY LAST FRAMES

CAPTURE IMAGE

TIMER

CAMERA SETTINGS

You can adjust the speed of your stop frame animation by clicking 'Project Settings' and then clicking and adjusting 'Movie Speed'.

Click 'Add Media' (the + sign) and give your film an opening title! Maybe add in the names of your objects as the actors. You can say things like: Starring Yellow Pepper! or Guest Appearance from Smooth Stone!

When you are happy with your animation, give your film a name and export it using the button shown below. Send it to yourself to keep and show your friends!
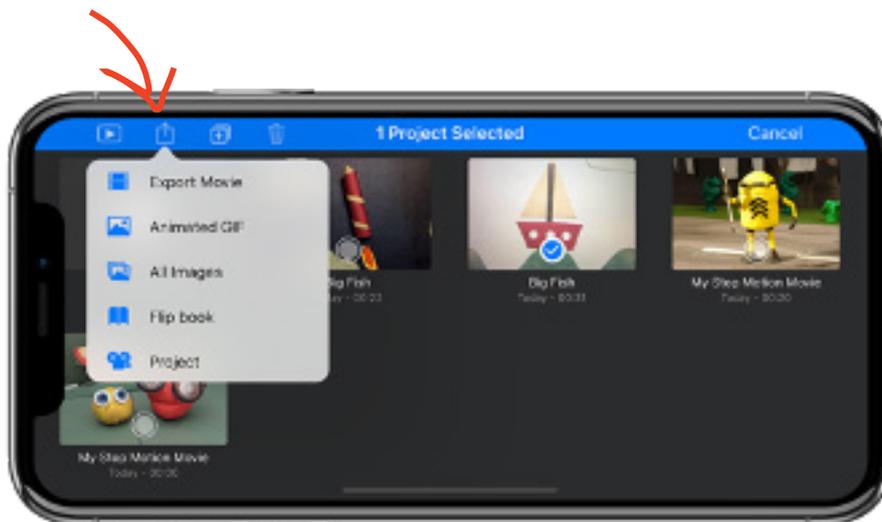
We would love to see it too, so please share it with us! Send it by email to us at imaginationhub@ioi.london or share it with us on social media.

activity two: growing a flower with stop frame animation
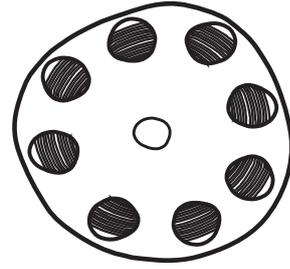
Step 1:

Take your smartphone or tablet and use the piles of books to stand it upright. You might need an extra book or two to make the camera slightly higher.

Step 2:

Take the flower and stick it in the soil in the flower pot. Place these in front of the phone/tablet so you can see the bottom of the flowerpot as well as the very top of the flower.
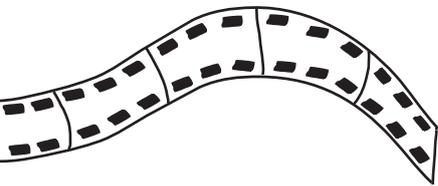
Step 3:

Take a pic of your full flower to get started. Now snip the top most part of your flower and the very ends of leaves with your scissors. Just a small snip! Use the dustpan and brush to sweep what you have snipped away from the shot.
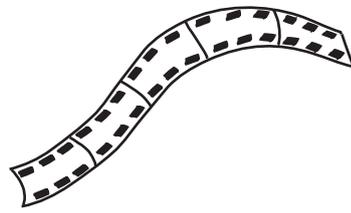
Take a pic and snip a bit more. Keep going taking pictures every time until you have snipped the flower all the way down to the soil. Make sure to take away the snippings every time.
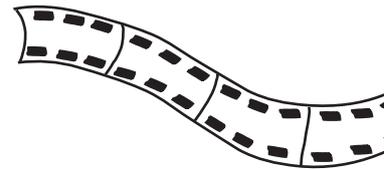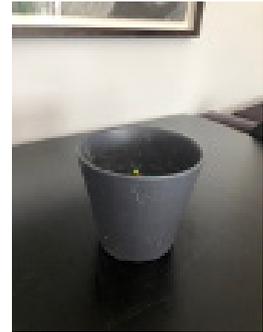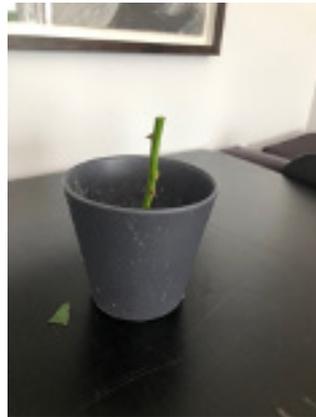
Step 4:

If you play the film it will show the flower get smaller and smaller until it disappears in the soil. But we want it to grow out of the soil! Click the first image and then click select. Now drag across to select all the images in the film and then press REVERSE. Press play and watch your flower grow out of the soil into a full flower! The magic of stop frame animation!
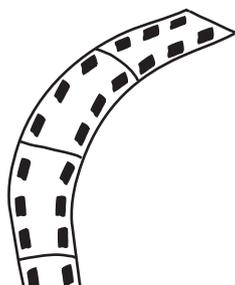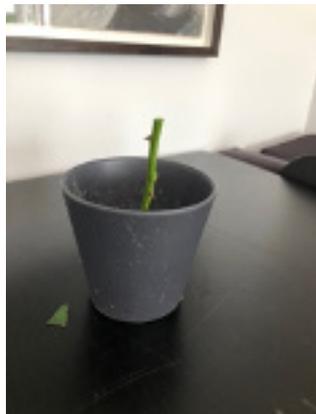
coding in AR: CoSpaces

Augmented Reality using Co Spaces is about creating worlds, adding sound, speech, characters, as well as using block coding so that the world you've created can come to life and be explored.

For this activity you will need:
- A laptop or a tablet or a smartphone
- This link: https://edu.cospaces.io/Auth
  If you would like a login, please email imaginationhub@ioi.london and we can send you one.
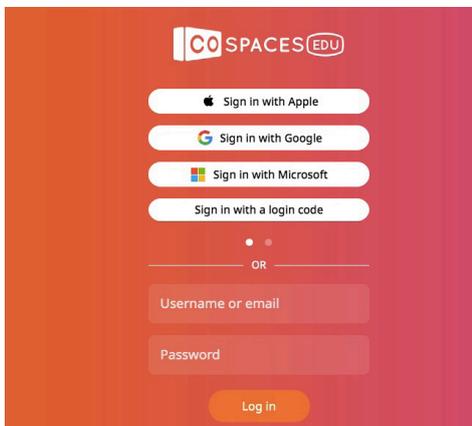
Step 1: Getting started

Log in with the username and password.

Step 2: Creating your Co Space

Click on 'Cospaces' (it might also be called 'Free play'). Now choose 'Create Cospace'.
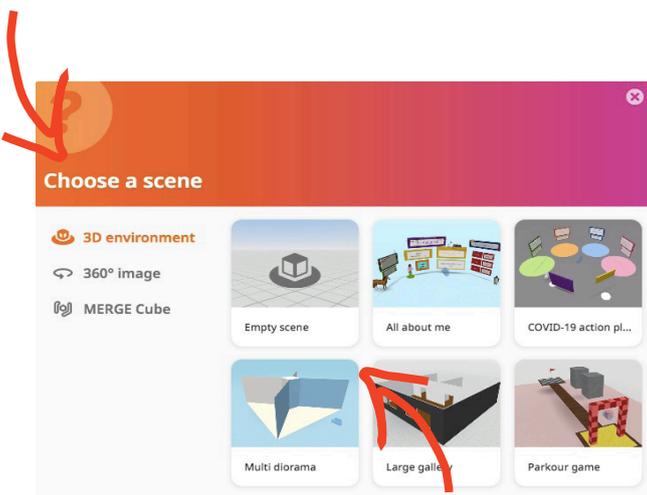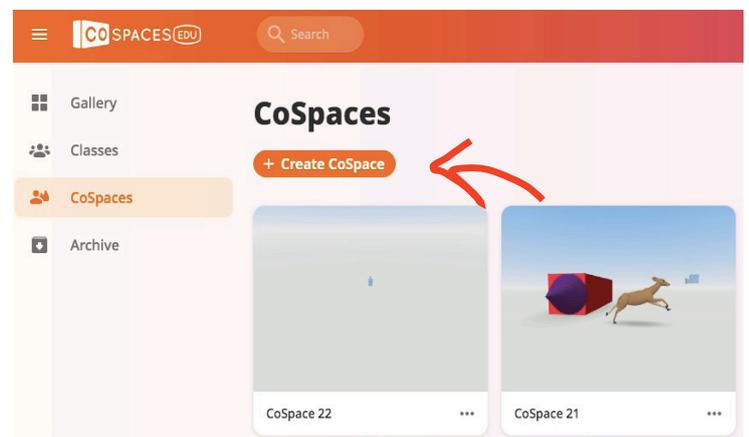
Choose 3D environment.
Now click on 'Empty scene'

Step 3: Understanding the layout of Co Spaces

This takes you back to the homepage

These buttons will take you back to your last step or forwards to re-do

'Share' your space with your friends

CoSpace 23 - Scene1

Home   Undo   Redo   Snapping   Help   Share   Code   Play

This shows you what your world looks like

Create new scenes here

This is the camera

'Upload' sound, video and images

Library   Upload   Environment

Everything you create will show up here

'Library' has all of the characters, animals and objects

Choose your environment (or background)
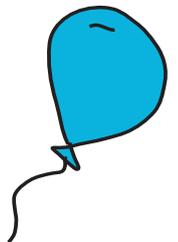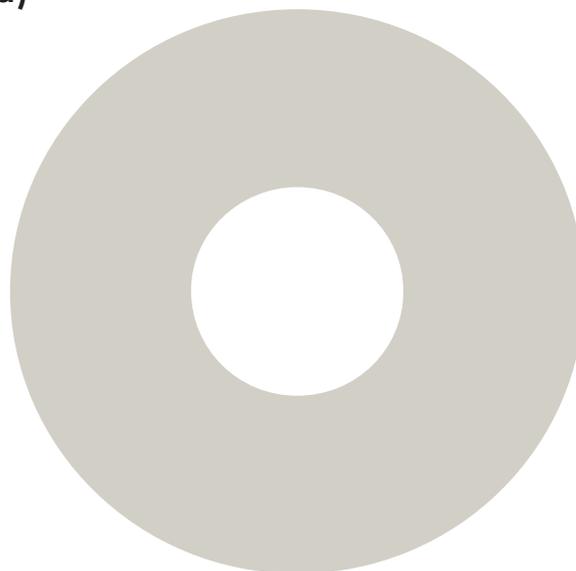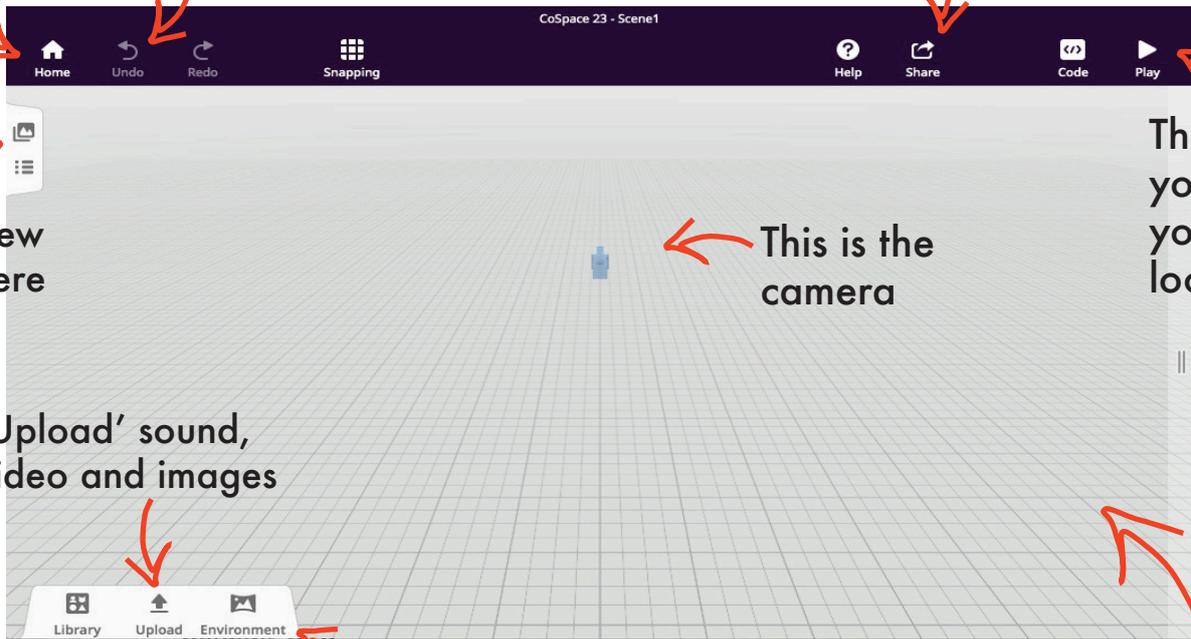
Step 4: Designing your Co Space
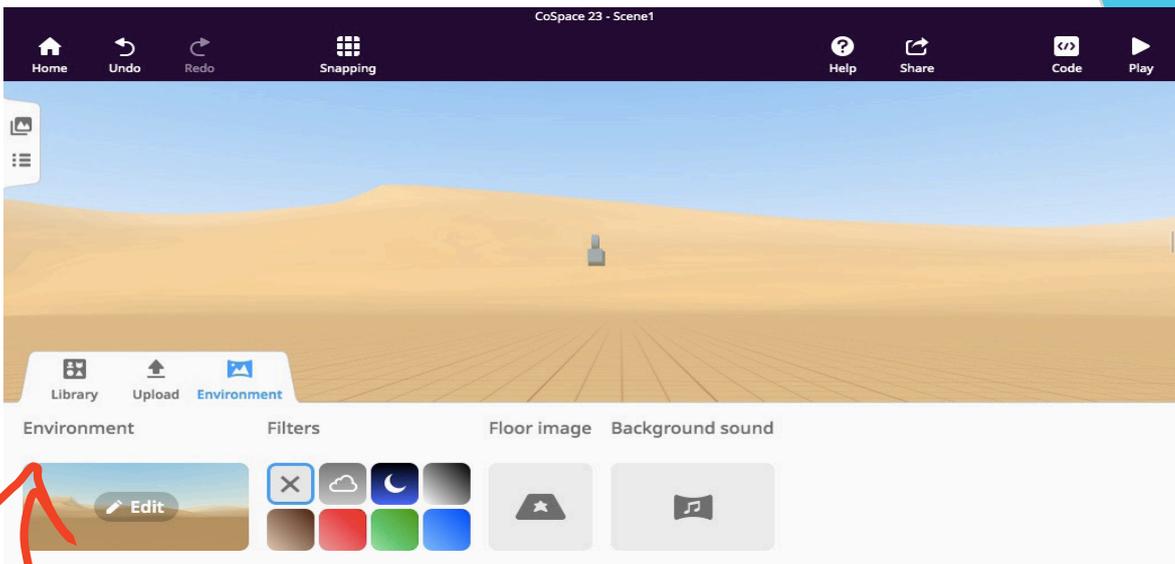
1. Click on 'Environment'. Then choose 'Edit' to select your background.

2. You can also choose a 'Mood' for your environment.
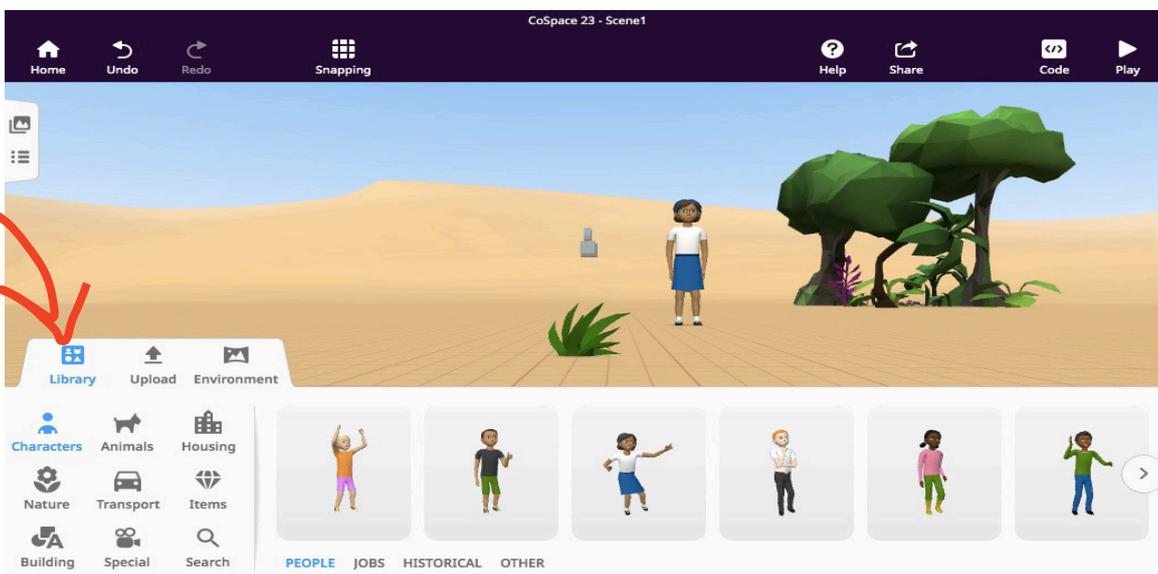
3. Click 'Library' and start choosing characters, animals and nature to go in your world. Click and drag your favourite things into the space.
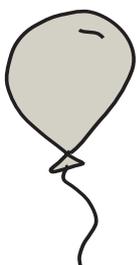
How do you edit your character?

1. Double click on a character/animal.

2. Click on 'Material' now you can change the way your character looks.
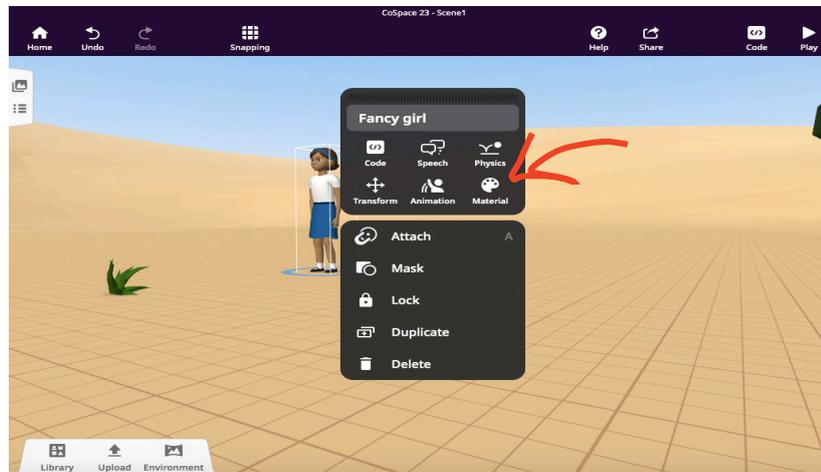
How do you make your character think or say something?

1. Double click on a character/animal.

2. Click on 'Speech'.

3. Type what your character will think or say.
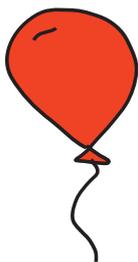
How to make things move?

This is how to animate your characters:
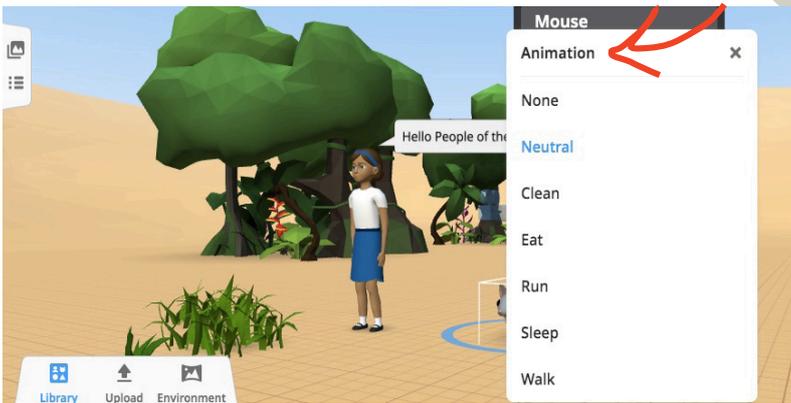
1. Double click on a character/animal.

2. Click on 'Animation', now you can choose what you want your character/animal to do.
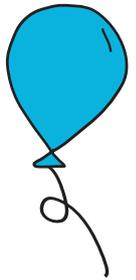
This how to make your characters move around your scene:

1. First we have to code it. Double click on a character, click 'Code', then 'Use in Co Blocks'.
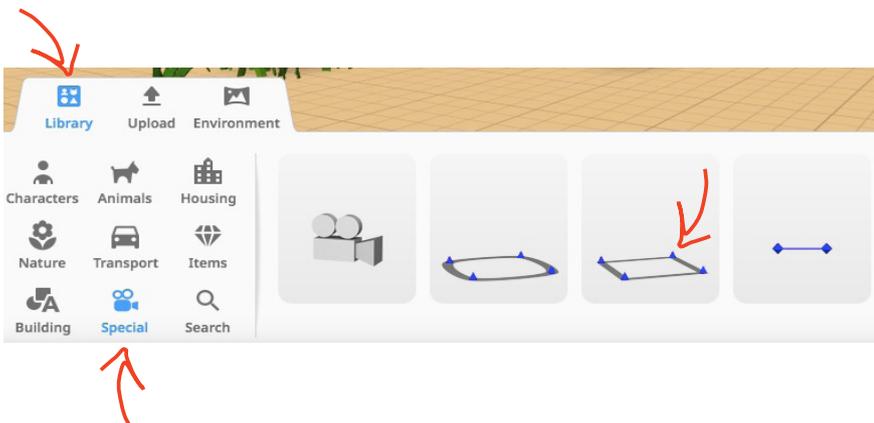
2. Go to 'Library', 'Special' and choose the a path, for example 'Square Path'.
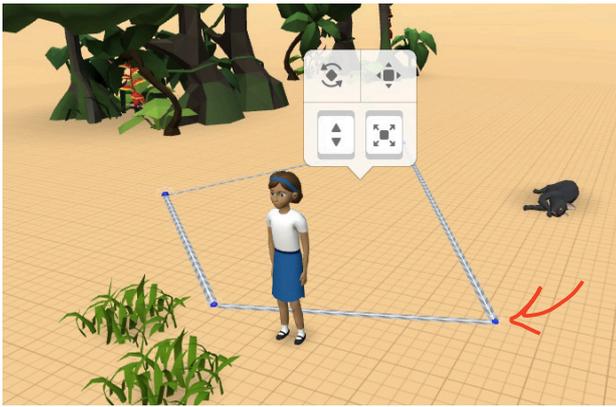
3. To make your Square Path bigger, click and drag each blue dot.
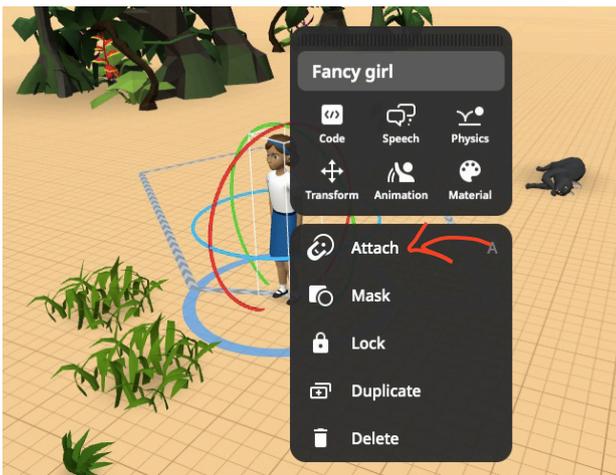
4. Double click on your character and select 'Attach'.
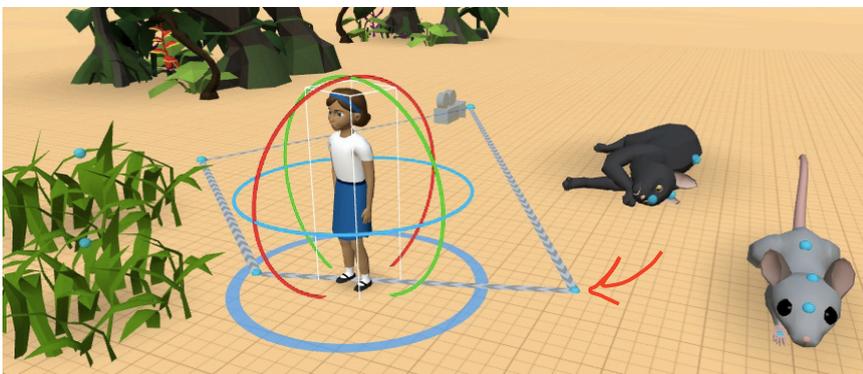
5. Lots of blue dots will appear - we want to click on a blue dot on our Square Path.

6. Now at the top of the page go to 'Code', then 'Coblocks'.

1 ▶ When Play clicked

2 move Fancy girl ⌄ on path Square path ⌄ ...
   in 5 sec.
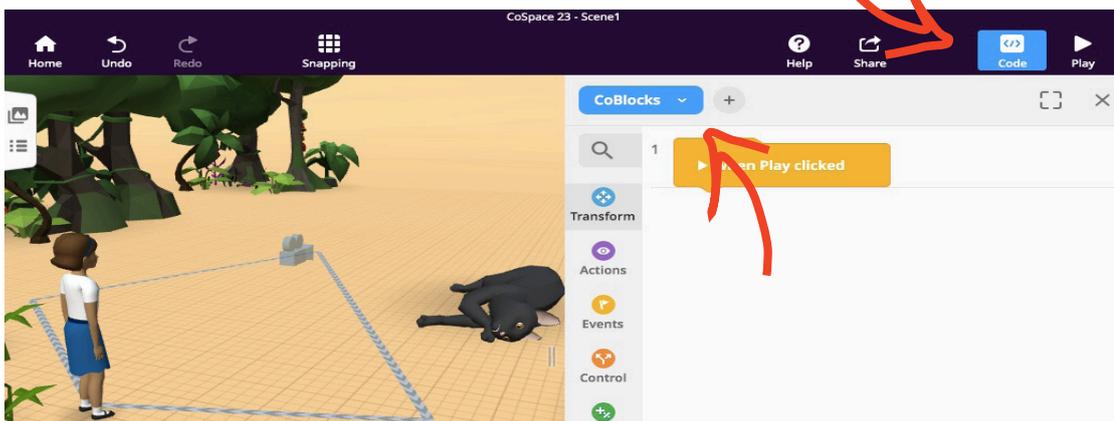
6. Under the coding block 'Transform', find the block that looks like this one. You can change the amount of time your character moves for too.

7. Click the x to close the coding panel, then the 'Play' button on the top of the screen and your character should be moving. You can keep adding in as much code as you like.

Top tip! The coding panel is split into three parts!

CoBlock ⌄ +

🔍

⊕ Transform
👁 Actions
▶ Events
🔀 Control
➕ Operators
📦 Items
💬 Data
❤ Functions
☹ Physics
⚙ Settings

Transform
Transitions

move Fancy girl ⌄ 1 meters f...
in 1 sec.

move Fancy girl ⌄
to x: 0 y: 0 z: 0
in 1 sec.

move Fancy girl ⌄ on path Square...
in 5 sec.

turn Fancy girl ⌄ clockwise ⌄ by

turn Fancy girl ⌄ clockwise ⌄ by
with radius 1 meters in 1 sec.

1 ▶ When Play clicked

2 move Fancy girl ⌄ on path Square path ⌄
   in 5 sec.

Here are the coding blocks

These are the different codes

Your code appears in this red section.

Step 5: Adding new scenes and audio

Click on this button at the top and

Then select 'New scene' to create a new scene for your world. Just like in a film where there are different scenes, your world is even more interesting with several scenes. You can choose an environment and characters the same way you did before.
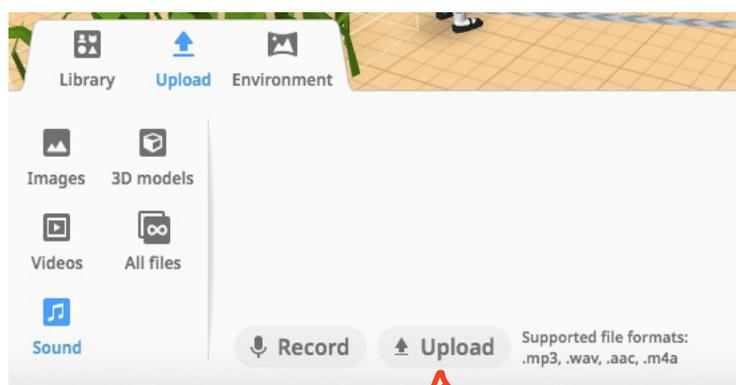
To add in sound:

Go to 'Upload', then 'Sound'. Now you can record your own sound or upload a song or sound you may have already on your device. Click 'Play' at the top of the screen to see if it worked.

Hack, code and experiment! There is so much to explore with CoSpaces. It is worth having a look through each of the Block Coding Sections to see what you can find.
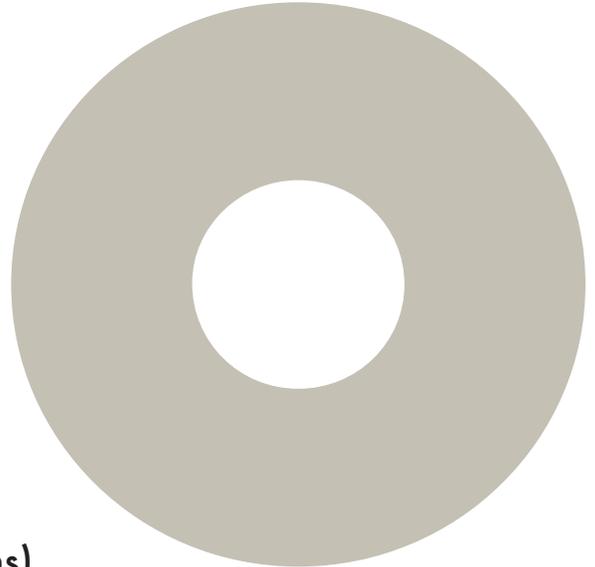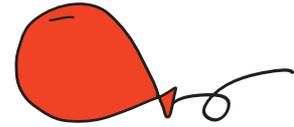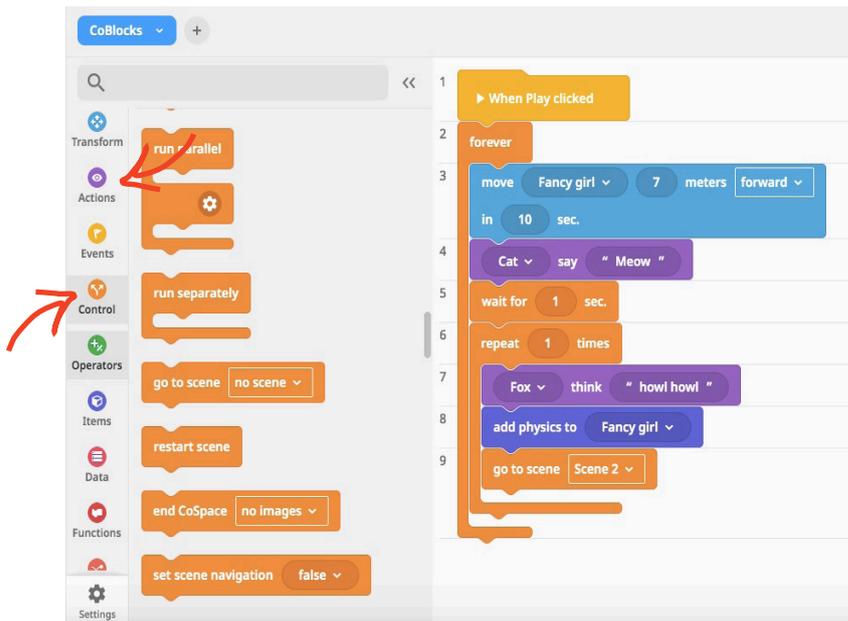
Try coding that will jump to a different scene (Controls) or maybe adding some sound (Actions).

What about adding a new 'Codeblock panel' so that you can add more code? You can use this to create separate codes for each scene too. How about experimenting with changing the view of the camera to orbit, fly or walk?

Share your AR space:
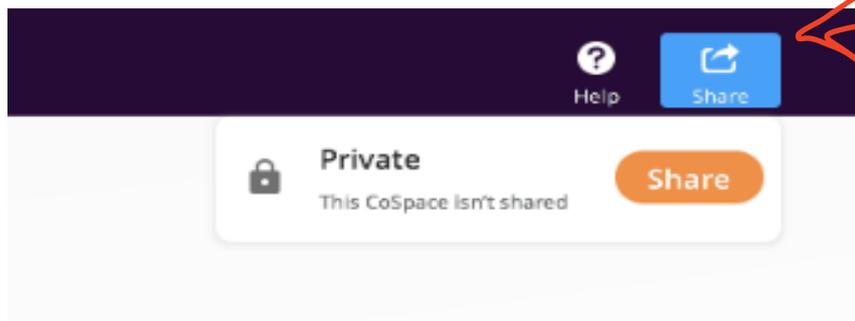
1. At the top of the screen click on the 'Share' button. Then click 'Share' again.
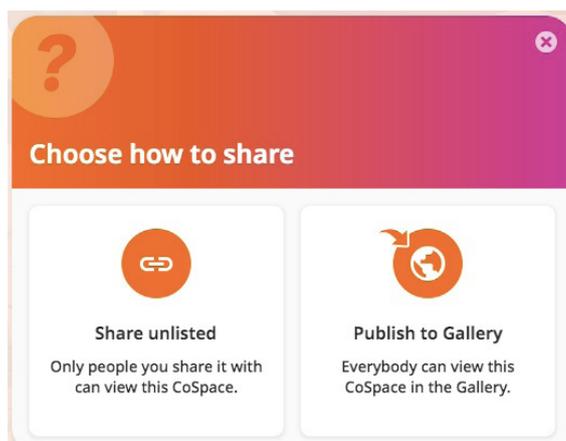
2. You can choose to share it with just the people you know using 'Share Unlisted'. To let everyone on CoSpaces see choose 'Publish to Gallery'.

3. Now just follow the instructions and that's it!

Well done!

gamification: MakeCode Arcade

Gamification using MakeCode Arcade is about creating retro games, designing characters and scenes, adding music, sound effects, as well as using block coding so that characters can explore the game and collect points.

What you will need?

- iPad or Laptop
- The website https://arcade.makecode.com/ (it is free, and no login is required)

Step 1: Getting Started

Click on 'New Project'
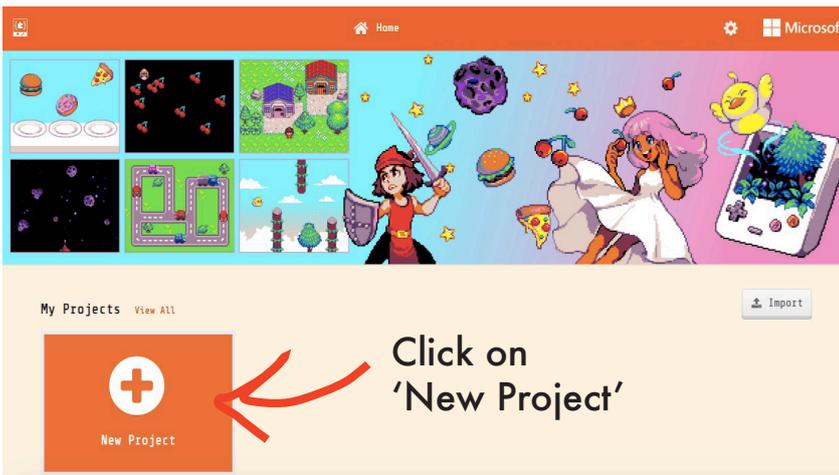
Step 2: Naming your project

Give your project/game a name, for example:
NAME OF YOUR GAME – YOUR NAME.
Then click 'Create'.
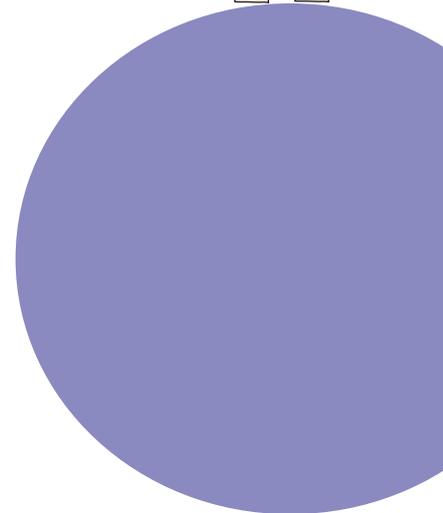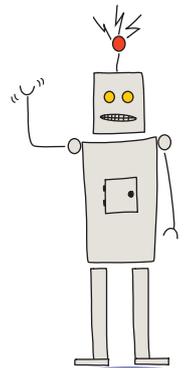
Step 3: Understanding Make Code Layout

This takes you back to your previous projects (games)

This lets you share it with us and with your friends and family

Block Coding

Coding Panel

Play and test your game

Menu

A

B

Microsoft

🏠 Home   ⤳ Share   ⊹ Blocks   JS JavaScript ⌄   ? ⚙ ▦ Microsoft

Search... 🔍

◀ Sprites
🎮 Controller
● Game
🎵 Music
🌲 Scene
📇 Info
↻ Loops
⤭ Logic
▦ Variables
▦ Math
⌄ Advanced

on start

⬇ Download   •••

hello   💾 ↻

↺ ↻ ⊖ ⊕
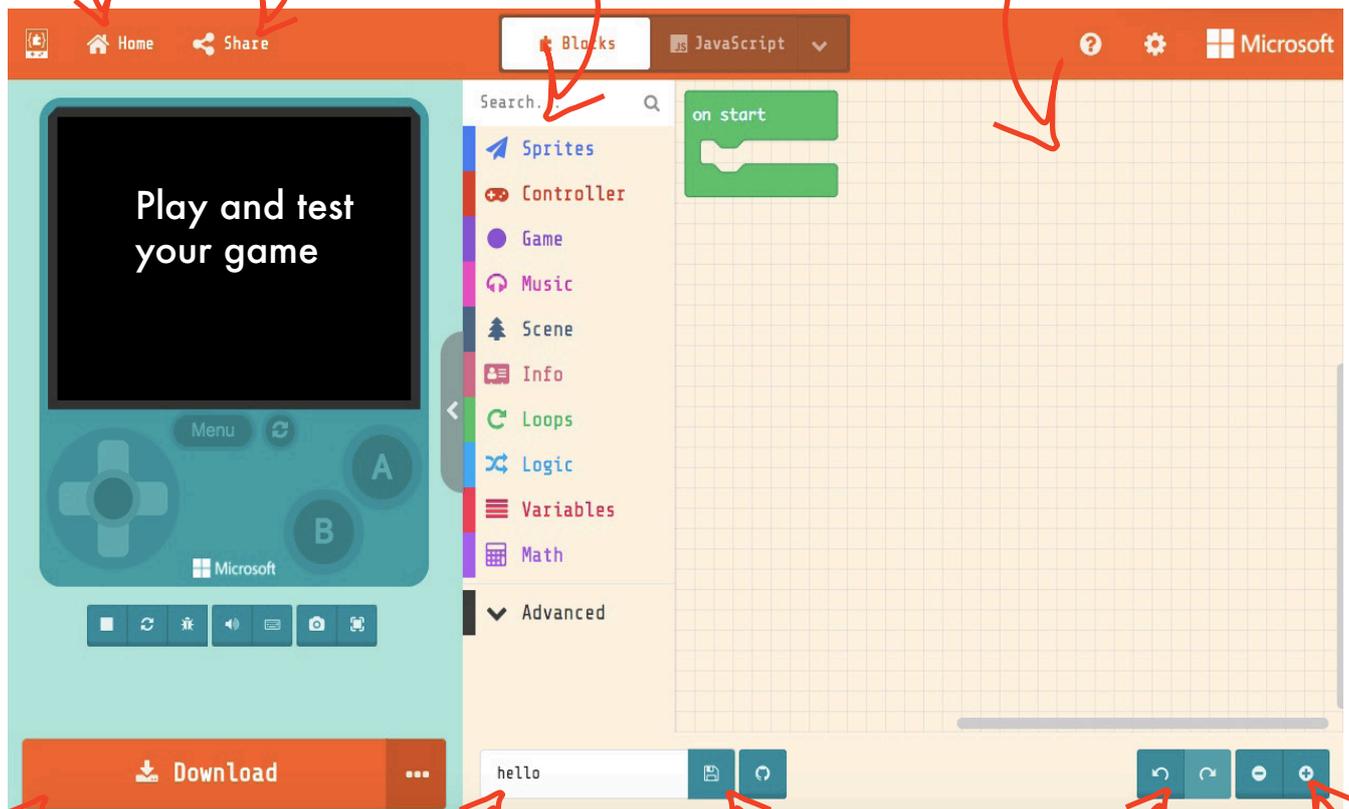
'Download' will save your project onto your computer/tablet

You can change the name of your project

Saving your project

Undo/ Redo

Zooming in and out of your page
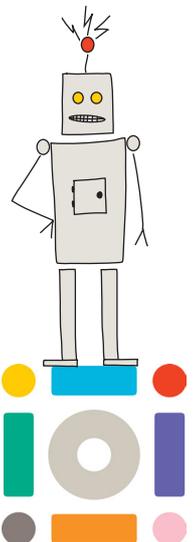
Step 4: Understanding your Console

The console is a simulation/test of what your game will look like.

The toggle is here

You use buttons A and B to play your game

If you click here, you can enlarge the console so that it will be full screen

This lets you take a photo of your game

You can play your game with more keyboard keys here
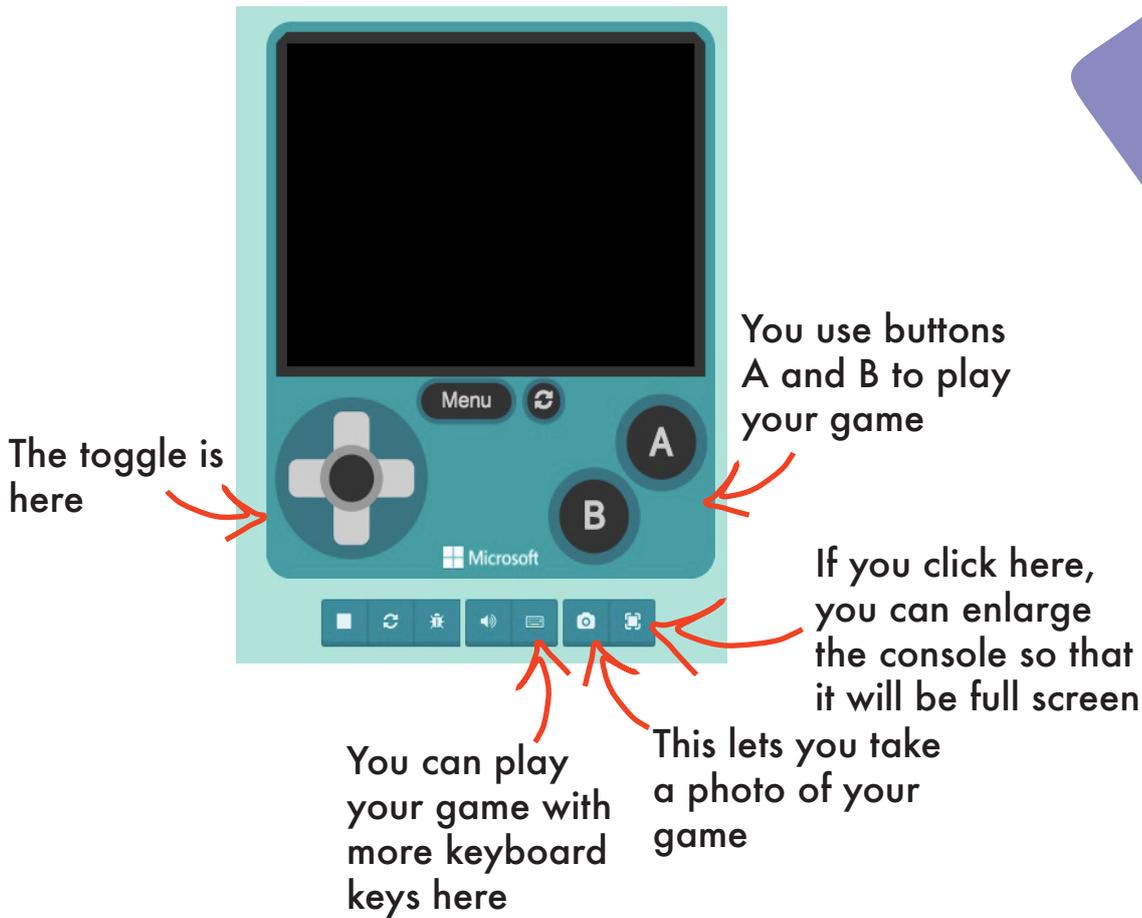
Step 5: Understanding Code Blocks

Coding blocks
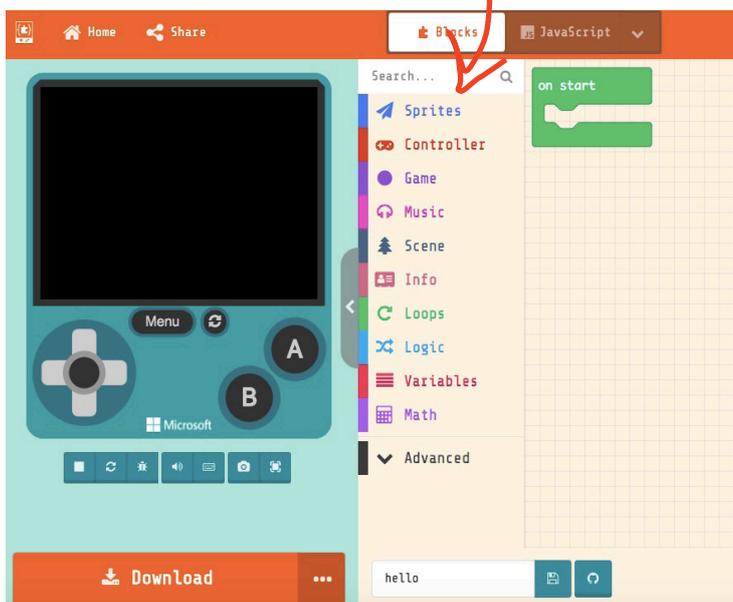
We will be adding all of the following code into 'On Start'. The colours of the Code Blocks show what they relate to.

For example, every code that you need to add to your scene can be found in 'Scene'.
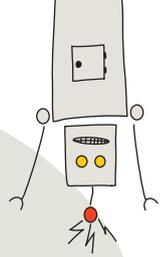
Step 6 Design your background

There are two ways to create a background:

1. Draw your own background

2. Use the tile map

How to draw your own background:

1. Click on 'Scene' in the Coding Blocks section.
Drag the code 'Set background colour to' the right of the screen so that it will appear in your Coding Panel. Place the code into the 'On Start' Block. Click on the box to change colour.

2. Next Drag the code 'set background image to'.
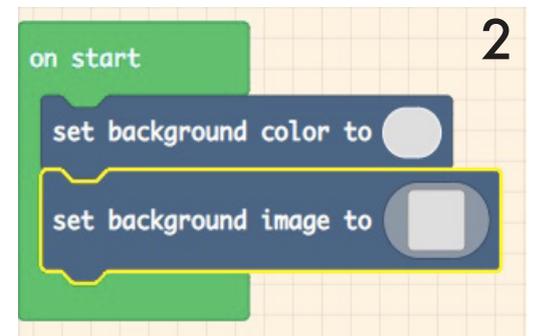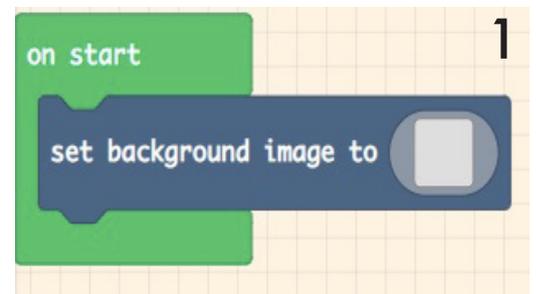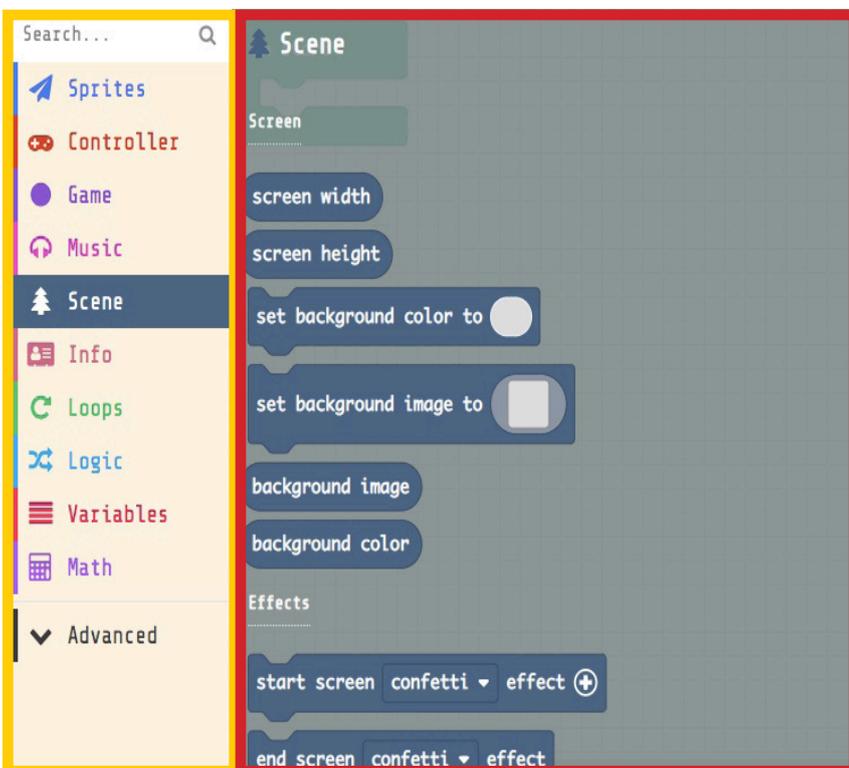
Coding blocks

Coding panel
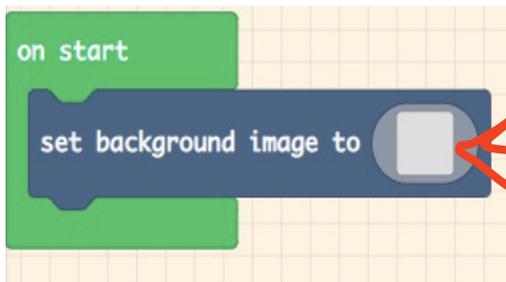
Click on the square box
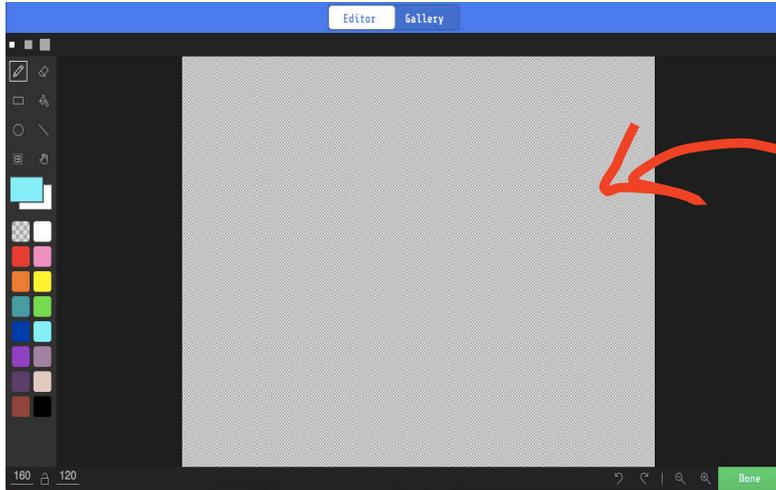
Draw here

Using the tools, you can select the pen to draw your scene. The icon selected will fill the whole of the background. You can change the colour to whatever you like. When you are finished press 'Done.' Your drawing will then appear on the game console.

Creating a Tile Map for your background:
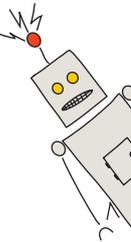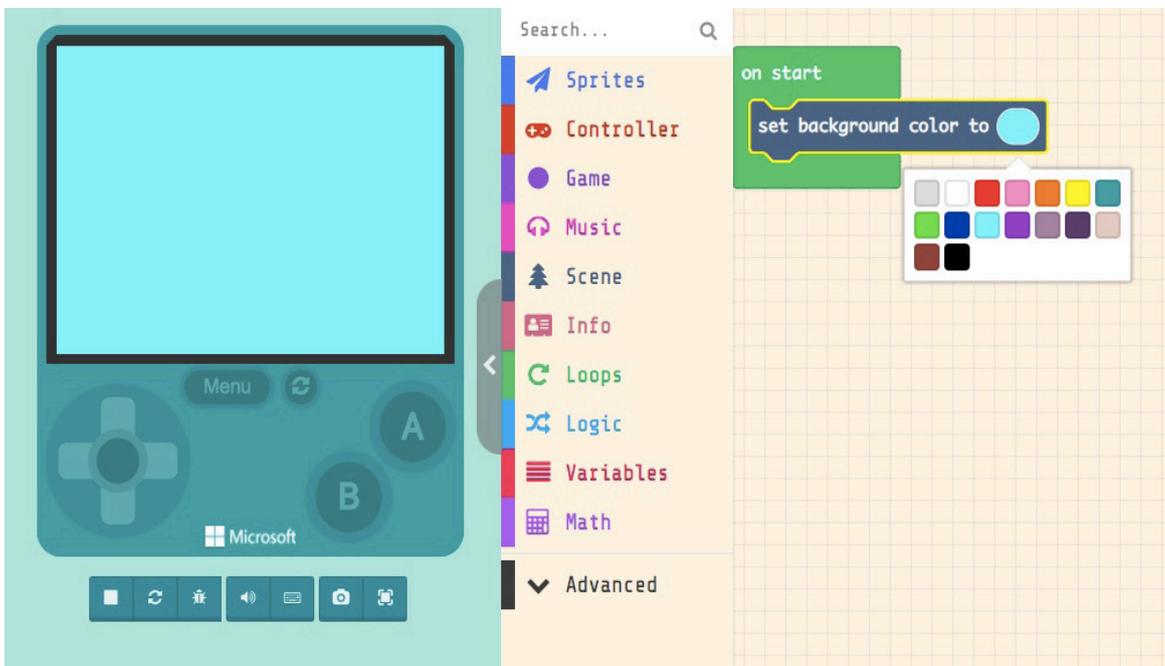
Click on Scene and drag in the code 'Set Background Colour To'. Place the code into 'On Start'. By clicking on this icon you can change the colour.
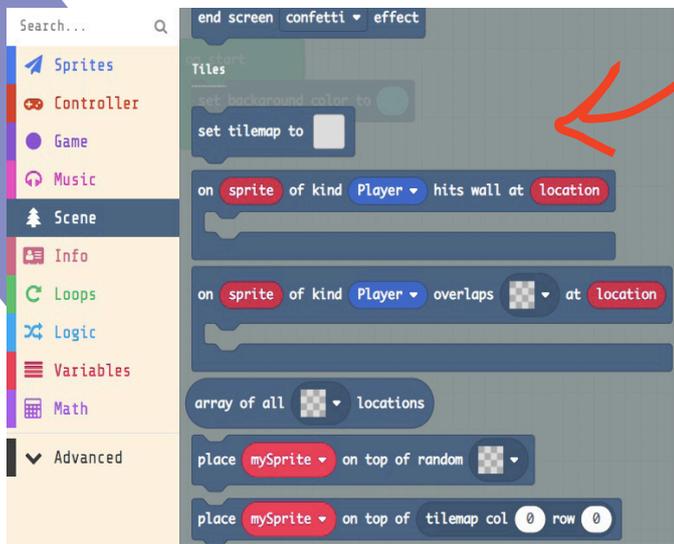
Next Click on Scene and then Drag the code 'set tilemap to' into your 'On Start' block.

Click on the square ▢
Now you can create your own Tile Map. Click on an image and then click on where you would like it to be in your space.
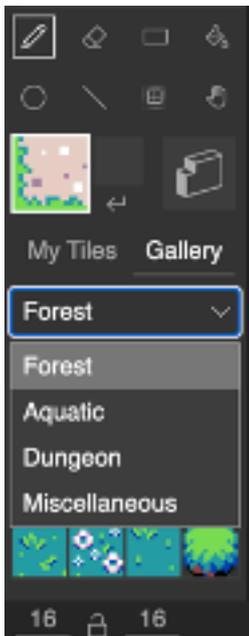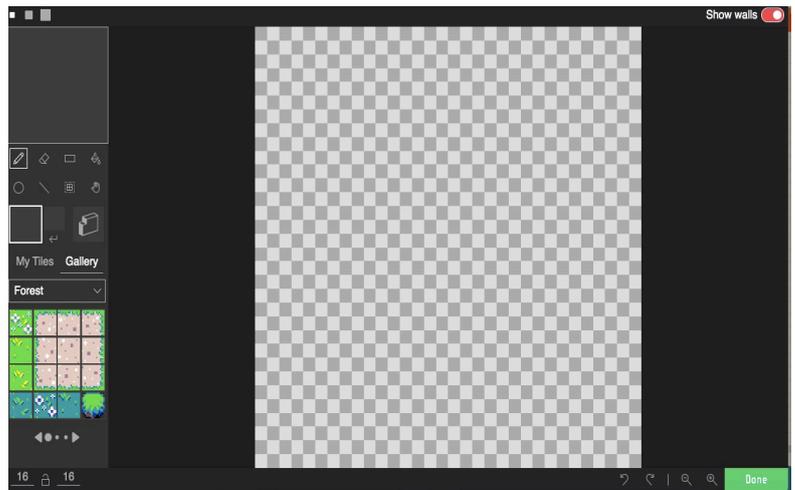
There are lots of themes that you can explore!

When you are happy with it you can press 'Done'
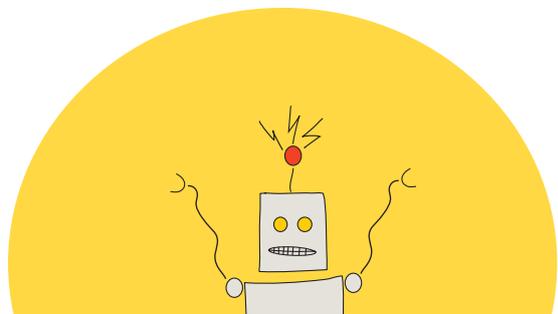
7. How to create your own character/sprite:
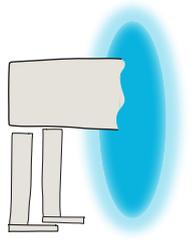
Click on Sprites.

Drag the code 'set mysprite to sprite (...) of kind player' into 'On Start'.
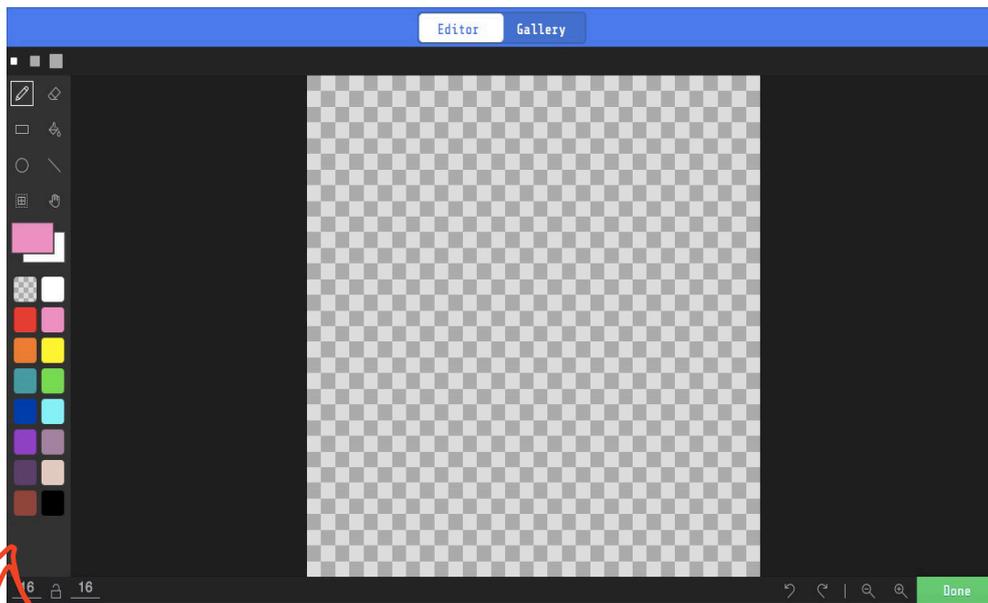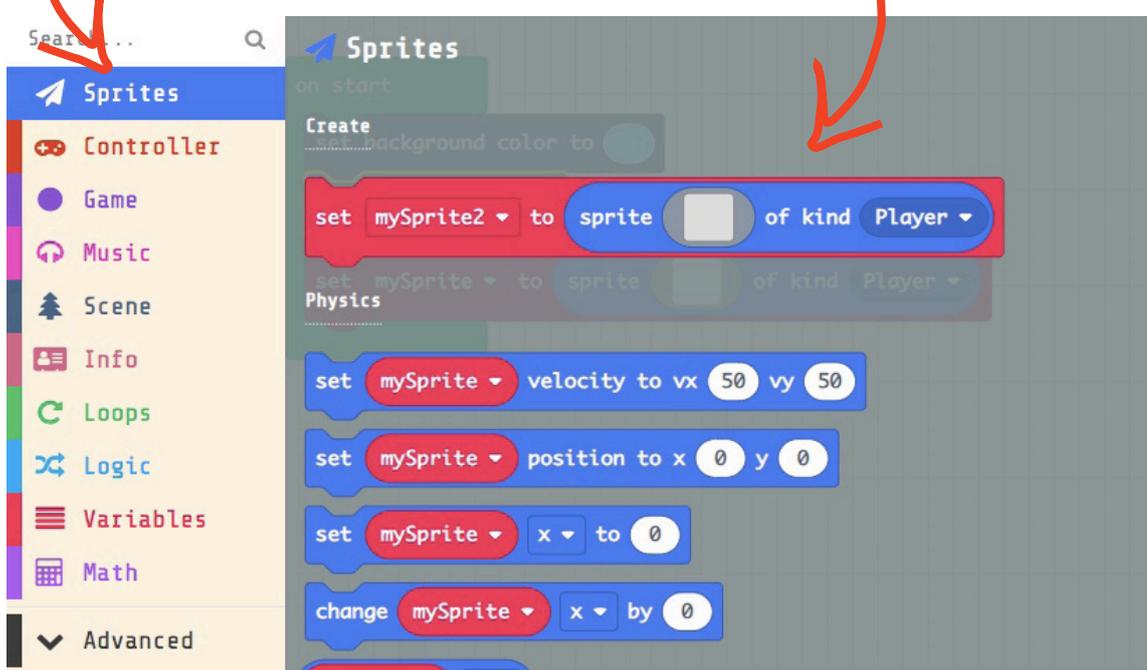
Using the tools, you can begin to design and draw your character. When you are finished press 'Done.'
Your character will then appear on the game console.
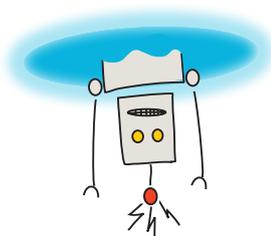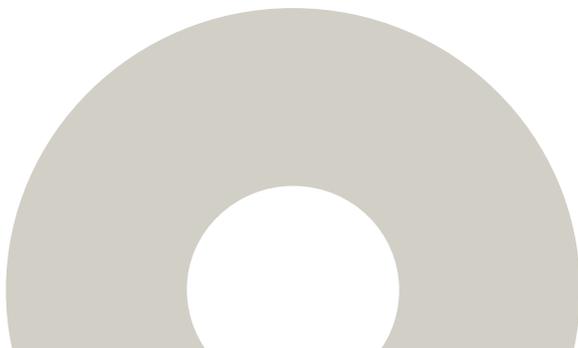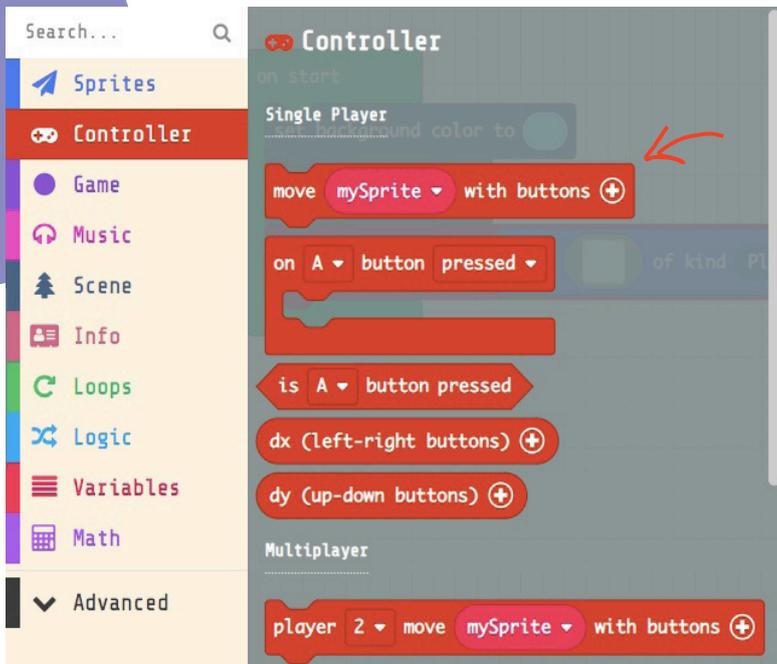
Click on Controller and then select and Drag 'move mysprite with buttons' into 'On Start' underneath the code 'set mysprite to sprite … of kind player'. This will then mean that your character will move when you move the Toggle, or your arrow keys if you are using a keyboard.

Here is what your code should look like so far:
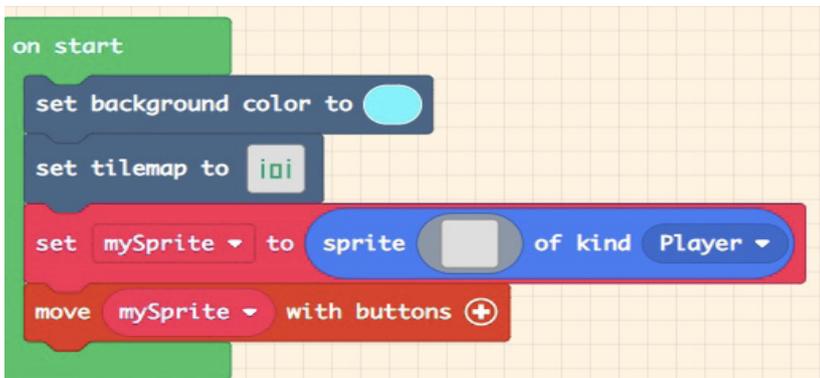
If you used a Tile Map for your background it should look like this …
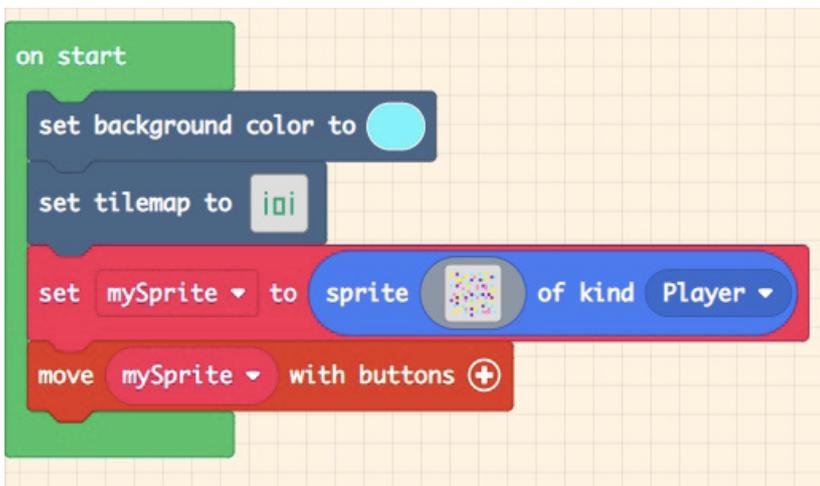
If you decided to draw your own background it should look like this…

Step 8. Start and End Screen effects for your Game
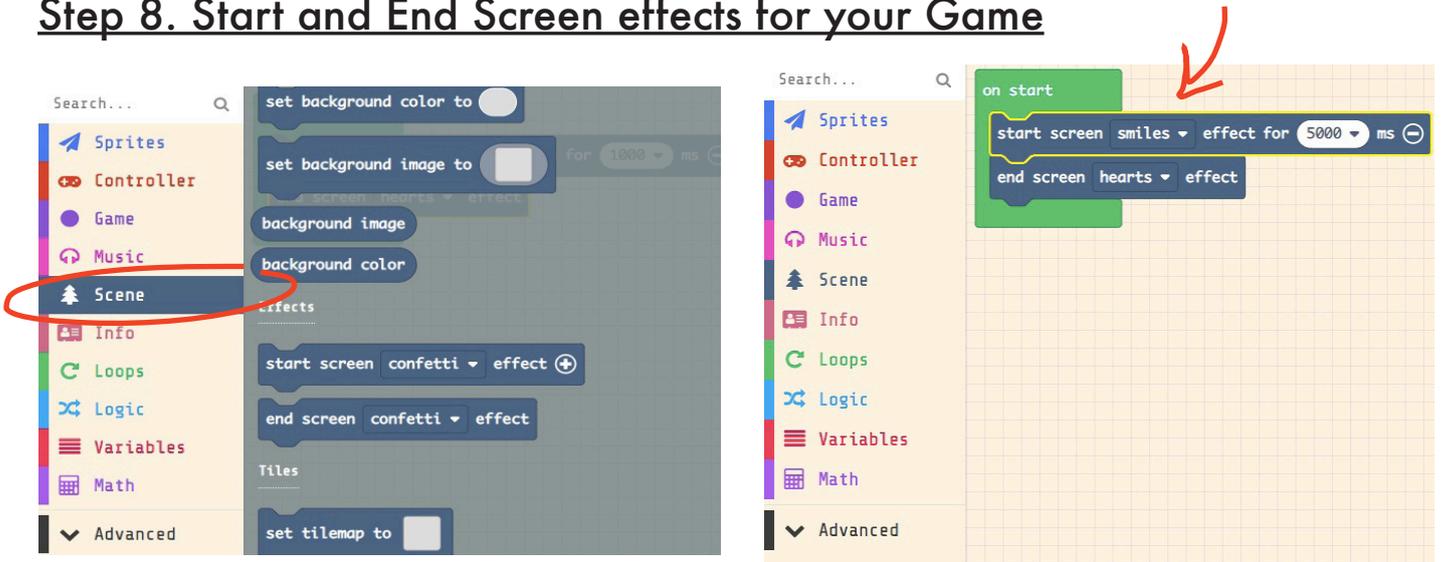
Click on 'Scene', then drag the code 'Start screen …. effect' and also 'End screen …. effect' into your code 'On Start'.



These are some examples of the confetti effect.

Hack and Experiment with these codes! There is so much to explore with Make Code Arcade. It is worth having a look through each of the Block Coding Sections to see what you can find.
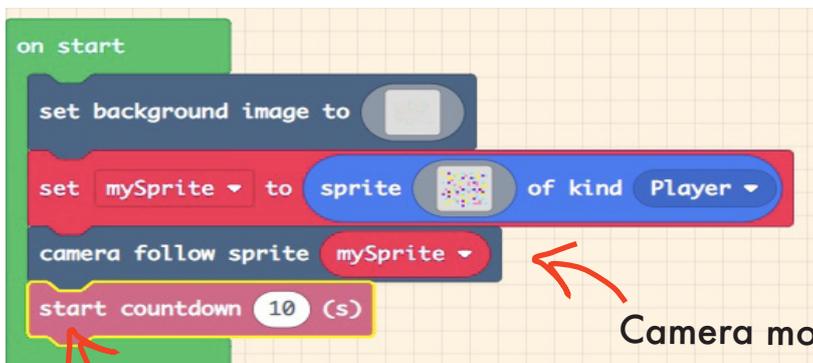

Camera movements (Scene)

Adding countdown timers (Info Block)
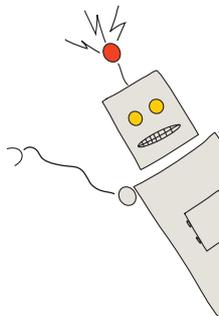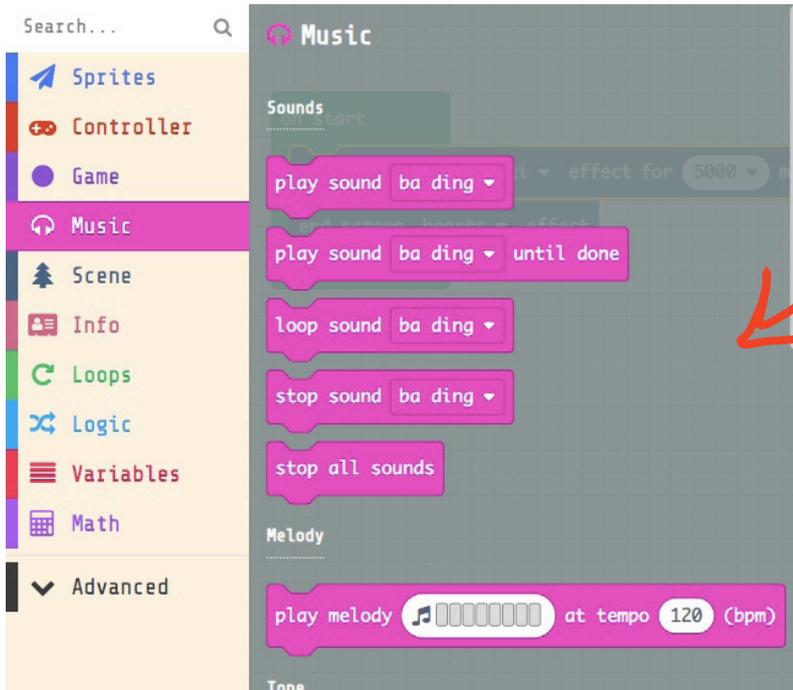
Try adding music to your game!
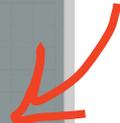
If your character travels over the wrong tile (for background using Tile Maps), it could display 'Game Over', or 'You Win!' if they travel on the right tile.


Other Tutorials and Game Ideas can be found here.
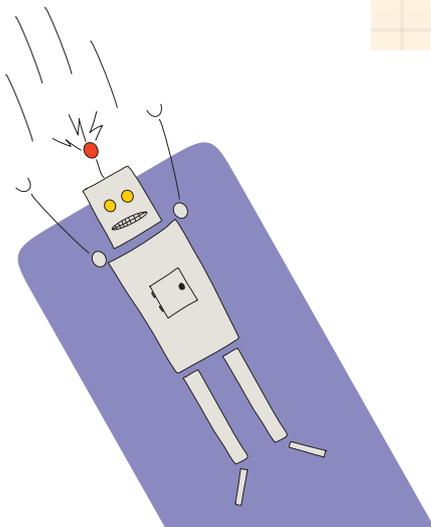
Step 9. Share your game.

1. Click 'Share'
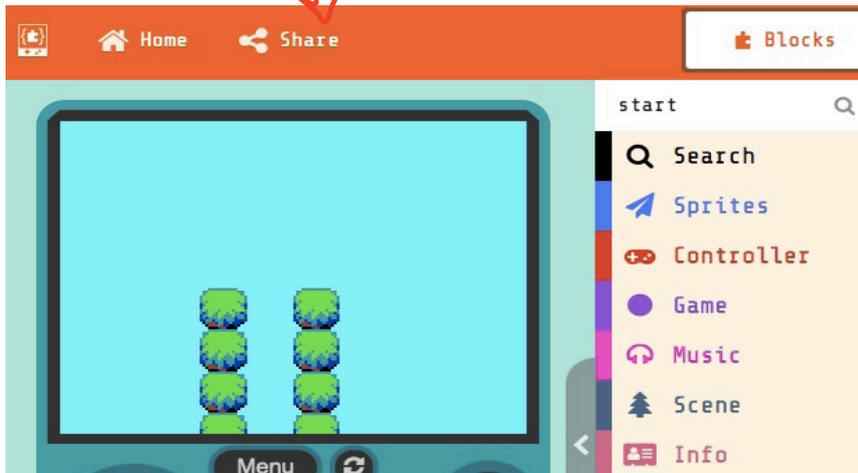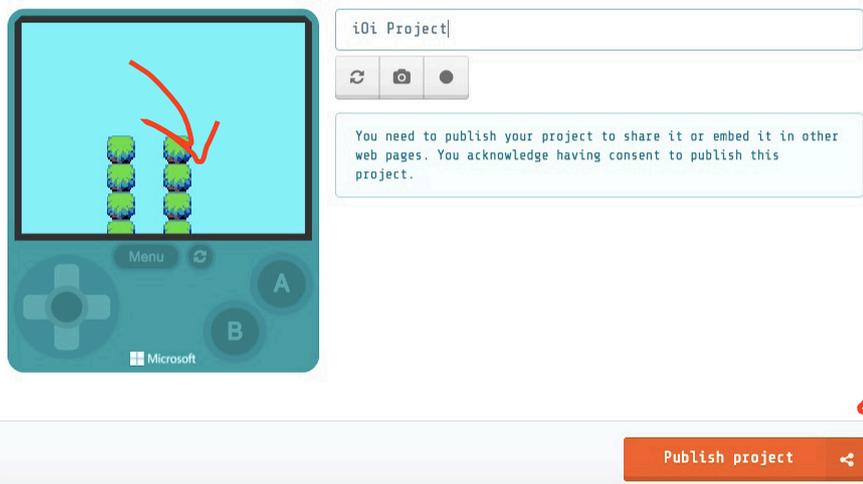
2. Then select 'Publish project'

3. Copy the link or scan the QR

https://makecode.com/_2bc2Y71gzhR8

Brought to you by

institute of
imagination