If you are new to Scratch 3.0, pick up a copy of the Scratch 3.0 Basics sheet to help with the screen layout.
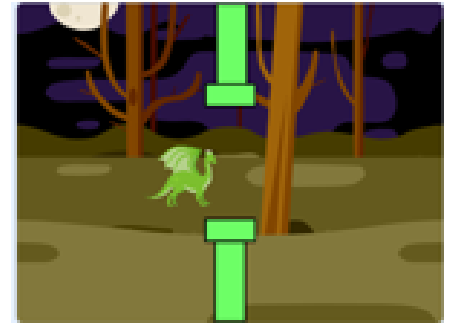
# *Start Your Project*

1 Open up Scratch.

For today's Project, we are going to re-create a game based on the internet sensation Flappy Bird, but using a fire breathing Dragon!!

Before we do anything, let's check everything is in the right place.

- Click on the Code tab in the top left of the screen.
- Make sure the mini cat Sprite has a blue highlight around it. This shows which sprite you are coding – really useful when you have more than one sprite. It should look something like this.
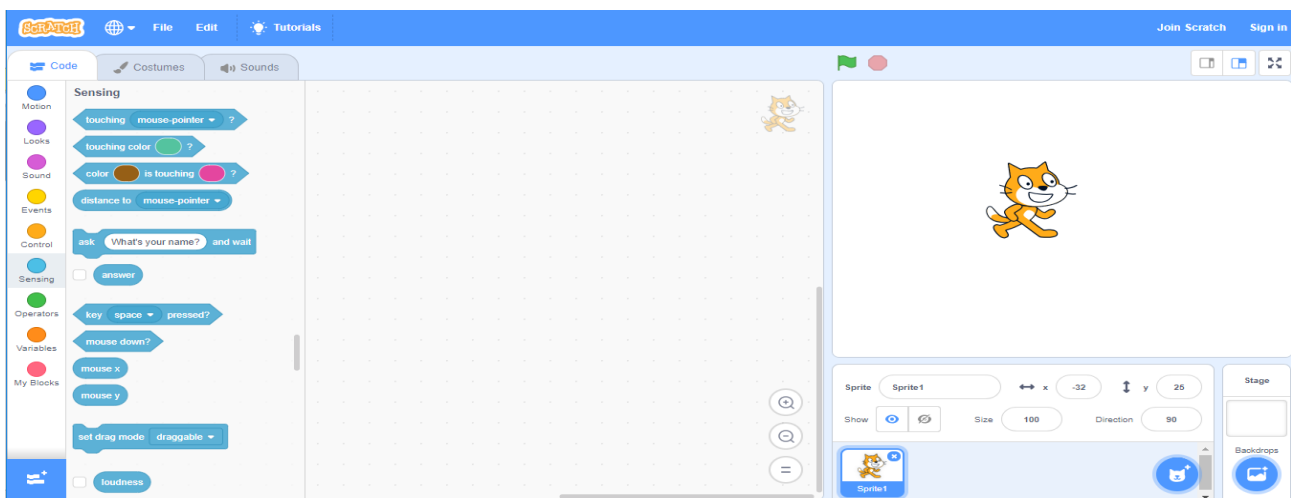

2 First click on the x by the cat sprite to delete the cat.

- Go to the bottom right of the screen to the Sprites, and select either the magnifying glass or the cat Spite (they do the same thing!) to select a sprite from the library.
- In the library, find the dragon, and click on it.
- You should now have a dragon where the cat was.
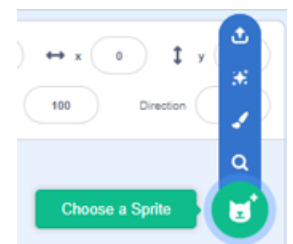
3 The dragon is quite large, so we need to shrink it.

- Click on the Code tab.
- Go to the "*Events*" section and find the "*When* (picture of a green flag) *clicked*" and drag it to the blank Script page on the right.
  - Now in "*Looks*", find the "set size to   %" and add it to the block.
   - ○ Change the number to 25.
    - ○ Your code should look like this.
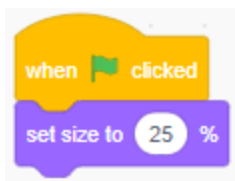
Did you know? …When you hold a new block just under an existing command, you will see a shadow. When you see this and you drop the new command, they stick – Just like Lego!!
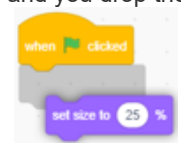
4 In our game the dragon will keep falling unless the space bar is pressed, so you only control the up and have to get the timing right for when he drops. How do we do this? With Code of course, try this:
- Drag in another "*When* (picture of a green flag) *clicked*".
- From "*Motion*" add the "*go to x: y: "*. Change the values to *-50* for x and *0* for y.
- From "*Control*" add in a "forever" loop.
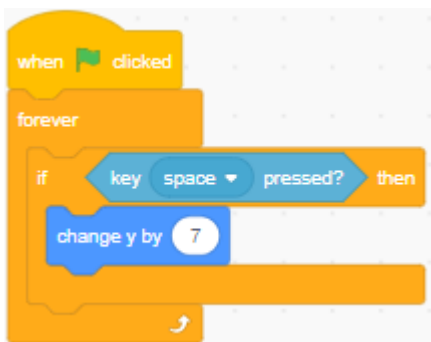- Inside the loop, from "*Motion*" add the "*change y by* " and change the number to -2.
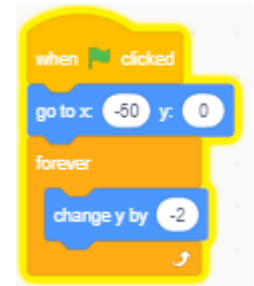
Your code should look something like this.

This moves the dragon to position x=-50 and y=0. It then continues to move down by -2 each time.
- Click on the green flag and see what happens.

5 We now need to make the dragon move upwards when the space bar is pressed. Try adding this:
- Drag in another "*When* (picture of a green flag) *clicked*".
- Add on a "*Forever*" loop.
- Also, from "*Control*" add an "*if then*" loop inside the "*forever*" loop.

- In the diamond space, from "*Sensing*" add the "*key pressed*" and make sure the *"space"* option is selected.
- Inside the loop, from "*Motion*" add the "*change y by* " and change the number to 7*.*

- This piece of code should look like this.
- Time to save your project so you don't lose your work.
- See the Scratch Basics sheet for how to create an on-line account.

Save your work – If you need help, refer to the **Scratch 3.0 Basics sheet.**

Let's test your work!
- ✓ *Click on the green flag.*
- ✓ *What happens to the dragon?*
- ✓ *What happens when you click on the spacebar?*
- ✓ *Now time to play* 😊
  - ✓ *What happens if you change the values for y?*
  - ✓ *Can you change the starting position of the dragon?*
  - ✓ *Can you make the dragon smaller or larger?*
- ✓ *Don't forget to put the values back to the code above, so I know where you are up to.*

Let's Make the Dragon Really Fly

6 When the dragon moves up and down the dragon doesn't flap its wings. Let's make that happen.

- Click on your Dragon spite.
- Now click on the Costumes tab.
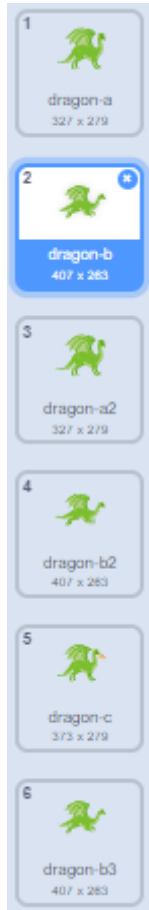
You will see your dragon. However, on the left of the screen you will see the same dragon in different poses. They are labelled *dragon-a, dragon-b and dragon-c*. These are the dragons' *Costumes.* By changing the Costume, it makes your Spite come to life.

I think we can do a little better than the standard, so let's try this.

- Click on dragon-a, right click and select duplicate. You will now have *dragon-a2.*
- Now on dragon-b, do the same but this time twice, so you have *dragon-b2, dragon-b3*.
- Finally drag each one to sort them so they are in this order:
  - dragon-a
  - dragon-b
  - dragon-a2
  - dragon-b2
  - dragon-c
  - dragon-b3
- Check your list against the picture on the left.
  - You can do this as many times as you like to create a mixture.

7 Now we need to make the Costumes change from one to the other as we hit the space bar. For this we need a small change to the code, so click on the *Code* tab.

- From "*Looks*" select the "*next costume*" block and add it under "*change y by*" block so your loop now looks like this.
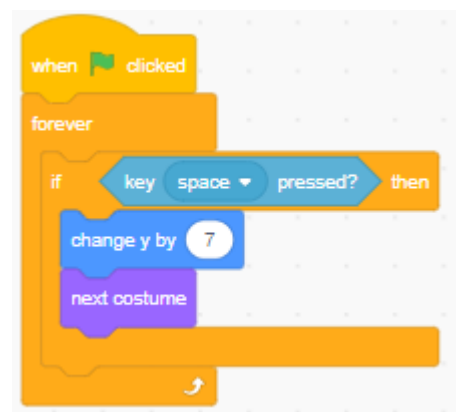
Time to save and test to see if it works as you want it to.
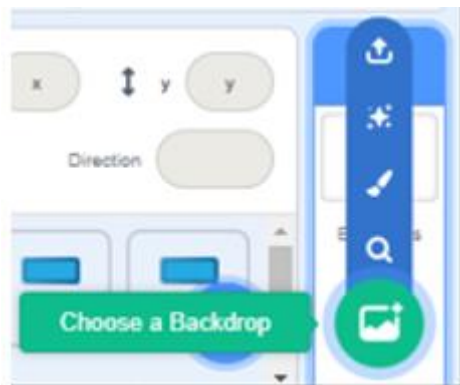
- ✓ *Click on the green flag.*
- ✓ *What happens to the dragon now when you click on space – does it now look like it's flying?*
- ✓ *What happens if you change the order of the costumes?*
- ✓ *What happens if you change the number?*
- ✓ *Can you change the control key from space to another key?*
- ✓ *Make sure you put everything back to where you started so I know where you are up to*

We Need Somewhere to Play

8 Let's add a backdrop to set the scene.

You can choose one from the library, or if you are feeing creative, make one of your own.

- On the far right, you'll find the backdrops.
- Click on the first one and this will take you to the library – just like with the Sprite library, the magnifying glass does the same thing.

- Pick one you think will work in your game by simply clicking on it. I think dragons live in the forest, so I chose "*Woods*". This looks far better.
  o If you want to, you can create your own by using the paint brush.
- My dragon looks more at home now.

Time to save and test … and play.

- ✓ *Click on the green flag.*
- ✓ *What happens to the dragon now when you click on space – does it now look like it's flying?*
  - ✓ What happens if you add more Costumes to the Dragon?
  - ✓ Can you change the sprite completely?
  - ✓ Can you add a customised version of the dragon to the ones already in the library?
  - ✓ Can you change the back drops as your game progresses?
- ✓ *Don't forget to put the values back to the code above, so I know where you are up to.*

We Need Something to Avoid

9 If you have ever played Flappy bird, you'll remember there are things you have to avoid as they move towards you. We do this by creating a new Sprite. Let's do that.

- Click on the paint option for Sprites to create a new Sprite .... and create away 😊
  - This is a chance to show off your creative skills. You are looking to create something for the Dragon to avoid, or pass between. At this stage my advice would be to keep it simple. You can always add more style later
- I've kept it really simple, by creating pipes with a smaller rectangle on a taller one.
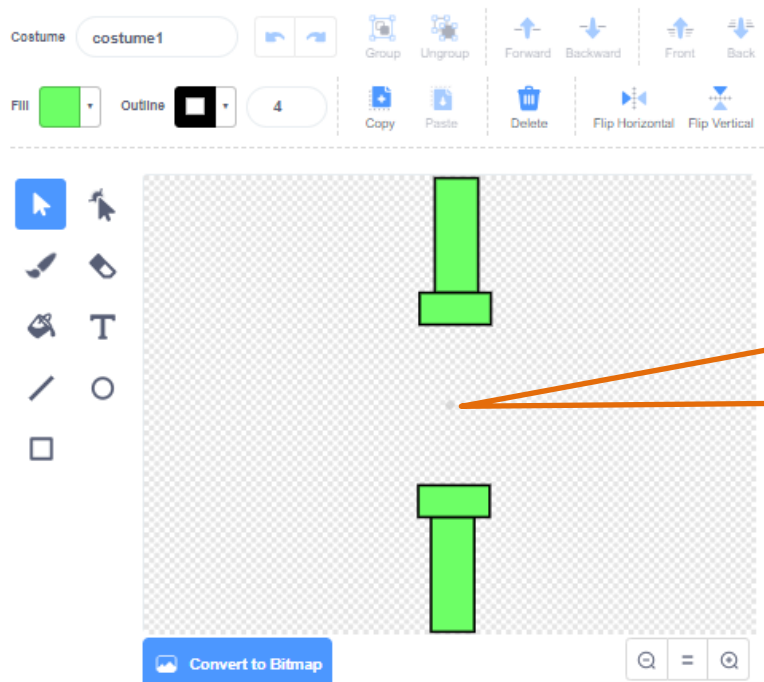

Quick Tip
Make sure you picture is centred around the slightly larger grey dot in the middle of the page. This will avoid problems later

- Once you are happy with your creation, click on the Sprite on the left and select. "*Duplicate*" – just like we did with the dragon.
  - Each time you duplicate, the sprite is given a slightly different name – I have costume1, costume2 and costume3.
  - You can change the name by simply clicking on the Costume cell, just remember what you called them
  - We're going to need this bit of information later.
- Now change one or two things to make the same obstacle slightly different.
  - I've made one pipe taller and one Shorter.
- Do this step again, so you have at least 3 "*costumes*"
- Just like the dragon, you can make more if you want to, which will make the game more interesting (and maybe harder!!)

10 Now we need some action. We need the pipes to glide across the screen and change costumes as it goes. Of course, we do this with code, so over to the *Code* tab.

- Create the following block.
- We've seen most of these blocks before, so just to explain the new ones.
  - *"hide"* hides the pipe Sprite so that it's not in the way.
  - *"Create clone of myself"* creates a copy of the sprite each time – ("myself" refers to the sprite - not you!!)
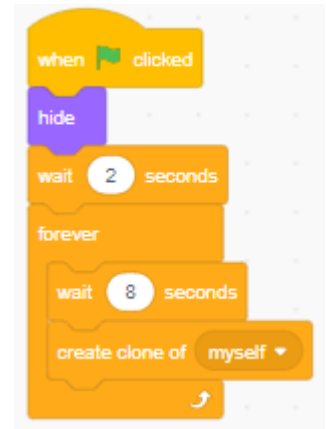
This code creates a copy of the sprite you are coding – in this case a pipe – for you to create new code later, telling it what to do.

- If you need any help understanding any of the other blocks ask one of the leaders – or why not try asking one of the other ninja's – you're all working together.

11 Now let's create the code to tell the cloned sprite what to do.

We need the following to make the pipes glide across the screen. This bit has blocks we've not used before, so I'll help you to understand as we go.

Let's create the code.

- From *"Control"* grab the "when I start as a clone".
  - This refers back to the earlier code which started the clone.
- From *"Looks"* pick the *"switch costume to"* then insert *"pick random"* from the *"Operators"* section. Change the numbers to 1 and however many costumes you created. I created 3.
  - This picks one of the costumes at random so the player doesn't know what is coming up.
- From *"Motion"* pick the *"go to x: y: "* and change the numbers to *240* for x and *0* for y.
  - This places the cloned sprite at the far right of the screen.
- From *"Looks"* select the *"show"* block.
  - This makes the cloned sprite appear.
- Back to *"Motion"* for the *"glide   secs to x: y   "* and change the numbers to 3secs, *-240* for x and *0* for y.
  - This makes the Sprite move from right to left in 3 second moves.
- Finally from *"Control"* add in the *"delete this clone".*
  - Once the cloned sprite reaches the far left of the screen it disappears.
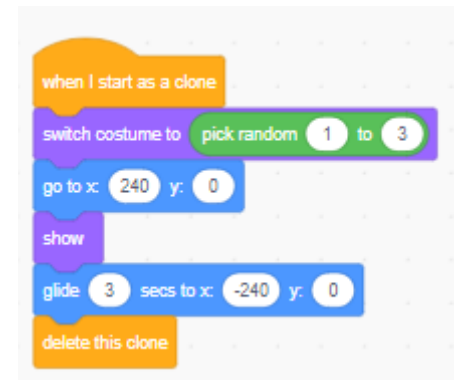
Phew! This shows that a small bit of code can do a lot.

Time to save and test … and play!
- ✓ Does everything work as expected?
- ✓ Can you speed up and slow down your obstacles?
- ✓ Can you make more or fewer obstacles appear on the screen at the same time?
- ✓ *Don't forget to put the values back to the code above, so I know where you are up to*

Avoid the Pipes

**12** If the dragon hits the pipes, nothing happens, let's put that right

On the Dragon sprite, add the following code
- Add a "*when green flag clicked*"
- In *Control* add a "*wait until*" block and then insert "touching   " block from *Sensing,* change the drop down to "*Sprite1*"
- Now from *Control* add a "*stop   " and change the drop down to "*all*"
- Your code should look like this
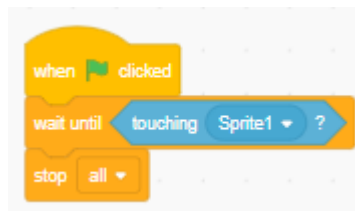
13 Let's add some scoring

- Click on the *Variables* section, and click on *"Make a Variable".* In the box that's pops up add "Score", and make sure "*For all sprites*" is selected, and click OK. You'll notice 2 things

  o You now have a score box on your screen in the top left corner

  o There is a new block created in the Variables section called "*Score*". We'll need this in a few moments.
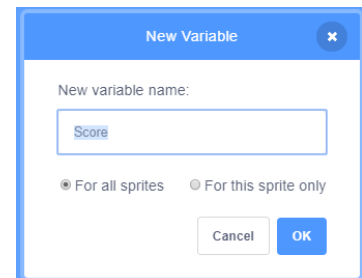
14 The game is finished! CONGRATULATIONS 😊

Or should I say, that's my game finished, but this is YOUR game not mine. Time to put your own stamp on it and really show off what you've learned

Customise it now and add your own features to the game.

Here are some ideas -

- ✓ Make the game smoother – it a bit clunky at the moment
- ✓ More things to avoid – they don't have to be pipes
- ✓ A variety of targets – they don't have to be all the same
- ✓ Good targets that increase your score, and bad targets that reduce your score
- ✓ Sound effects
- ✓ More than one backdrop – it could change as you progress
- ✓ Vary the speed the obstacles appear
- ✓ Change the direction of the obstacles so they fall from the top rather than left and right. You will also need to change your sprite to move left and right, instead of up and down

Take a look at the actual game flappy bird - https://flappybird.io/ - and see if you can create your own version. You can also ask your friends or any of the leaders for ideas if you need any help