

If you are new to Scratch 3.0, pick up a copy of the Scratch Basics Sheet to help with screen layout

## Start Your Project

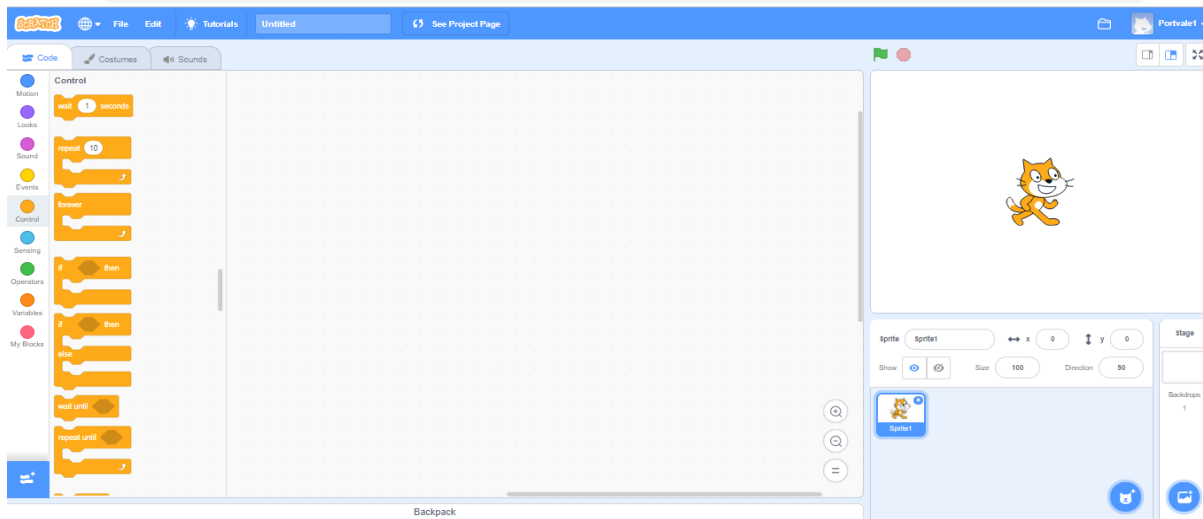
### 1. Open Scratch 3.0

For today's game you need to protect the animals at Newbridge House. Aliens are trying to take them away and you need to defend them!!



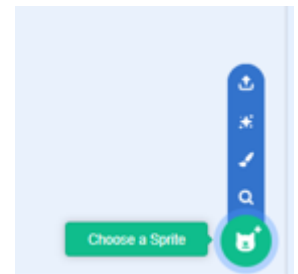
Before we start let's check everything is in the right place

- Click on the *Code* tab in the top left of the screen
- Make sure the mini cat (he's called Scratchy!) has a blue highlight around it to show which sprite you are coding. This is useful when you have more than one *Sprite*. Your screen should look like this



### 2. We don't need Scratchy for this game, so the first thing to do is delete him by clicking on the white cross. Now let's select a new one.

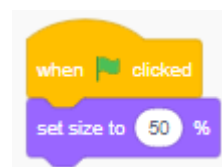
- Click on the "Choose a Sprite" in the bottom right corner. This opens the sprite library
- Find the sprite called "Rocketship" and click on it.
- This sprite comes with several different Costumes, in case you want to animate it. We just need "rocketship-e" for this game, so click on the *Costumes* tab and deleted the others in the same way you deleted *Scratchy*



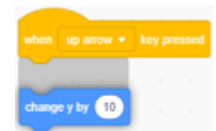
### 3. Now we have a sprite, we need to add some code to make it a little smaller.

- Make sure your new sprite has a blue outline, and click on the *Code* tab
- Go to the *Events* section and drag a "When green flag clicked" block. This starts the game
- From *Looks* add a "set size to %" block and add it to your first block. Click on the number and change it to 50. This reduces the sprite to 50%

Your code should look like this

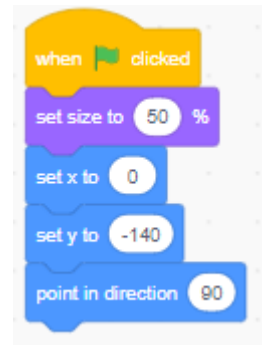


**Did you know?** ...When you hold a new block just under an existing command, you will see a shadow. When you see this and you drop the new command, they stick – Just like Lego!!



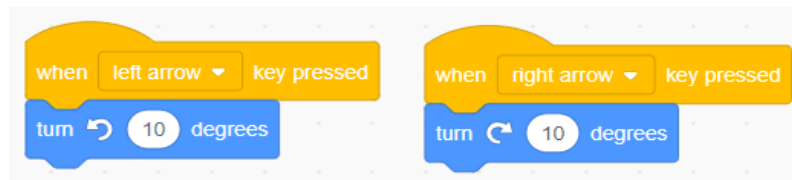
4. Ok, next thing is to move it to the starting position, by adding the following to your code

- From *Motion* add a “set x to “ block, a “set y to “ block and a “point in direction” block
- Your code should now look like this
- Change the numbers to those in the picture
  - This code moves the sprite to the bottom, centre of the screen – where  $y=-140$  and  $x = 0$ . It also points the sprite upwards
- Test it by clicking on the green flag.
  - If you need any help understanding the co-ordinates, there is an explanation in the [Scratch 3.0 Basics](#) sheet



5. Now let's make the sprite move

- In a space on the *Code* page add the following blocks.



- The blocks may say something different, like “space”. To change it click on the white arrow and select the right on
- Make sure one is a clockwise arrow and one is anti-clockwise
- Change the numbers to match the code here
- Remember the colours are our friends, so will tell you where each block is



Save your project so you don't lose all your hard work. If you're not sure how to do this, refer to the [Scratch 3.0 Basics](#) sheet

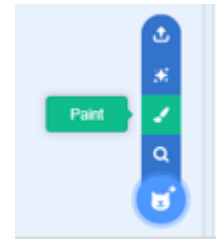
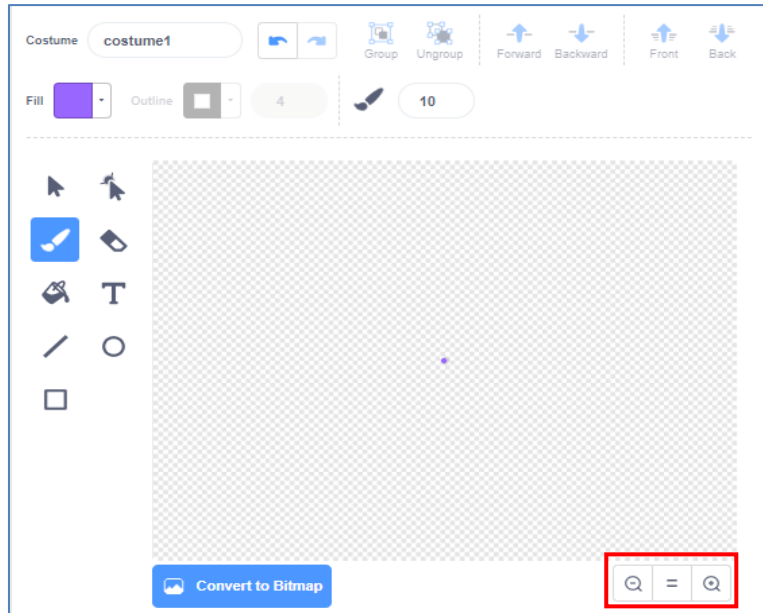
*Now time to test your work*

- ✓ Click on the green flag. What happens?
- ✓ Play with the numbers. What happens?
- ✓ Press the right and left arrow keys. What happens?
- ✓ Don't forget to put all the values back to the code above so I know where you are up to

## Aim ... And Fire!

6. We need a new sprite, to use as a bullet, but this time we will be creating it ourselves, using the paint option

- Go to the same place where you selected the rocketship
- This time click on the *Paint* (paintbrush) option. This opens the following



- Click on the *paintbrush* tool and put a single dot in the middle of the window – where the grey dot already is. There are magnifying buttons in the bottom right if you need some help.
- Now click on the *Code* tab and add the following code.
- You have seen most of this code already, so you know this moves the dot to the same place as the *rocketship*. The new bit is the “hide” block, which hides the bullet until we need it later.
- Change the name of your sprite to “*Bullet*”, by typing in the cell called “*Sprite*” in the area under your game

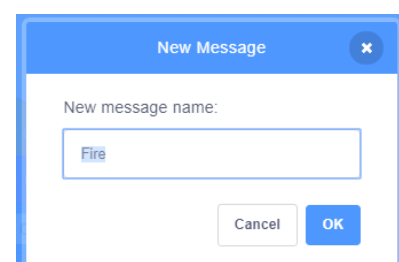


7. Now let's make the bullet fire and work with the rocketship.

- First, we need to click on the *rocketship* sprite and make sure we are on the *Code* tab.
- Add the following blocks in a spare area
- The *Broadcast* block will say something different. To create a new one, click on the arrow and select “*new message*”. A blue box will pop up
- Type “*Fire*” into the area and click OK

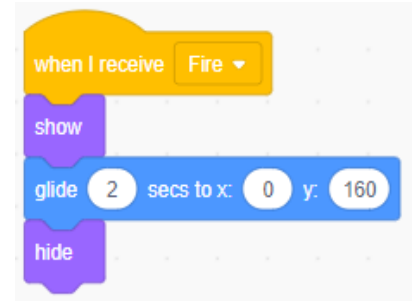


- A “*Broadcast*” is a way to tell the game to expect something to happen – in this case “*when the space is pressed*”.
- You'll see how we use this in the next part.



8. Now click on the *bullet* sprite, and click on the *Code* tab

- Add the following code
- There are some new blocks here, so what do they do?
  - “*When I receive fire*” is the other part of the broadcast message, so only happens when the space bar is pressed
  - “*show*” make the bullet appear
  - “*Glide 2 secs to x: 0 y: 160*” makes the bullet move from the rocketship to the top of the screen in 2 seconds. The glide function makes this a smooth move
  - “*hide*” make the bullet disappear when it gets to the top of the screen

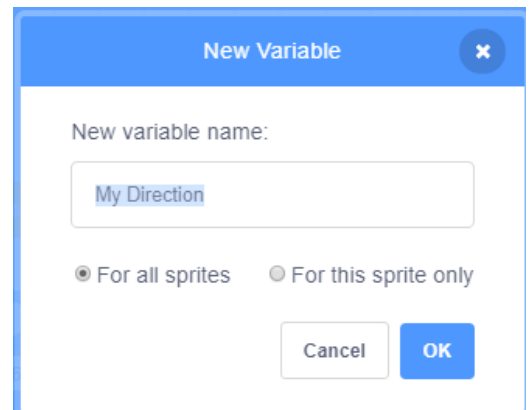


Click on the green flag and test your firing. Does the bullet travel to the top of the screen and the disappear?

What happens if you tilt your rocketship left or right – hmm that’s not right, the bullet is only firing straight up! Let’s do something about it .... and learn about variables

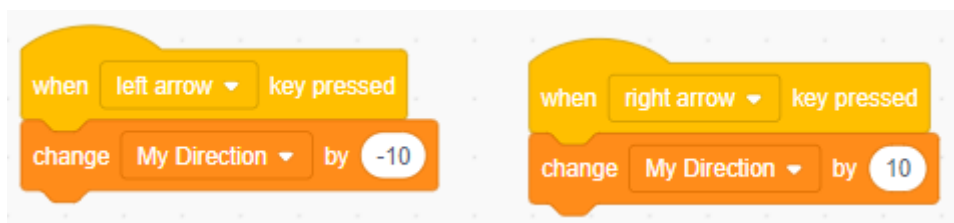
9. We will be adding code to our *rocketship*, so first click on this sprite, and on the *Code* Tab.

- Click on the *Variables* blocks. There is a different type of block here called “*Make a Variable*”. Click on here and a blue box appears.
- Call it *My Direction*
- Make sure the “*For all sprites*” option is also selected and click OK
- You will now see a new oval block has appeared called “*My Direction*”, with a tick against it.
  - This tick makes it appear on the page. We don’t need it to show in the game, so just click on the tick mark and it will disappear from the page, but is still available to use in our code



10. We now need to amend some of our existing code to use the variable, so go to your rocketship *Code* tab

- Delete the rotation block, by dragging them off the screen, and replace with these



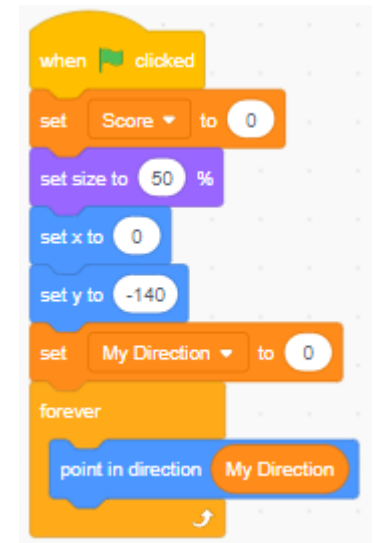
- Make sure you are using the change and not the set blocks, also check the left is -10 and the right is just 10

Make sure you have saved you hard work before we move onto the next sheet. We will test in few minutes, but need to do another piece of work first

## Much More Than One Direction

11. Still on our *rocketship* Code tab, we need to make another change.

- Delete the point in direction block
- Replace it with the “set My Direction to 90” from the Variables section
  - This makes the *rocketship* point upwards
- Now add a “forever” loop, which continues the command all the time
- Finally add a “point in direction” block and slot in the “My Direction” block from the variables section



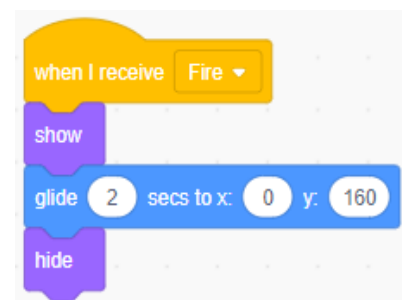
Ok so that’s the *rocketship* all set, we now need to make a few changes to the Bullet

12. Just like at home, we need to keep things tidy, so we are going to bring the two pieces of code together into one.

- Click on the *Bullet* sprite and then click on the Code tab
- Replace the “when green flag clicked” block with the “when I receive Fire”.
- From Variables, drag in the “My Direction” block you created earlier, and replace the zero in the “point in direction” block
- Add the “show” block
- Add a “repeat until” loop from Control. Insert a “touching” block from Sensing, and change the drop down to “edge”
- Add in a “move 10 steps” and a “wait 0.1 secs” block inside the loops
- Finally use the “hide” block from Looks
  - Your amended code should look like this

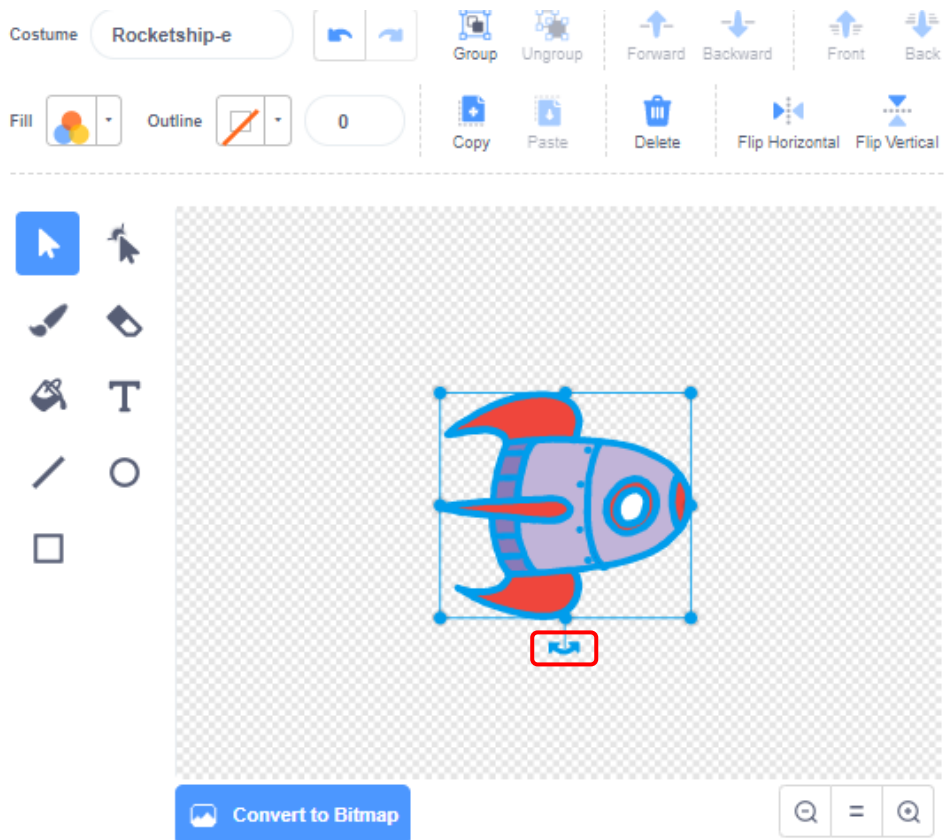


You can also now delete this piece of code we created earlier as it’s no longer required



13. What happens if you click on the green flag and test now? The bullet changes as the rocketship rotates, but it's coming out of the side!! Let's fix that

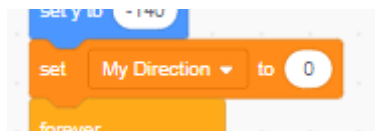
- Click on the *rocketship* sprite, and then select the *Costume* tab
- Select the *arrow* icon, then click on the picture
- A blue square will appear around the rocketship and there is also a curved handle with two arrows. This allows you to rotate the picture



- Use this handle to rotate the *rocketship* 90 degrees to the right, so it looks like the picture below

14. Still on the *rocketship* sprite, click on the *Code* tab

- Change the piece of code which says "set My Direction to 90" to "set My Direction to 0"



That should have fixed the problem, if not, check your code is the same as in the instructions. If you are still having problems, check with another ninja. If it's still not doing as you want, ask one of the leaders.

Save your project so you don't lose all your hard work.

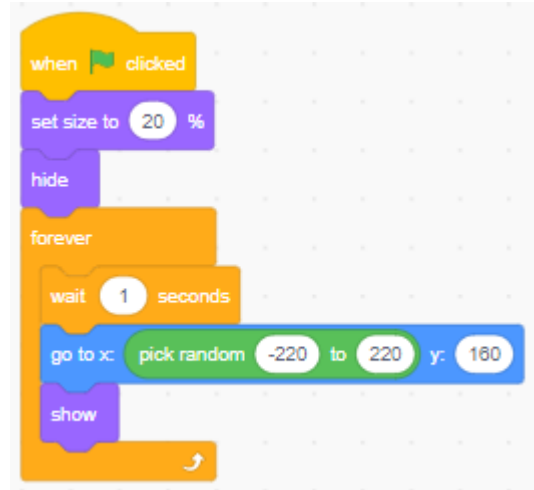
*Time to test all your hard work*

- ✓ Click on the green flag and check your rocketship is in the bottom centre of the page. If you click on the left and right arrows, the rocketship rotates. If you hit the space bar, a bullet fires out of the top. This always fires from the top regardless of the direction the *rocketship* is pointed
- ✓ Now let's play with the numbers. What happens?
- ✓ Don't forget to put all of the values back to the code above so I know where you are up to

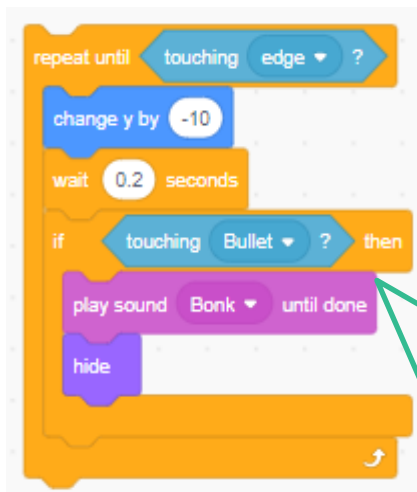
## Bring on The Bad Guys

15. Our game needs an alien to steal the animals, so let's add one to our game

- Add another sprite in the same way as before. I've picked one called *Kiran*. Again, we don't need all the costumes, so I'm just using "*Kiran-b*". The others can be deleted
- Click on the *Code* tab and add the following – Remember the colours are your friend
- Most of this code you have seen before
- Change the name of your sprite to "*Alien*"
- So, what does this do?
  - We start by setting the size of our Alien to 20%, we then make her invisible (*hide*), wait a second, "*go to*" a random x location anywhere at the top of the screen – where Y is always 160, and then make the alien appear (*show*) at that point
- Now let's make her drop down, and add a sound effect



16. Create the following new piece of code.



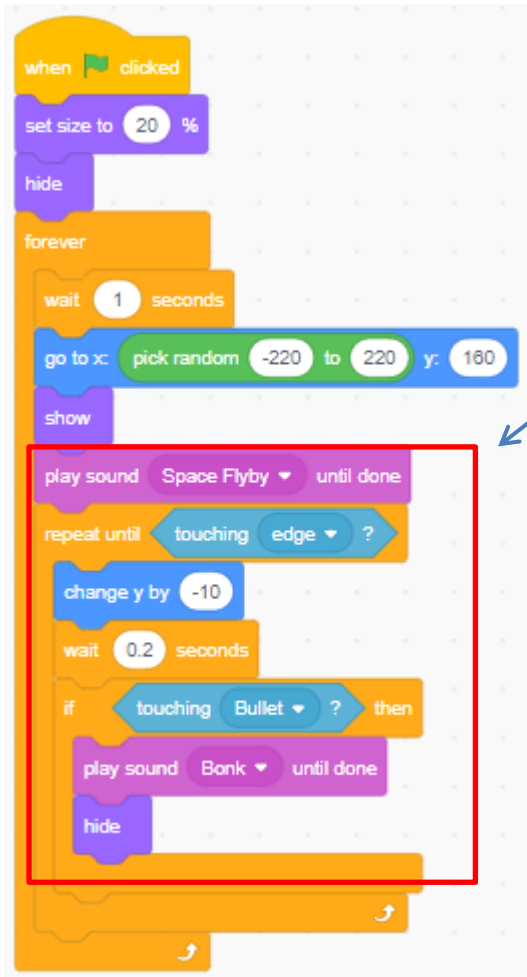
To create the "*play sound*" block, first select a sound

- Click on the *Sounds* Tab. This opens the *Sounds* page, you will see there are already a few sounds that have been selected, but there are LOTS more!!
- Click on the icon in the bottom left, this opens the *Sounds Library*
- Find one which you think will work when the bullet hits. I've selected one called "*Bonk*".
- Once you have your sound, a sound wave profile is created, which you can edit to make even more options
- Take some time to explore the options
- You can then add the block and the *Bonk* option will appear in the drop-down menu

- Make sure you have selected the correct options for the blocks with drop downs. If not, just click on the white down arrow and select the right one. Check your values are the same too
- What does this Code do?
  - You'll remember in instruction 15, we set the y value to 160, which is the top of the page. This code changes that value by -10 every 0.2 seconds until it touches the *Bullet*. Once it does, it makes an *bonk* sound, and then hides (vanishes).

17. To make the two pieces of code work together, we need to drag one inside the other like this. The loop in the code will automatically adjust to accommodate

- I also added another sound effect just under the show block to announce the arrival of our alien



More progress, but still a little more to do,

Save your project so you don't lose all of your hard work.

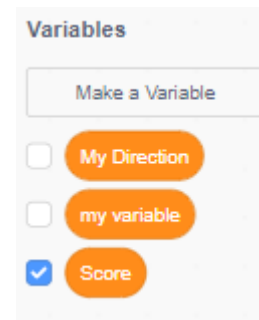
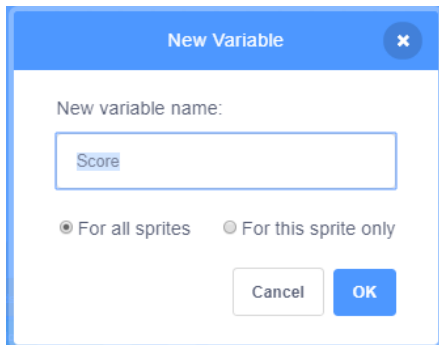
*Now time to test your work*

- ✓ Click on the green flag and check everything is working
- ✓ Now let's play and see what happens. Here's some ideas to try?
  - Try to change the sound effect?
  - Can you make your own sound?
  - Try to speed up or slow down the dropping speed
  - Make the Alien larger to make it easier to hit, or even smaller to make it harder
- ✓ Don't forget to put all the values back to the code above so I know where you are up to

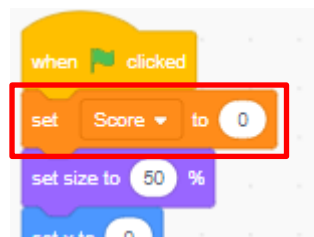


## What's the Score?

18. We now have the good guy – our *Rocketship* – and the bad guys – our *Alien*, but how do we know who's winning if no one is keeping score? Let's add a score
- Create a new variable, this time call it "Score"
  - Make sure there is a dot (it's called a radio button) is next to "select for all sprites".
  - Also check that the tick is showing next to the new block you have created under the Variables section. This makes it appear on the screen as part of the game.



19. We will now use the new variable in our Code. Click on the *Rocketship* sprite and add the following to your code, this will start the scoring at zero

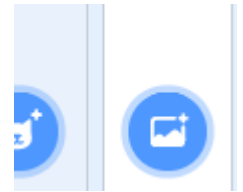


20. We now need a way to increase – or decrease the score as part of the game.
- Click on the Alien sprite, and add the following block to your code
  - This increases your score by 10 if you hit the Alien



21. Let's make the game a little more interesting ..... and harder.

- First let's add a backdrop.
- Click on the *Backdrop* button on the bottom right of the screen, next to where you picked your sprites from earlier. This opens the *Backdrop Library*.
- Find one you like and click on it. I like one called "Savanna", which looks a little bit like Newbridge farm
- Click on the *Backdrops* tab and delete any other backdrops in the same way you have deleted sprite or costumes earlier.



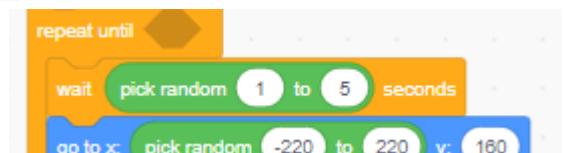
22. Now let's create the mood, by adding some background sounds

- Still on the *Backgrounds* section, click on the *Sounds* tab and choose a suitable sound – I've found one called "Space Noise"
- Click on the *Code* tab and create the following small piece of code, which will make the sound play all the time



23. Next let's vary how often the *Alien* drops.

- Click on the *Alien* sprite, and the *Code* tab
- Make the following change by dragging in a "pick random" block from *Operators*



24. Finally let's add more Aliens

- Right click on your *Alien* sprite and select *duplicate*. This creates another sprite and also copies all of the code, so you don't have to recreate any of it
- You can do this as many times as you like

Save your project so you don't lose all your hard work.

*Now time to test your work*

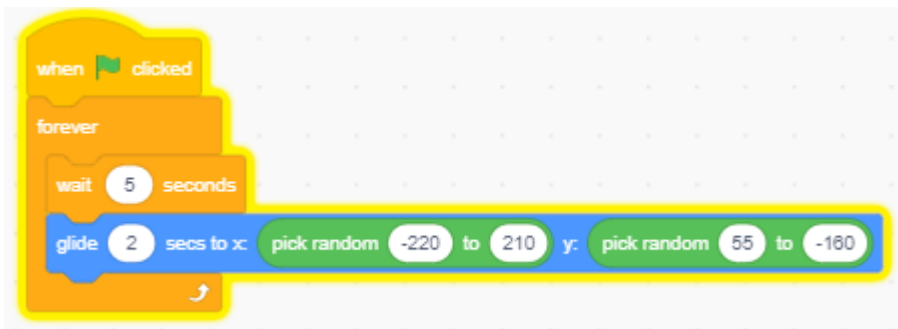
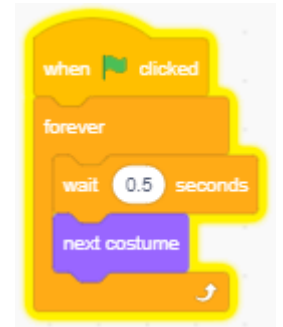
- ✓ Click on the green flag and check everything is working
- ✓ Now let's play and see what happens. Here's some ideas to try.
  - Change the sound effect?
  - Change the Aliens, so you have a variety of invaders. Change their size to make it easier to hit, or even smaller to make it harder
  - Is it possible to hit more than one alien with one shot?

Don't forget to put all the values back to the code above so I know where you are up to

## Where Are the Animals?

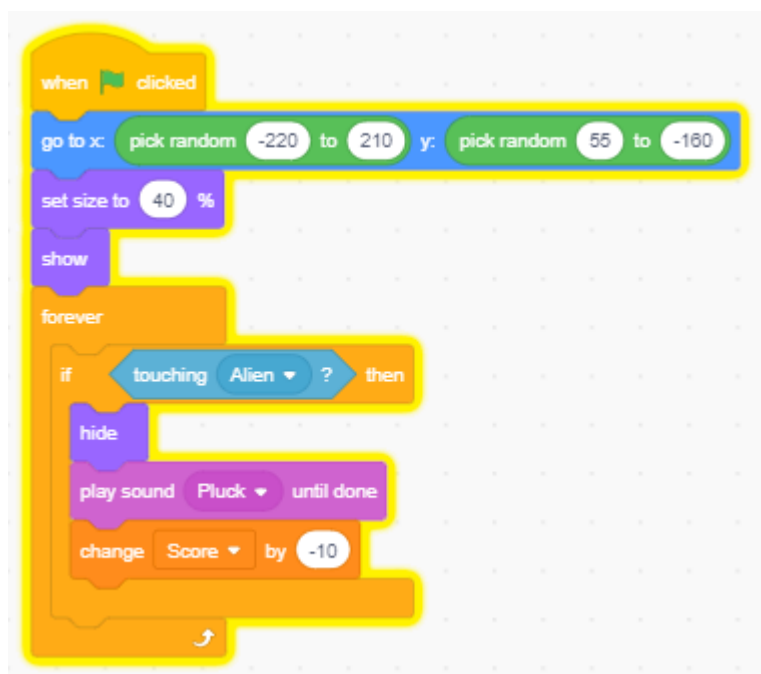
25. The farm is looking quite empty. Let's add some animals

- Select a new sprite, I chose a *Hen*, but this time let's use the costumes, so don't delete them.
- Now let's add some code, so click on the Code tab
- First let's use those costumes to animate the hen, add the following code
  - This code changes to the next costumes every 0.5 seconds to make it look like the hen is pecking at the ground looking for food
- Now let's make it move around the farm randomly to avoid being caught. How do we do this? By adding code of course. Try this

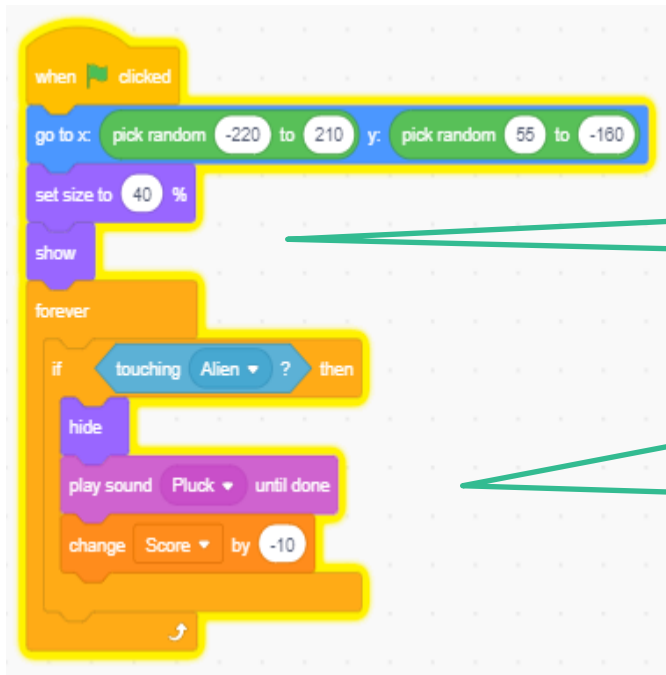


- This code waits 5 seconds and then moves the hen to anywhere under the sky horizon – which is at position 55 on the y axis

26. And finally let's make it work with the rest of the game, with this code



- Can you work out what each block of code does? Discuss it with one of the other Ninja's then flip over the sheet for a readymade explanation.



Moves the Hen to a random location on the ground part of the background.

Sets the size of the Hen to 40%, and then makes the Hen appear on the page

This loop continues to check to see if the alien has caught the Hen. If it does, the *Pluck* sound is played, and the player loses 10 points.

- Do a quick *Save* then check to see if this works. Hmmmm, it works for one Alien, but not for the others. Why does this happen?
  - Our code only works for our *Alien* sprite, but not for our *Alien2* sprite, so let's fix that by adding another loop inside our forever loop, like this



- You will need to add one of these loops for each of the additional Aliens you added in *Step 24*

Time to save and test

- ✓ Does that work better
- ✓ Try changing the sound affect, are there any other sounds you would like to add?
- ✓ Can you change the coding so that there are different sounds and penalties for each alien?
- ✓ Can you vary the size of aliens as they appear?

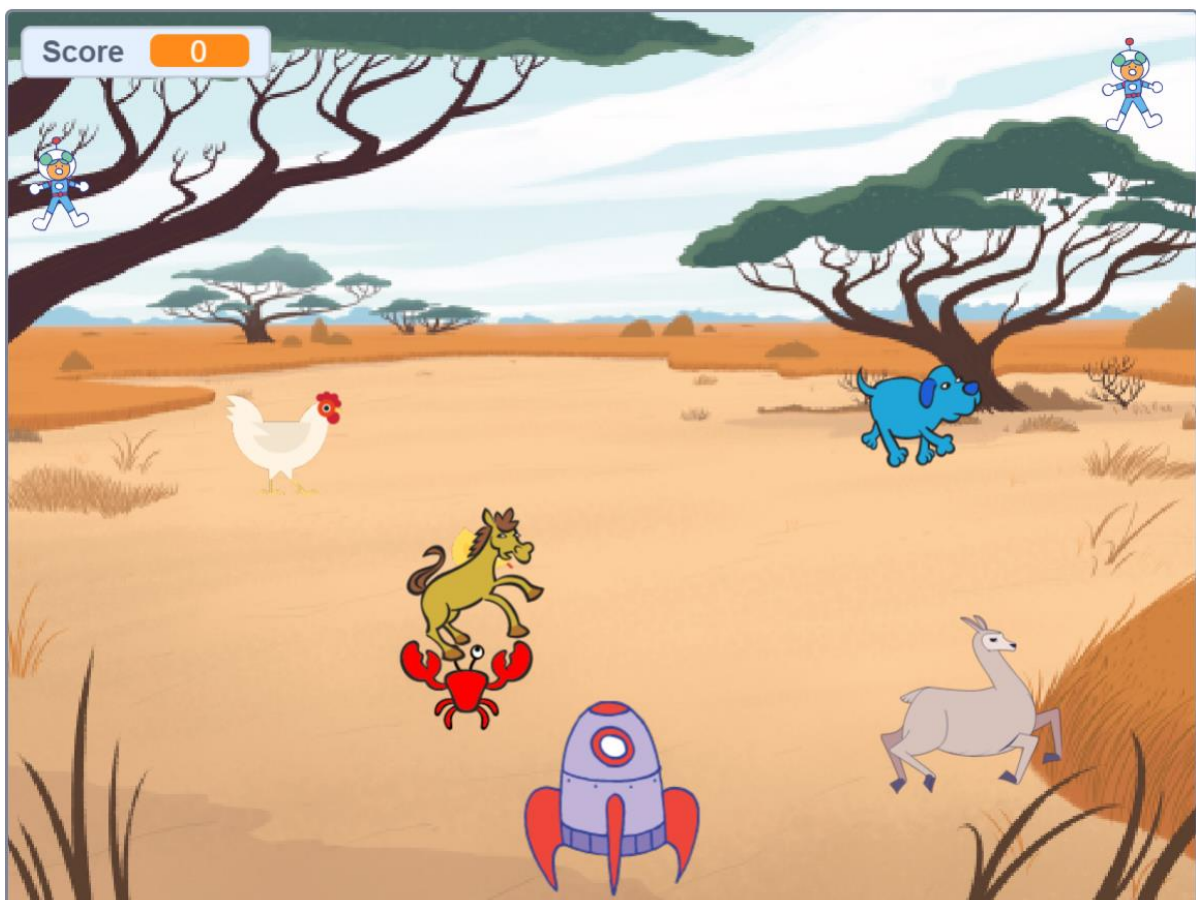
Don't forget to put all the values back to the code above so I know where you are up to and we can finish the game.

## Fill the Farm

27. Let's add more animals to the Farm. We have done the hard work, so let's use a few shortcuts.

- Find another animal you like in the Sprite Library and add it.
  - I found one called "Dog2"
  - Now go back to the code for your *Hen*
  - Pick up each group of coding blocks and drag them over the new sprite. You will see your new sprite wobbles (!), this means the code has copied across
  - Do this for each of the 3 sets of code
  - Now got into the *Sounds* tab and add in the *Pluck* sound effect
  - Just like at home, it's always a good idea to keep everything tidy, so click on the *Code* tab of your new sprite, and make sure the 3 sets of code are not on top of each other
  - Click on the Green Arrow and watch the two Sprite moving together!
- Do this as many times as you like so you have a farm full of animals

Final save and now really test all of you code and make sure your game is working how you want it to.



28. I've run out of ideas, so my project is finished

But this is **YOUR** project not mine. Time to put your own stamp on it and really show off what you have learned

Here are some ideas

- ✓ Create an introduction so players know what they have to do
- ✓ Create your own sounds
- ✓ Change the backdrop when you reach a certain score
- ✓ Have a Finishing screen if your score get to zero?

Ask your friends or the leaders for other ideas

And most of all

# HAVE FUN!!!!

