

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

## Start your project

### 1. Open up Scratch.

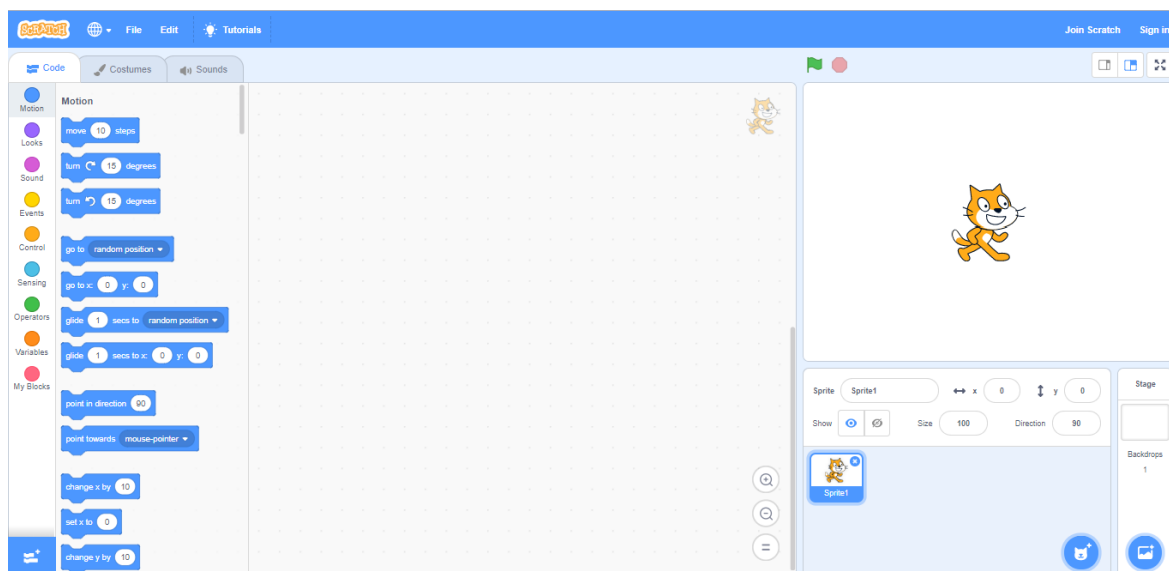
For today's project we are going to create the diver sprite, who will then collect fish for points. Collect 10 fish to win. Your diver must also avoid the sharks. If touched, points will be lost and you will lose.



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

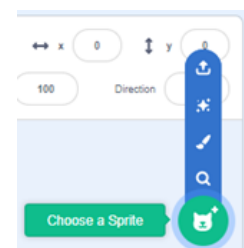
Click on the Code tab in the top left corner of the screen

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. Let's create our diver.

- Delete "Sprite1"
  - Select it and click on the cross in the blue circle in the top right corner of the cat.
- Now let's find a diver
  - Select the "Choose a Sprite" button.
  - In the folder "People", select a character. I've picked "Diver 1"
  - Let's change our diver's name. I'm going to call my diver "Scuba Steve".
    - Go to the box that says "Diver1"
    - Highlight it and type your Diver's name.
- Is your diver too big? We can change the size in a number of different ways. We can use code, however this time we are going to use the Sprite settings
  - In the Size box of the *Sprite Info* screen, change the number to 70 and click enter. Your diver will shrink to 70% of the original size



3. Let's get Scuba Steve to move.
- Make sure your sprite is selected and click on the *Code* tab.
  - From the *Events* section, drag “When Space Key Pressed” across to the coding area
  - We need 4 of these, so Repeat 4 times.

Using the first:

- Click on the down arrow next to “space” and select “up arrow”.
- From *Motion* add the block “change y by ” and change the number to 10

Using the second:

- Click on the down arrow next to “space” and select “down arrow”.
- From *Motion* add the block “change y by ” and change the number to -10

Using the third:

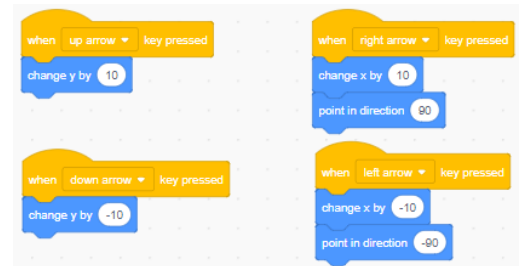
- Click on the down arrow next to “space” and select “right arrow”.
- From *Motion* add the block “change x by ” and change the number to 10

And finally using the fourth:

- Click on the down arrow next to “Space” and select “left arrow”.
- From *Motion* add the block “change x by ” and change the number to -10

4. What happens when you click left? He swims backwards!!  
Mmm, we need to fix that.

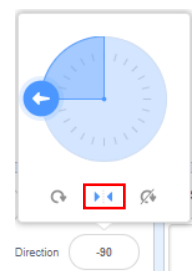
- From *Motion* add the block “Point in Direction 90” to your “Right Arrow” instructions.
- Do the same with the “Left Arrow” and change to “90” to “-90”.



Your code should now look something like this.

What happens now when you click the left arrow key? The diver is facing the right way, but rotates and swims upside down! Let's fix this bit.

- Click your left arrow, so your diver is upside down
- In the info section (the bit where you changed the size earlier) you will see a section called *Direction*. Click on the number and the picture on the right appears. The icons at the bottom of the square control what happens to your sprite when it changes direction
- Click the middle icon (the one with two arrows facing each other). This will turn him the right way up.



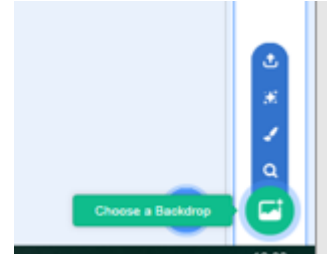
Save your project so you don't lose all of your hard work! If you're not sure how to do this refer to the [Scratch 3.0 Basics](#) sheet

- ✓ Time to test and see if Scuba Steve moves up, down, left and right.
- ✓ Play around with the numbers and watch your diver grow or shrink.
- ✓ Can you find a piece of code to set the *rotation style*?
- ✓ Don't forget to put the values back to the code above, so I know where you are up to

# Setting the Scene & Adding Sound Effects

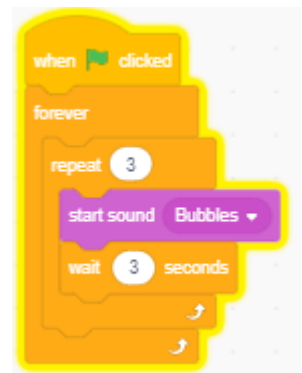
5. Let's put Scuba Steve in the water by creating our tank.

- Next to where you selected your Sprite earlier, there are another set of buttons to select a backdrop.
  - Click the “Choose a Backdrop” button and select a backdrop.
  - I've used “Underwater 1”
- You'll notice the tabs have changed and you now have one called *Backdrops*. If you have any other backdrops, now's the time to delete them. You can either select it and then click on the white x or right click and click delete.



6. Now let's add some background Sound Effects. Since our diver is under water, shall we add some watery sounds?

- Click on the *Sounds* tab.
  - Delete any other sounds which are already selected.
  - In the bottom left of the screen you'll find the *Choose a Sound* button. Click on it and you will see the Scratch sound library.
  - Find a sound you like and select it. I've chosen one called “Bubbles”.
- Now let's make the sound work with the diver, try this.
  - Select your *Scuba Steve* diver sprite and select the *Code* tab.
  - In *Events*, select “When Flag Clicked” and drag to an empty space on the screen.
  - Click on *Control* and add the “Forever” loop.
  - Still in *Control*, add the “Repeat 10” block inside the “Forever” Loop.
    - Change the value from 10 to 3.
  - In *Sound*, select “Start Sound ” and place it below the “Repeat 3” loop. Use the white drop- down arrow to select *Bubbles* if this is not already selected
  - From *Control* add a “wait 1 seconds”.
  - Change the value from 1 to 3
- Your code should now look something like this



Time to Save and test

- ✓ Is your diver now swimming in the right direction?
- ✓ Have you got a great scene for your diver?
  - Try a few different ones, or you can even create your own if you are feeling creative
- ✓ What does the sound you picked sound like with your diver swimming around the tank?
  - Again try a few different ones, or record your own!!
- ✓ Play with your repeat and waiting times, what happens?
- ✓ Don't forget to put the values back to the code above, so I know where you are up to.

# What's A Game Without Baddies?

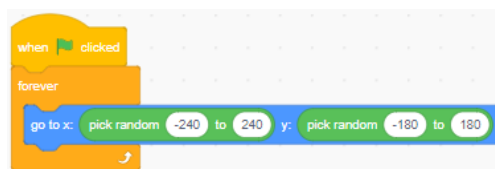
7. Let's start to make this game interesting by creating your creatures!



- In this section we will create and code one creature and then learn how to duplicate it. We can then change the costumes.
  - Add a new sprite - to act as your bad fish - in the same way as you added your diver earlier. I chose a "Shark 2".
    - This sprite has different versions called *Costumes*. You will see these by clicking on the *Costumes* tab. They are shown on the left.
    - We only need the first one, so go ahead and delete "shark2-b" and "shark2-c".
  - Let's shrink your fish in the same way we shrank our diver earlier. I've reduced mine to 50%. I've also changed the name of my fish. I've called it "Daddy Shark".

8. We now need to add some code, so click across to the *Code* tab and add the following.

- Go to *Events* and select "when Green Flag clicked".
- Go to *Controls* and drag a "forever" loop below it.
  - We want the fish to swim all over the screen, so let's do the following:
    - In *Motion*, add a "Go To X:0 and Y:0" block inside the "forever" loop.
    - From *Operators*, select "Pick Random 1 to 10" and stick it inside the X value.
      - Change the values so they show as -240 to 240.
    - Repeat for the Y value.
      - Change these values so they show as -180 to 180
  - Your code should look something like this



Why do we use these numbers? This is the size of your stage, and it prevents our fish from swimming away. We want to keep them all inside the tank.

Time to Save and test

- ✓ Is your fish staying in the tank
- ✓ What happens if you make the numbers smaller?
  - Is the fish restricted to a smaller area?
- ✓ ... or larger?
  - Does your fish sometimes disappear?

It's quite hard with the fish jumping all over the place, so let's make it swim

- ✓ Don't forget to put the values back to the code above, so I know where you are up to.

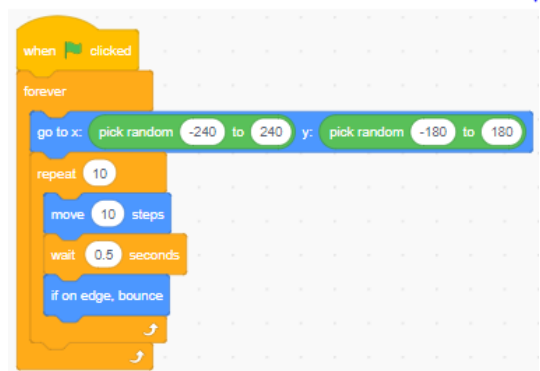
## Let's finish off our Bad Fish?

9. Let's make our Daddy Shark swim, by adding some more code. Try this
- From *Control*, add a "Repeat 10" block below the "Go to X: Y" but still inside the "Forever" loop.
  - From *Motion*, drag a "Move 10 Steps" block inside the "Repeat" loop.

Daddy Shark is moving too fast, so we will need to slow it down.

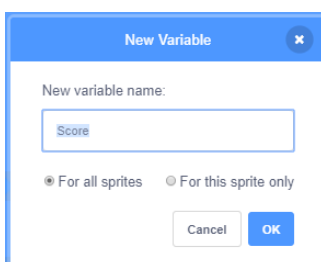
- From *Control*, add a "Wait 1 Secs" block
  - Change the value from "1" to "0.5".
- Imagine your Daddy Shark is inside a fish tank. What happens when they touch the glass? They turn around! Let's make the same thing happen to our game. Let's add some new code.
  - From *Motion*, add a "if on edge, bounce" block  
Remember to turn your "Bad Fish" the right way up in the same way as we did with Scuba Steve earlier.

So far, your code should look like this...

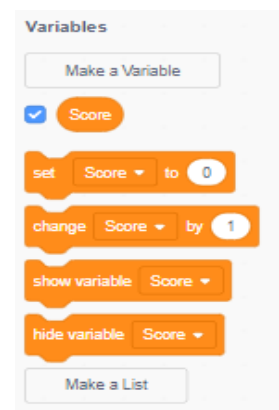


10. If a shark is a baddie, something needs to happen when *Scuba Steve* collides with the *Shark*. Let's add some scoring and reduce it by a point each time the two sprites touch each other.

- From *Control* add a new "if then" loop above your go to x: block.
  - Careful it doesn't wrap around all of the existing code!
- From *Sensing* add a "touching" block and insert it into the gap in the if then block.
  - Click on the white drop-down arrow and change to "Scuba Steve"
- Click on Variables – this section works a little different to the other sections, and is how we add a Scoring to the game.
  - Click on the box which says "Make a Variable"

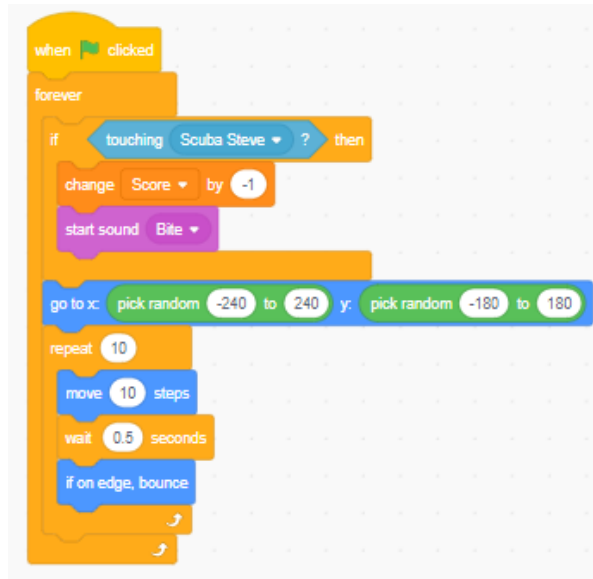


- You then get the blue box
- Let's call the Variable "Score"
- Make sure "For all sprites" is also checked.
- Click OK
- You will now see a new block called "Score" appear in the *Variables* section



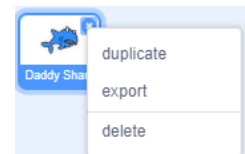
- OK lets use our new variable in the code
  - From *Variables* find the "change by" block and add it to your code
  - Click on the white arrow and change the variable to "Score"
  - Now change the number to -1
- Let's add a sound so you know when you've been caught by a Shark. We do this in the same way as we did earlier
  - I've chosen a sound called "Bite"
  - From *Sound* add the "start sound" block and add this in. Change the drop down to "Bite"

## 11. Your code should look something like this



## 12. We already have one Shark that has been coded. Rather than repeating all the earlier steps, we are going speed things along using duplication and simply changing the costumes.

- Click on the “Daddy Shark” sprite and right click your mouse.
  - Select “Duplicate” and then repeat that step again so we now have 3 Daddy Sharks
- Click on the second Daddy Shark
  - Click on the *Costumes* tab and click on “Choose a Costume” on the bottom left of the screen
  - Find another suitable picture from the library. I chose “Shark2-c”.
  - Delete the first costume by right clicking on the old sprite and select delete.
  - Change the name of your shark. I’ve called mine “Granddad Shark”.
- Do the same with the third shark. I chose “Shark2-b” and renamed it “Mummy Shark”
- You can do this as many times as you like to create lots of “Bad” fish. I’m happy with 3 for now



## Time to Save and test

- ✓ Do you have some scary “bad fish” and do they swim inside the fish tank?
- ✓ Does anything happen when they touch your diver?
- ✓ Can you change the scoring so you lose 5 points instead of 1?
- ✓ Can you speed up your diver or make the fish swim faster?
- ✓ Can you stop the fish from jumping around?
- ✓ Can you find a coding way to reduce the size of a sprite instead of just changing the value of “Size” in the *Sprite info panel*?
- ✓ Can you make the fish act differently?
- ✓ Don’t forget to put the values back to the code above, so I know where you are up to.

## We Need Some Good Guys?

13. Now it's time to make some good guys.
- Create a duplicate in the same way we did earlier
  - I found one called Fish-a and changed the name to "Nemo".
14. We are now going to change some of the code so that you can earn points when *Scuba Steve* touches them.
- Click on your "Nemo" sprite and select the Code tab
  - Find the line which says "change Score by -1"
  - Change the value "-1" to "1".
15. Let's add a cool sound effect when *Scuba Steve* catches *Nemo*, the "Good fish".
- Go to the "Sounds" tab and click on "Choose a Sound."
  - Find one you like – I've picked one called "Pluck"
  - Click back to the Code tab
    - In Sound, drag "start sound..." inside the "If" statement. Place it just below the change score block and change the drop-down to "Pluck"



With the new additions, your code should now look like this...

16. Let's really fill up the tank now by adding more fish in the same way, but this time duplicate "Nemo" so you keep all of your hard coding work. Below is my sprite line up.



Maybe a good idea to do a quick save and test before we go any further. Don't want to lose any of your hard work

- ✓ Does everything work as expected?
- ✓ Do you get a bite sound when you touch a good fish?
- ✓ Are the fish all swimming inside the fish tank or are they swimming outside? If outside, you may need to go back through your code to see where you went wrong.
- ✓ Does everything fit nicely in the tank? If not, you may need to adjust the sizing of some of the fish. This will also make the game more interesting
- ✓ Don't forget to put the values back to the code above, so I know where you are up to.








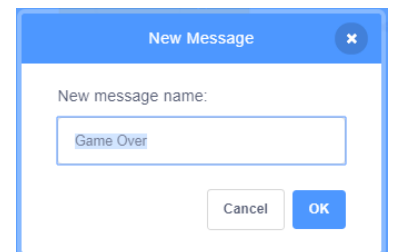
# This Is A Game, Let's Add Some Rules?

17. Let's make this game more fun! If Scuba Steve touches a "Good fish" a sound will play, and you will earn a point. If Scuba Steve touches a "Bad fish" you hear a different sound and lose a point. – You've already done all of this.

However, the new bit is - If you get 10 points you win, if you get 0 points you lose, and the game will end. So, let's get coding

Staying with the *Scuba Steve* sprite, click on the "Code" Tab and add the following

- In *Events*, select "When Green Flag Clicked".
  - First let's set the score to zero each time the game starts
    - From *Variables* click on the "set to 0" block. Slot this just under the Green flag block
    - Change the variable to "Score" by clicking the down arrow
  - Go to *Looks*, pick "Switch costume to" and drag below the above command.
    - Click the Down Arrow and change the value to "Scuba Steve".
  - From *Control* add a "Forever" loop, then add an "If then" loop inside it.
  - Now a tricky bit to fill in the diamond
    - From *Operators* add a  block
    - Into the first slot add a  block. Enter  in the first oval from *Variables*, and a 10 into the second oval of this block
    - In the second oval add a  block. This time enter  in the first oval and a 0 into the second oval
    - Finally, for this bit, from *Events* add a "broadcast and wait". Click on the white drop-down arrow, and select "New message".
      - A blue box appears.
      - Type in "Game Over" and click OK
- Your code should look like this



That was a tough bit, so just take a few minutes to check your code – especially the green diamonds. Make sure you have your < and > the right way around



**Did you know?** ...A quick maths reminder.  
 < means "Less Than" (it points backwards)  
 > means "Greater Than" (it points forwards)

It's a good idea to do a quick save. Not much will happen if you test now, so we will test a little later. Just remember we may need to look at this bit of code if you have an issue later.



## Winners .... And Losers

18. We are nearly there so let's make a good game a really great game

- Click on the "Scuba Steve" sprite and then the *Costumes* tab
- Add a new costume to show the end game.
- I've selected "Diver2" from the "People" Folder.
  - You will notice the diver is on a checkered background, so we can add things to the picture
- Create the screen you want to appear when you have won the game




- I clicked on the "T" icon and added some text, but you can create your own design. Here's mine
- I also changed the name of this Costume to "Winner", you'll see why later 😊
- Don't delete the old one costume – we need both.

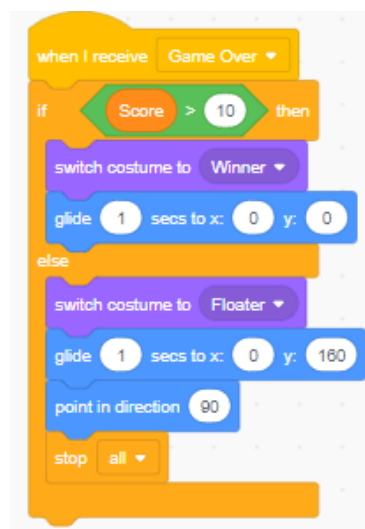
19. Now do the same and create a loser image. Here's mine. I've called this Costume "Floater"



## 20. Final bit of code before we can really play

- You'll remember in our last piece of code we created a broadcast message. This tells the game something important has happened and it need to do something. So, we start this piece of code called "when I receive " from the *Control* section. Change the drop down to "Game Over" which is the broadcast message you created earlier
- Also, from *Control* add a special "If then" block, which also has an "else" option
  - Create the following,  as you did earlier, and add it into the "If" diamond
  - This is the condition for a winner, so we need to now show the winner costume we created earlier.
- Into the top slot of the if then loop add the following
  - From *Looks*, add a "switch costume to " block and change the drop down to "Winner"
  - From *Sensing* add a "glide secs to x: y:" block. Change the numbers to glide 1, x:0 y:0. This places the costume in the centre of the screen
- Into the else slot of the if then loop add the following
  - From *Looks*, add a "switch costume to " block and change the drop down to "Floater"
  - From *Sensing* add a "glide secs to x: y:" block. Change the numbers to glide 1, x:0 y:160. This places the costume at the top of the screen. Like its floating!!
  - We also need to add a "point in direction" block from *Motion* to make sure the writing is not upside down! Change the number to 90
  - Finally, from *Control* add a "stop " block and change the drop down to *all*. This ends the game

Your finished code looks like this...



## 21. Time to save and carry out a final test

- ✓ Is everything working as you would like?
  - Don't forget if something is not quite right, it maybe the code in section 18
- ✓ Play around with the numbers, see what happens
- ✓ Do all of the colours work with the backgrounds? Are the costumes the right size?

## Time To Get Personal

22. 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:

- ✓ More things to target – they don't have to be fish
- ✓ A variety of targets – they don't have to be all the same
- ✓ More sound effects
  - Try and create your own
- ✓ More than one backdrop – it could change as you get to level 2, and level 3, and....
- ✓ Maybe some of your fish are bottom feeders. Can you restrict them to only moving across the bottom of the tank?
- ✓ Can you create another game using your new skills?
  - Maybe a Halloween game with good and bad ghosts
  - Or a space game with good and bad aliens?

You can ask your friends or any of the leaders if you need any help or ideas.