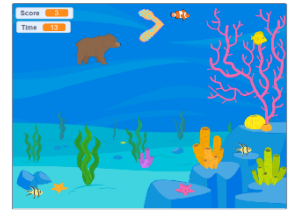**If you are new to Scratch 3.0, pick up a copy of the Scratch Basics Sheet to help with the screen layout**

Start your project

1 Open up Scratch

For today's Project, we are going to create a game using the *Bear Walking* Sprite. It will throw a boomerang to catch fish!!

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
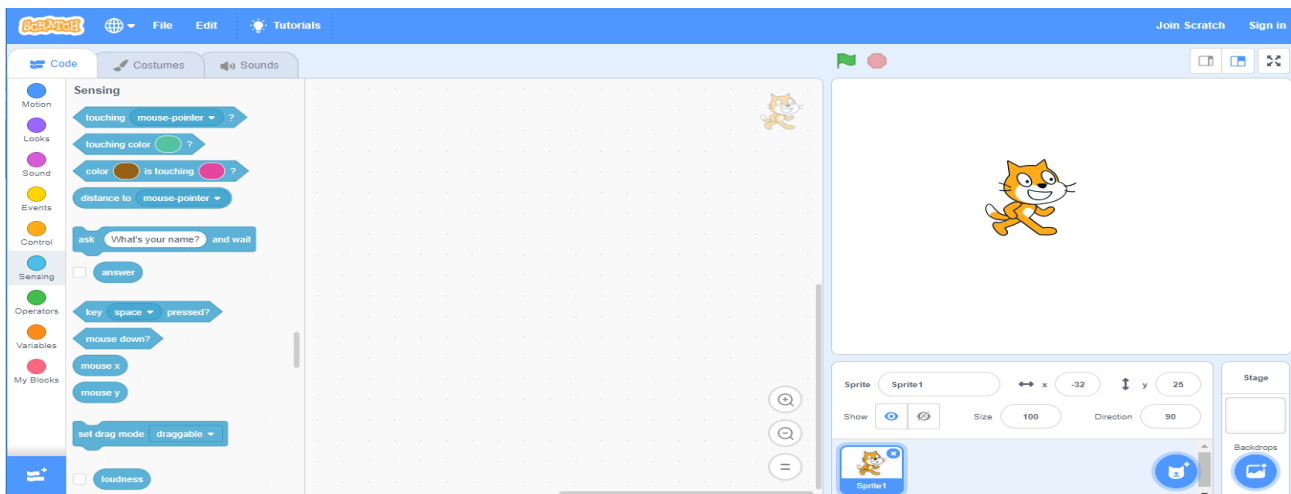
2 Let's start by changing the Cat to a Bear

- First click on the x by the cat sprite to delete the cat
- Now add a new Sprite by clicking on the new sprite button. We are going to use one from the Scratch library so click on the cat head with the +
- You can scroll through all of the sprites, or you can click on the groups at the top to narrow your search – Let's try "*Animals*"
- Pick the one which moves when you hover over it – It's your game. I like the one called "*Bear Walking*"
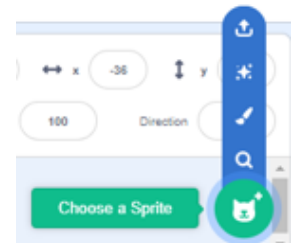
3 Now let's make the Bear move by adding some code.

- Click on the yellow *Events* button in the top left corner. This takes you to all of the Events commands you can use - or you can just scroll the long list to find the Events blocks
- Find the one that says "*when space key pressed*". Pick it up and drag it to the middle area.
- Repeat until you have four of them.
- Click on the little white arrow next to each word "*space*".
- Change each of them, so one says "*up arrow*", one says "*down arrow*", one of them says "*left arrow*" and one of them "*right arrow*".

Your code should look something like this:

4 Let's tell the Bear what to do when those buttons are pressed.
- In the *Motion* section find the command that says "*change y by 10*". Put one of these on "*up*" key and one on the "*down*" key.
- You will also need "*change x by 10*". Stick two of these to "left" and "right"
- Change all of the numbers by clicking on the *10* and type in *2*
- Next add the Motion blocks "*change X by 10" to the "left" and "right" Events blocks* in the same way
- Test the program by clicking the green flag in the top right-hand corner.
  Does it work right? Use the arrow keys on your keyboard to move around.

> **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

Hmmm – not quite right. The Bear only moves up and right. Let fix this.
- Change the number on the left button by clicking on the "*2*" in that box and type in "*-2*". That should make him go in the right direction. Now do the same for down.
- Test it again. Is that better?
- Your code should look like this now:
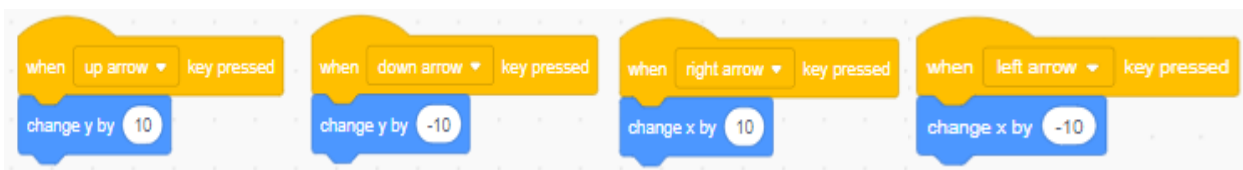
and your Bear should be moving all over the screen.

5 Starting to look better, but he walks backwards. Let's fix that bit.
- From *Motion* add on these two extra blocks "point in direction 90" to the existing left and right keys but change the left one to "-90".
- Now from the *Motion* section add in the "*set rotation style* "block and make sure the "*left-right*" option is selected
- One final piece to stop him from flipping upside down
- To the left key, from *Motion* add in the "*set rotation style*" and make sure the option "*left-right*" is selected from the drop down
- These two sections should now look something like this

> **Did you know**? … When you click on the number of the "point in direction" block, you also get a circle. You can now drag the arrow symbol to the direction you want

Time to Save your hard work so you don't lose any of your hard work. If you're not sure how to do this, refer to the **Scratch 3.0 Basics** sheet
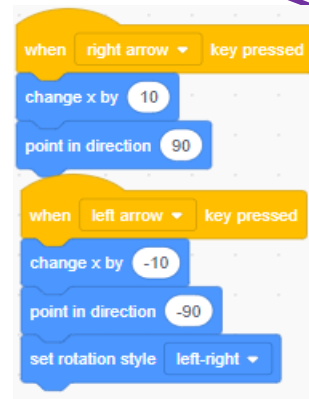
Time to test your code.
- ✓ Is everything working as you would expect
- ✓ Play with the number – what happens?
- ✓ Don't forget to put the values back so I know where you are up to 😊

Do The Bear Strut

6 The Bear already has the ability to look cool when it walks. It does this by using "*Costumes*". These are different pictures you can swap to make it look like something is happening, just like in animation – Have you ever made a flip book? You draw the same picture on the bottom corner of a pad, but each picture makes a slight move. When you flick through the pages it looks like the picture is moving.

So how do we use code to do this for us?

- Click on the *Costumes* tab at the top left and you will see the Bear, but you will also see several other pictures of the Bear in slightly different poses
- Click on the *Code* tab. From the *Looks* , add a "next costume" add to your code.
- These codes are only needed on the left and right buttons.
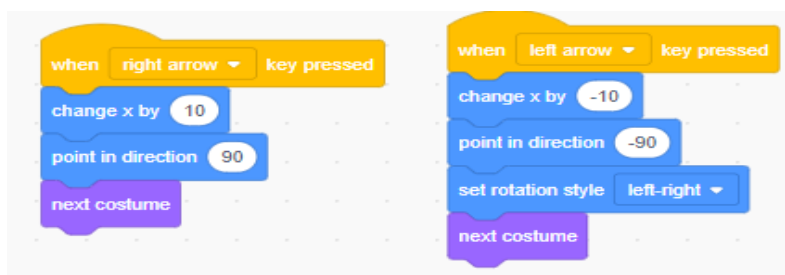
- What happens when you test now? How cool does the Bear look – he's really got some attitude in those strides

7 To make other things in the game work, we need some *Variables*

- Go to the *Variables* section
- This menu is a little different to what we have been used to. Click on "*make a variable*" box, and the blue box pops up. Let's call it "*Score*" and click OK
- Make sure the radio button "For All Sprites" is selected
- Do the same three more times. Call one "Speed", one "Thrown" and the third "Time"
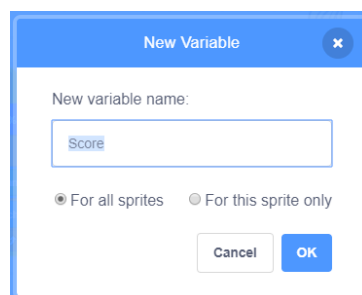
> **Did you know**? …A variable is a bit of code which changes based on a set of conditions.
>
> So as an example, like keeping score in a game. The score (code) changes when a baddie is hit (condition). If you don"t hit a baddie, you don"t get the point!

You'll notice, as you create a variable, it appears in the list, and the box is automatically checked, which means it is shown on your game.

- We only need to see "*Score*" and *"Time"* so click-on the blue arrows next to *"Speed"* and *"Thrown"* to uncheck them and remove them from your game screen

Your screen should now look something like this:
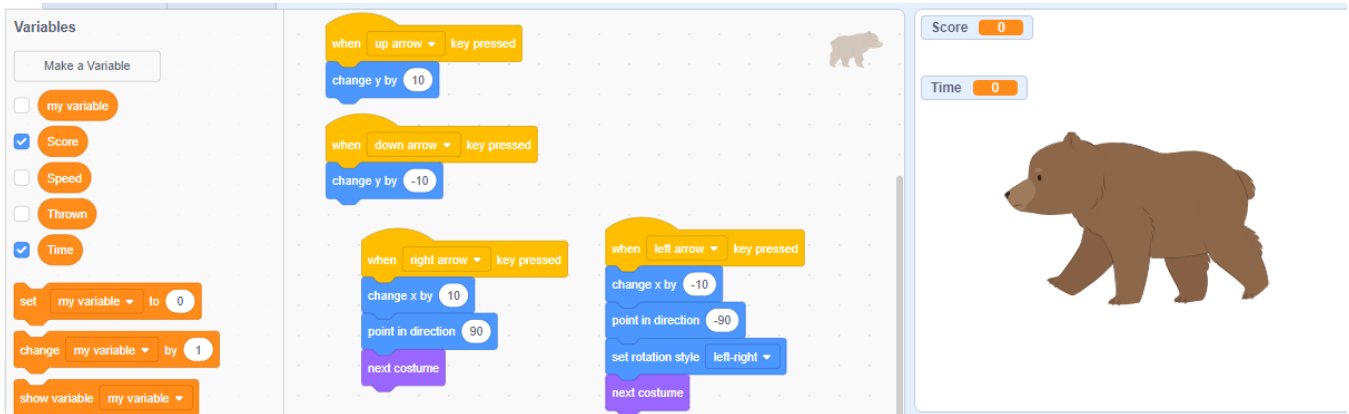
8 We need to set some values for our Variables to set up for the start of our game. So, it's back to the coding blocks

- From *Controls* get the "w*hen flag clicked*"
- From *Variables* get 3 x "*set   to *" blocks
  - Change one to "score" and change the value to 0
  - Change one to "thrown" and change the value to false (just click and type it in)
  - Change one to "time" and change the value to 0
- It should look something like this:

Time to Save your hard work.

Time to test your code.

- ✓ Is everything working as you would expect
- ✓ Play with the number – what happens?
- ✓ What happens if you add the costumes code to the up / down codes?
- ✓ With a few exceptions it looks like not a lot is happening, but we are setting the game up ready for the next steps
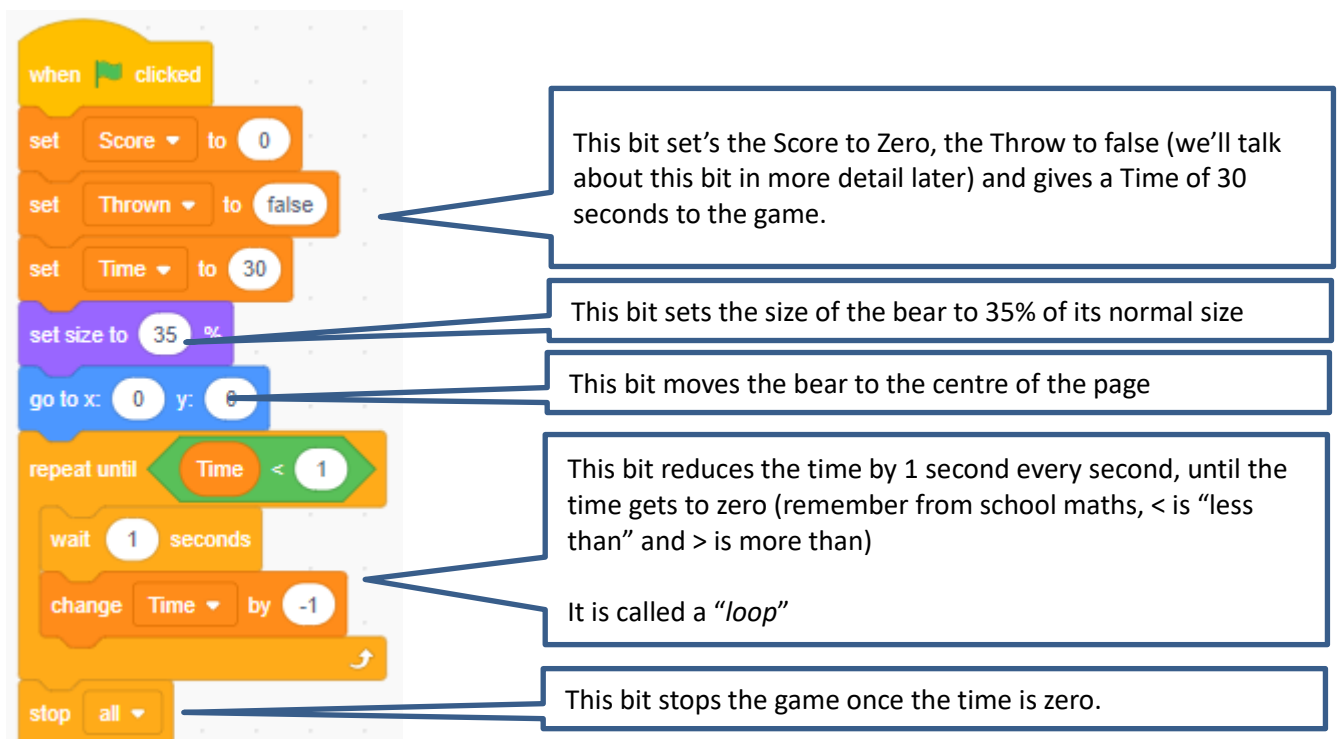- ✓ Don't forget to put the values back so I know where you are up to 😊

It's About Time – It's All About Time

9 Let's start to make this game interesting by adding some rules to it

First, we'll set a time limit on how long the game will play for, otherwise you could play forever.

Using the code, you have already created, add the following blocks

- From *Looks* add the "*set size to*   " block and change the value to 35
- From *Motion* add the "*go to x: y:*" block and change both values to 0
- From *Control* add the "*repeat until*" loop. Now from *Operators* insert the "   *<1*"and from *Variable* add "Time"
- From *Control* add the "*wait sec*" block, and set the value to 1
- From *Variables* add the "*change   by*" block, change the variable to *"Time" and the value to -1*
- Finally, from *Control* add the "stop all" block

You've added quite a few blocks here so just check the code looks something like this and best to double check the values you have changed


So, what does that lot do??. Let's take a look

This bit set's the Score to Zero, the Throw to false (we'll talk about this bit in more detail later) and gives a Time of 30 seconds to the game.

This bit sets the size of the bear to 35% of its normal size

This bit moves the bear to the centre of the page

This bit reduces the time by 1 second every second, until the time gets to zero (remember from school maths, < is "less than" and > is more than)

It is called a "*loop*"

This bit stops the game once the time is zero.

Phew, that was a lot to understand. If anything is not clear, ask one of the leaders to explain it better

10 Before we test and play, let's change the name of our Sprite. This bit is quite easy

- Underneath the picture of your Sprite on the Right of the screen you will see a panel which shows a lot of info about your sprite.
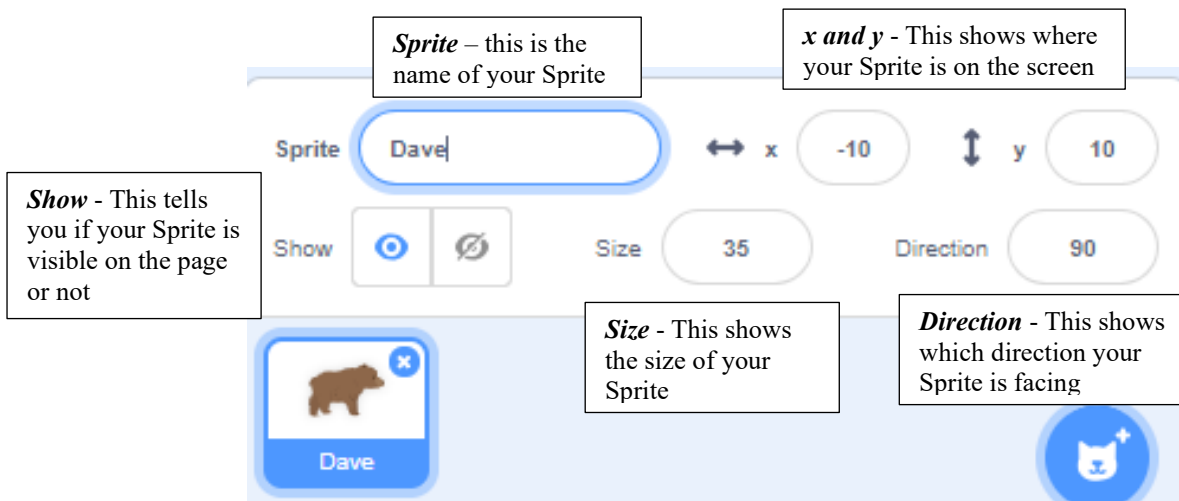
- Simply click on the bit that says "Bear-Walking" and change to whatever you want. My bear is called Dave!! You'll also notice the name changes in the mini picture

Time to Save your hard work.

Time to test your code and play

- ✓ Is everything working as you would expect? The Bear should be walking left and right, and the time should be counting down. The game should stop when it gets to zero. If not, check your number and values
- ✓ Play with the number – what happens?
- ✓ What happens to the sprite information when you click on the Green flag?
- ✓ Can you make the game last longer or shorter?
- ✓ Can you change the size of the sprite using your code? Can you change it using the sprite information box?
- ✓ Play with the other values in the info box and see what happens
- ✓ Don't forget to put the values back so I know where you are up to 😊

It's All Coming Back To Me Now

11 OK, we have a bear, what about the Boomerang I hear you say. Great Question let's create one.

- Go to the Sprite section, where we picked our Bear sprite earlier, but this time select the paint option

- Now the screen changes completely and you get a Blank checkered page. Time to show your artistic side!!

- Think of this screen as a piece of paper that you can draw on. First pick your colours in both *Fill* and *Outline* – we'll need these later. Next pick your tool – I picked a paintbrush, but you could choose the line, and create your boomerang !!

- Stay and play a while. Get used to the different things you can create

- You will also see your design appear as you go on the game page with your Sprites

I'm not very good at art, so here's my boomerang – yours will probably look quite different (and probably a lot better !!)
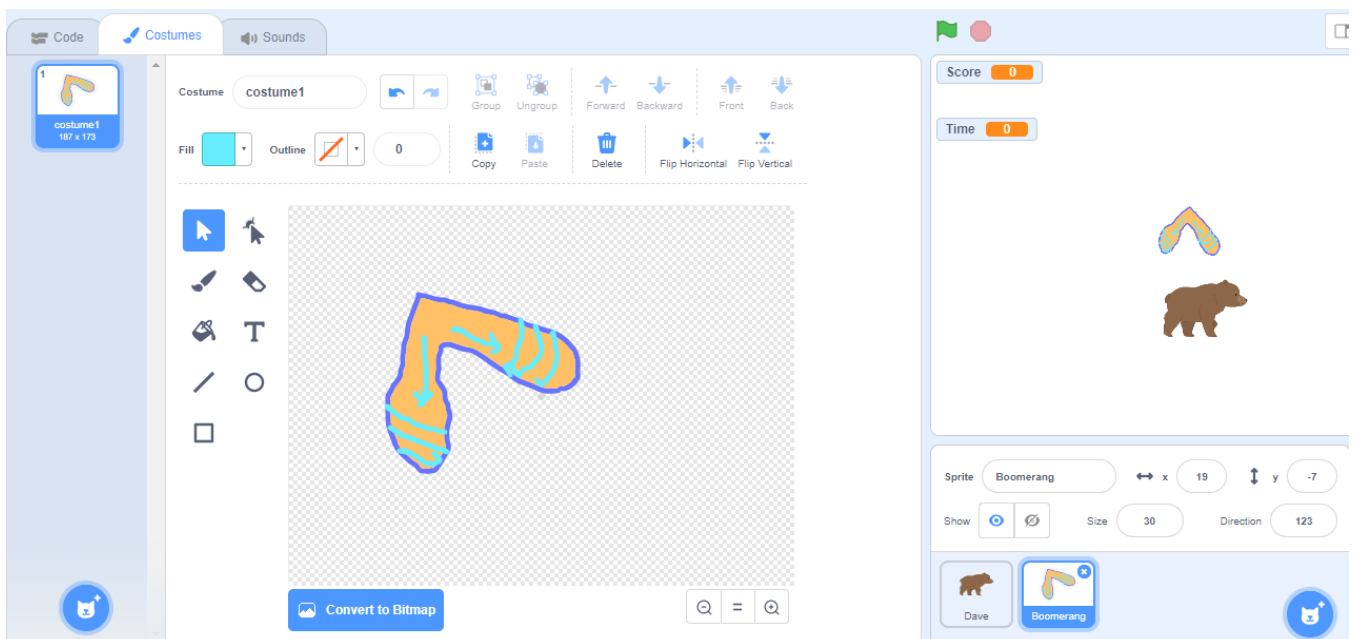
Before we move on, change the name of the Sprite in the same way as we did earlier. I've called mine simply "Boomerang"

12 ***Big Piece of Code Alert***

You've done lots of coding now, so let's see how you get on with this lot! You've done brilliantly so far so I know you've got this 😊
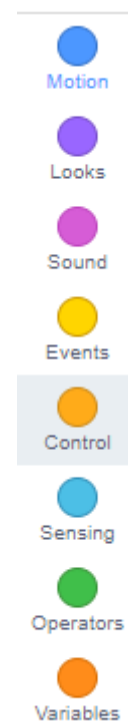
Make sure you are on your boomerang Sprite, and create this piece of code

Where do I find the blocks?

Remember the colours are your friends

Save your work

If you need any help, grab the next card and I'll show you how …… and more important, Why?

… but WHY???

Hopefully you were Ok with that little (!) task, but were you 100% sure what each bit did? Let's break it down just to make sure. Check your values are the same too

| Code	Explanation
when 🏳 clicked	Starts the code when the green flag has been clicked.
set size to 30 %	Sets the boomerang size to 30%
repeat until Time < 1	Creates a BIG Loop to keep the game going until the time reaches 0
if Thrown = false then / set Thrown to true / go to Dave / point towards mouse-pointer / show / set Speed to 24	Creates a loop to throw the boomerang once the mouse is clicked. It also throws it towards our sprite (Dave)
repeat until Speed = 0 / turn ↻ 15 degrees / move Speed steps / change Speed by -1	Creates a loop to turn and move the boomerang. It also sets the speed of the throw
repeat 4 / turn ↻ 15 degrees	Creates a loop to keeps the boomerang turning
repeat until touching Dave ? / turn ↻ 15 degrees / point towards Dave / move Speed steps / change Speed by 1	A final loop to make the boomerang come back to your sprite (Dave)
hide	Final bit to hide the boomerang at the end of the throw
set Thrown to false	The other end of the BIG loop

Phew, that was a lot of work! Well done 😊 Ask one of the leaders if you need more help to understand or if you get a bit stuck, that's why we're here – not just to drink coffee!!

Really important, you've done a lot of work, so make sure you save it. You don't want to have to recreate it all!!

And now the best bit – lets test.

- ✓ Play with the numbers to see what happens

- ✓ As you've done so much, start with a few changes, then make loads.

- ✓ Try to predict what will happen when you make a change before your make, then try it and see if you were right

- ✓ Share you game with your friends who are working on the same project.

- ✓ Share ideas on how to improve or make you game more fun

- ✓ As always, don't forget to put the values back so I know where you are up to

Ready, Aim – What Am I Aiming At?
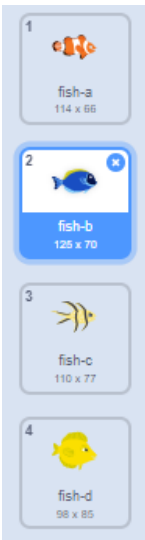
13 Now that Dave has learned how to throw, and hopefully catch, let's give him something to aim at. Back to our sprites library and pick something you like. I'm picking a fish!!

This sprite also has a number of different costumes, which this time are different fish. We can use these to make the game more interesting

14 As always, we need some code to make the fish work. Don't worry, this bit is a lot easier. Try to create this in the *Code* section for the fish sprite

Remember the colours are your friends

So, what does this do? Can you work it out? Here's some help.
- Same as before we start when the flag is clicked
- We then set the size of the fish to 30%
- The loop moves the fish to a random place on the screen.
  - We use x and y co-ordinates to position something on the screen. By setting these codes to random, the computer decides where the sprite appears. There is more information on this in the **Scratch 3.0 Basics** sheets.
- When it is touched, it increases the score by 1, changes to another fish, and moves the fish to another random location.

15 One fish is good, how about a few more to add a bit of variety to the game. I'll show you a quick way to do this so you don't have to code each fish.

- Make sure your fish has a blue square around it
- Right click. You will see a small menu.
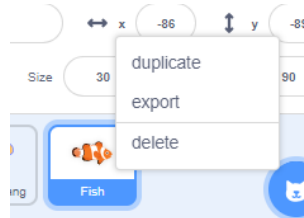
- Click on duplicate a few times until you have 4 in total. Duplicating, also copies the code, so you don't have to recreate it
- If you want to be more creative, you can create a new sprite from the library – maybe one of the other costumes, maybe a shark or a jelly fish.
  - If you decide to do this, you will also need to add the same code from the first fish to the others – maybe you can make each new sprite do something different - your game, your rules.

Time to save and test, before we do one final thing

And now the best bit – let's test.

- ✓ Play with the numbers to see what happens

- ✓ See if you make your new sprite only appear in the top left square

- ✓ What about the bottom right? Top right or bottom left?

- ✓ As always, don't forget to reset the numbers and values before we move on

Backgrounds Make A Good Game Great

16 Let's put these fish in a more interesting setting

- On the far right, you'll find the backdrops.

- Click on the first one and this will take you to the *Backdrops* library. Pick one of the backdrops for your game by simply clicking on it. I chose "*Underwater 1*"
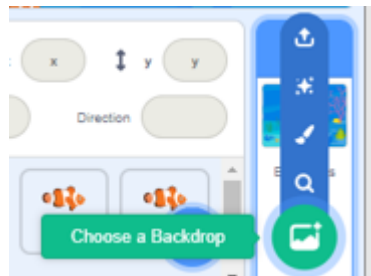
Did you know Bears could swim underwater!!

Here's my finished game

17 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 throw at
- ✓ A variety of targets
- ✓ Make the fish swim around
- ✓ Good targets that increase your score, and bad targets that reduce your score
- ✓ Sound effects
- ✓ More than one backdrop – it could change as you get to level 2, and level 3, and….
- ✓ A teleport button – for those moments when the Sprite is totally stuck
- ✓ Restrict your sprite to only moving left and right
- ✓ Vary how far you throw the boomerang

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

This project is heavily based on a project from https://inventwithscratch.com/boomerang/