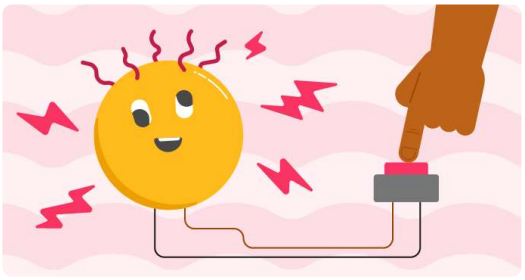
Raspberry Pi and Scratch stress buster

Control a Scratch sprite with a simple switch on your Raspberry Pi

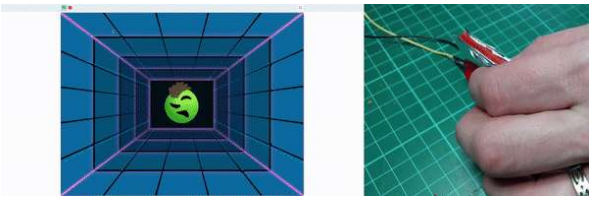


Step 1 You will make

In this project, you will add a button to the **Stress ball** (https://projects.raspberrypi.org/en/projects/stress-ball) project, so that you can squeeze the **Ball** sprite by pressing a button.

You will:

- Make a simple switch with jumper wires
- Use Scratch to detect physical inputs
- Make your own button



In order to complete this project you will need:

Hardware

- A Raspberry Pi computer
- 2 × pin-to-socket jumper wires
- A drinking straw
- A sheet of aluminium foil
- Some glue

Software

- Scratch 3 Desktop - **This project can not be completed using the online Scratch 3 editor**, and must be completed using a Raspberry Pi with the desktop version installed.

Downloads

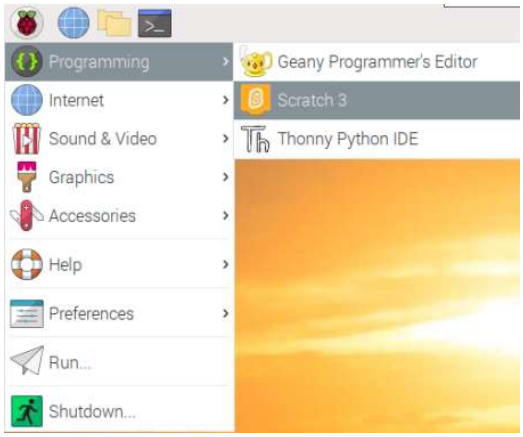
- Download the **Stress ball project** (http://rpf.io/p/en/stress-ball-get) and unzip the folder.

If you need to print this project, please use the **printer-friendly version** (https://projects.raspberrypi.org/en/projects/rpi-stress-buster-with-scratch/print).

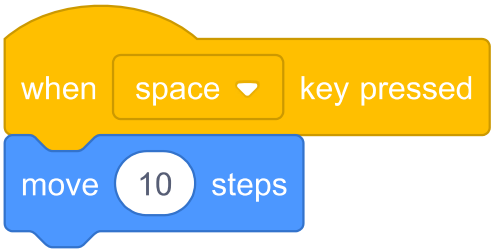
Step 2 A simple switch

In this step, you will learn how to move a sprite using a simple switch.

Open Scratch on your Raspberry Pi.



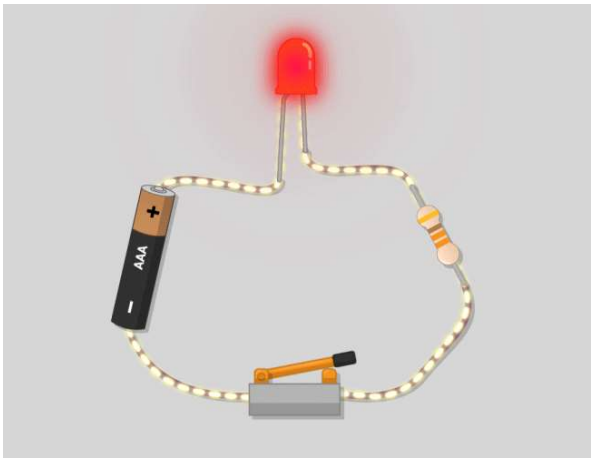
You should see the Scratch **Cat** sprite on the Stage. Start by using a **keyboard event** to make the sprite move, using the blocks shown below.



Click the green flag and then press the `space` key a few times to see the sprite move.

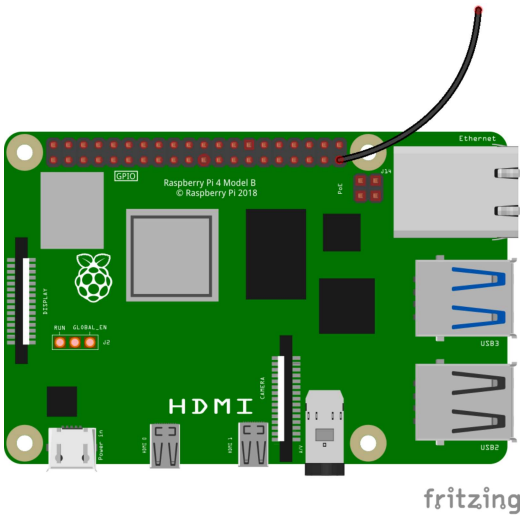
Now you are going to add another **event** that moves the sprite, this time using a homemade physical switch.

A switch works by letting electricity flow from one wire to another wire, by closing a gap to complete a circuit.

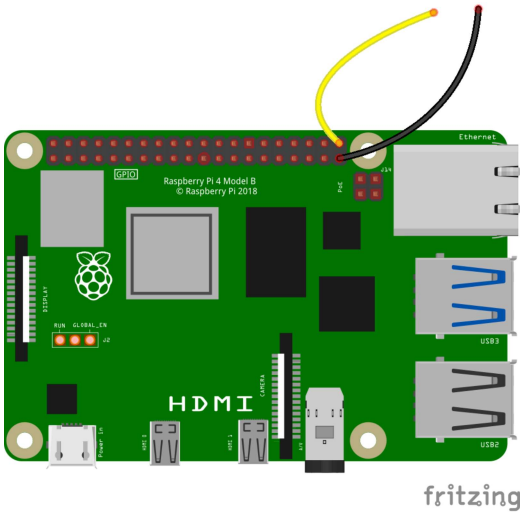


You can make your own switch for your Raspberry Pi using two pin-to-socket jumper wires.

Connect one of your jumper wires to a ground pin on the Raspberry Pi.

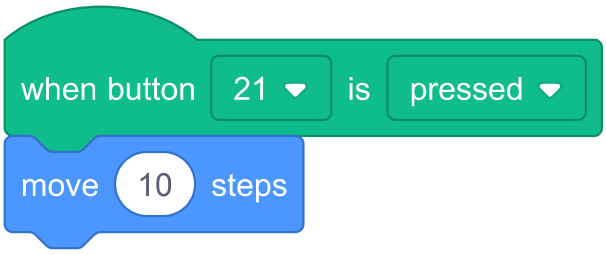


Now connect a second pin-to-socket jumper wire to Pin 21 on your Raspberry Pi.



Add the Raspberry Pi `Simple Electronics` extension to your Scratch program.

Add the following blocks to your script to read the input from your switch.



Click the green flag, and touch the two jumper wires together. You should see the sprite move ten steps. Break the connection, then touch the wires together again and it should move another ten steps.

Save your project

Step 3 Adding a switch to a game

The stress-relieving **Stress ball** (https://projects.raspberrypi.org/en/projects/stress-ball) project is perfect for adding a physical controller to. If you haven't already done so, you can make your own version of the game by following the instructions, or you can **download the finished project** (https://rpf.io/p/en/stress-ball-get).

Open the Stress ball Scratch project on your Raspberry Pi, using the Desktop version.

Opening a downloaded Scratch 3 Desktop project

Once you have downloaded the zip file from the link above, open your file manager and navigate to the **Downloads** folder.

Find the file you just downloaded. It will end in `.zip`.

Right click on the file and choose 'Extract files'. Extract them to your downloads folder.

In Scratch 3 Desktop, click the `File` menu and choose `Load from your computer`.

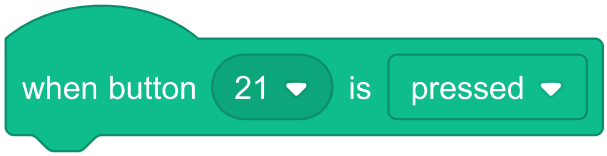
Navigate to your downloads folder again and select the file `Stress Ball - challenge.sb3`.

Click `OK` or press `Enter`.

Play the game, clicking on the stress ball to squeeze it.

Add the Raspberry Pi `Simple Electronics` extension to your project.

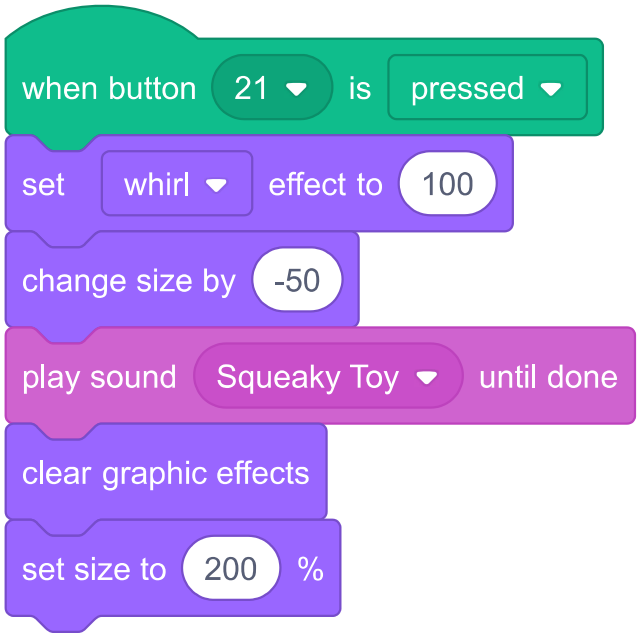
Just like you did in the last step, add a `when button 21 is pressed` block to the code.



The blocks that detect the **Click** and make the **Ball** sprite change, look like this:

Right click on the `set [whirl v] effect to (100)` block and choose **Duplicate** from the menu.

Take the newly duplicated blocks and add them underneath the `when button 21 is pressed` block, so that your blocks look like this.



Run your program by clicking the green flag. You should be able to squeeze your **Ball** sprite by touching the jumper wires together.

Save your project

Step 4 Make your own button

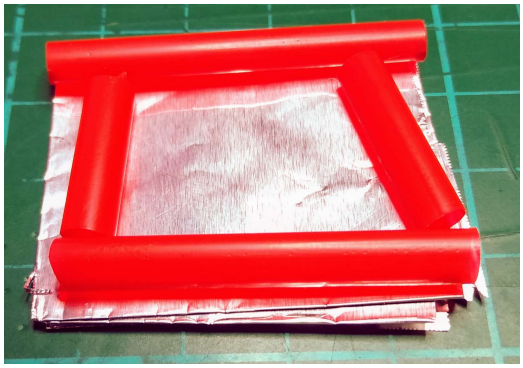
Now that you have programmed your game, you can make a button that you can push to help relieve some stress.

Cut a sheet of aluminium foil, about 15 cm by 15 cm.

Fold the foil several times, until you have a square that is about 3 cm by 3 cm.

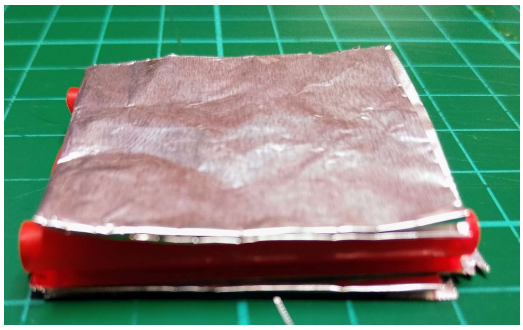
Repeat this with a second sheet, so that you have two folded squares of foil.

Take a drinking straw and cut off four pieces, so that you can arrange them in a square around the edges of one piece of the folded foil.



Glue the straws in place.

Glue the second foil square on top of the straws to make a ‘straw sandwich’.



Tape one pin-to-socket jumper wire to the bottom square of foil, and the other to the top square of foil. It doesn't matter which wire goes to which square.

Run your program again. You should now be able to squeeze the **ball** sprite by pushing down firmly in the middle of your button until the two squares of aluminium touch each other.

Upgrade your project

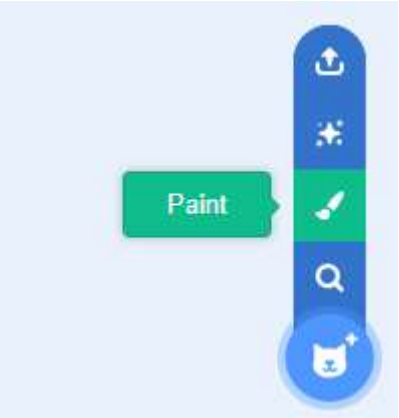
Now, you can use your imagination to improve and upgrade your project.

You could:

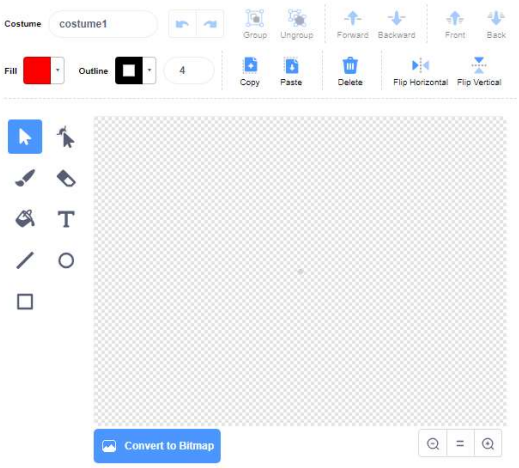
- Change the costume or backdrop of your stress ball to be more interesting or cool,
- Add more or better sounds,
- Upgrade your button to something more robust, bigger or more fun!

Drawing sprites

- Click **Paint** on the **Choose a Sprite** menu to **Paint new sprite**.



- Use the drawing tool in the **Costumes** tab to paint your new sprite.

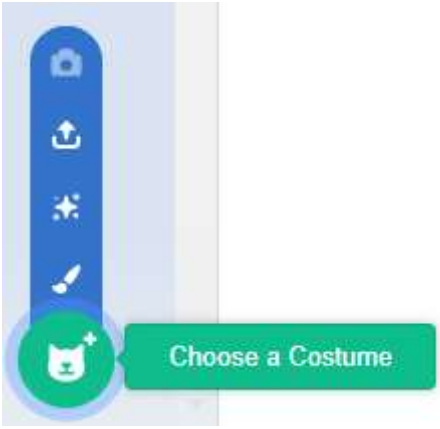


- When you are finished, don't forget to give your new sprite a sensible name.

Adding new costumes in Scratch

- With your sprite selected, click on the Costumes tab

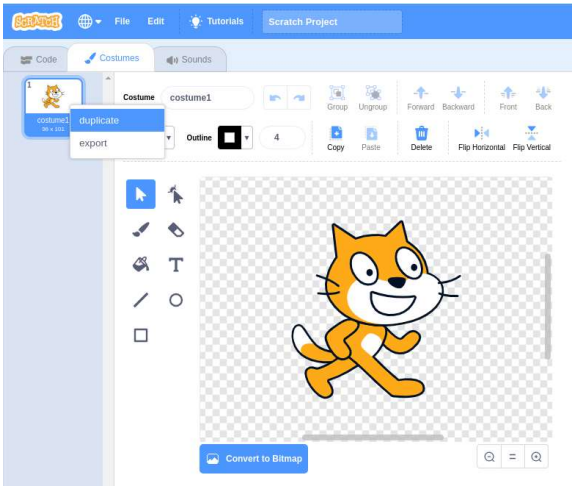
- Click **Choose a Costume** and choose one of the five options. From bottom to top they are:
  - Choose costume from library
  - Paint new costume
  - Use a random (surprise) costume
  - Upload costume from file
  - New costume from camera



- If you wish to delete the imported costume, select it and click on the small cross in the top right hand corner.

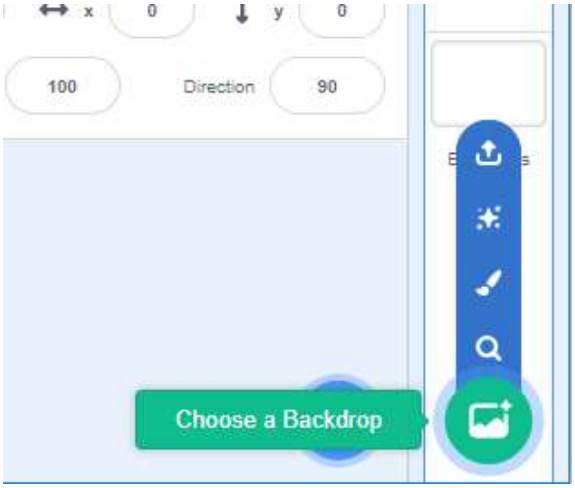
Duplicate costumes in Scratch 3

- Click the Costumes tab, and you'll see your sprite's costume.
- Right-click on the costume and click duplicate to create a copy of the costume

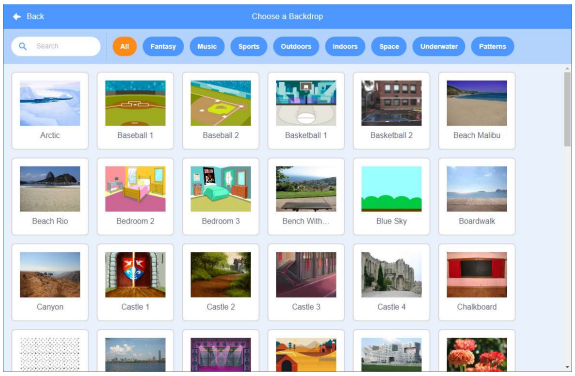


Add a backdrop from the Backdrop Library

Click on **Choose a Backdrop** in the bottom right-hand corner of the screen to open the Backdrop Library:



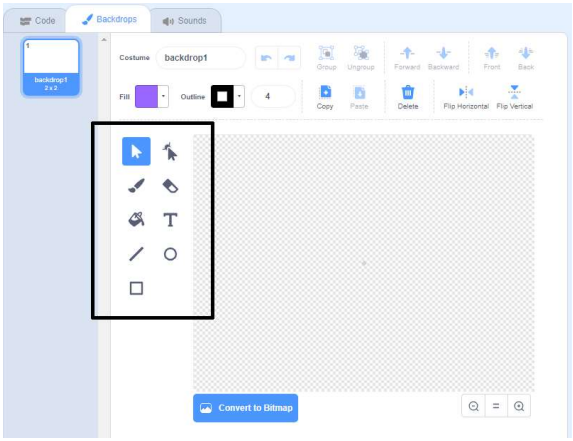
You can search for a backdrop, or browse for one by category. Click on a backdrop to add it to your project.



Paint a new Scratch 3 backdrop

- Select the **backdrop** icon in the bottom right and click on “Paint”

- Use the drawing tools in the **Backdrops** tab to paint your backdrop.

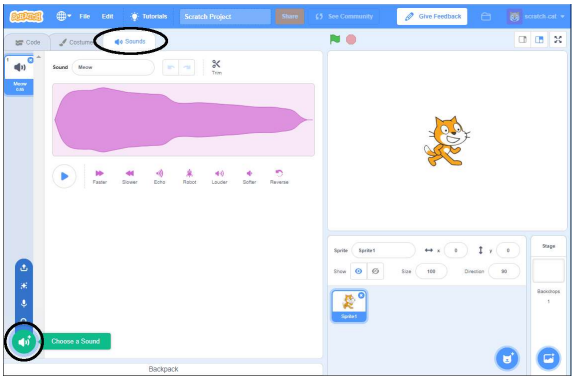


- When you are finished, don't forget to give your new backdrop a sensible name.

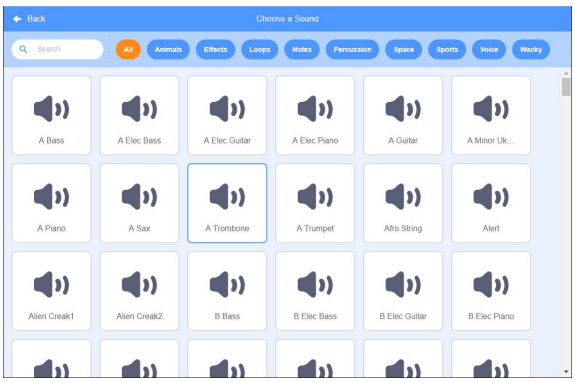
Adding a sound from the library

- Select the sprite you want to add the sound to.

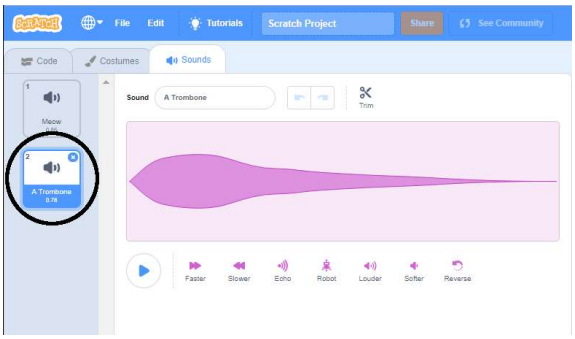
- Click the **Sounds** tab, and click **Choose a Sound**:



- Sounds are organised by category, and you can hover over the icon to hear a sound. Choose a suitable sound.



- You should then see that your sprite has your chosen sound.



Car Smash Stress Ball:

This project has done several of those things! The sprite has been changed to a car, which has costumes showing increasing signs of damage to the car that change as more hits are recorded.

The sounds are all added from the Scratch `Effects` library, and include: `Bonk`, `Crunch`, `Car Horn` and `Glass Breaking`.

The button has been upgraded by adding some contacts to either side of the insides of a martial arts kick pad. This allows the user to relieve the maximum stress possible, by allowing them to hit the pad **very** hard!

Completed Project

You can download the completed Stress Buster project **here** [(http://rpf.io/p/en/rpi-stress-buster-with-scratch-get)](http://rpf.io/p/en/rpi-stress-buster-with-scratch-get).

What next?

If you are following the **Physical computing with Scratch and the Raspberry Pi path** (https://projects.raspberrypi.org/en/pathways/physical-computing-with-scratch-and-the-raspberry-pi) pathway, you can move on to the **Wire loop game project** (https://projects.raspberrypi.org/en/projects/rpi-wire-loop-game-scratch)

If you want to have more fun exploring Scratch, then you could try out any of **these projects** (https://projects.raspberrypi.org/en/projects?software%5B%5D=scratch&curriculum%5B%5D=%201).
