Broadcasting spells

Use a magic wand to choose spells and broadcast spell messages to turn sprites into toads and grow and shrink them.

Step 1 Introduction

Make an app where you use a magic wand to turn sprites into toads, and grow and shrink them.

You will:

- Create buttons that `broadcast` messages to other sprites
- Get multiple sprites to respond when they `receive` the same message
- Use the Sound blocks menu to reverse sounds

Broadcasting and **receiving** messages is like a call and response pattern in music.

"P3T3 P3T3 is a traditional song from Ghana, West Africa. It is performed by one lead person who calls and a group that respond by repeating a key phrase when they hear the call." - Kwame Bakoji-Hume, African Activities CIC

Step 2 Choose your wand

In this step, you will set the scene, choose your wand and create your own computer-generated magic.

Computer-generated imagery (CGI) can be used to create special effects that don't happen in the real world. Making a modern fantasy movie or animation involves lots of code and computer art.

Open the **Broadcasting spells starter project** (https://scratch.mit.edu/projects/518441891/editor). Scratch will open in another browser tab.

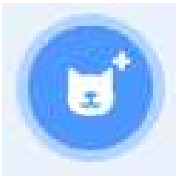
Working offline

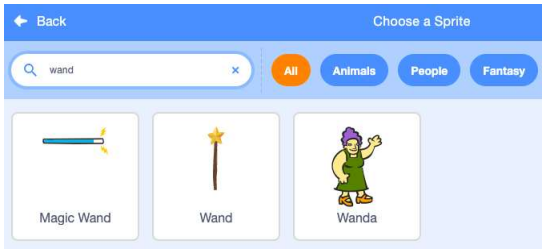
For information about how to set up Scratch for offline use, visit **our 'Getting started with Scratch' guide** (https://projects.raspberrypi.org/en/projects/getting-started-scratch/1).

You should see a fairy in a woodland.

You need a wand to cast a spell.

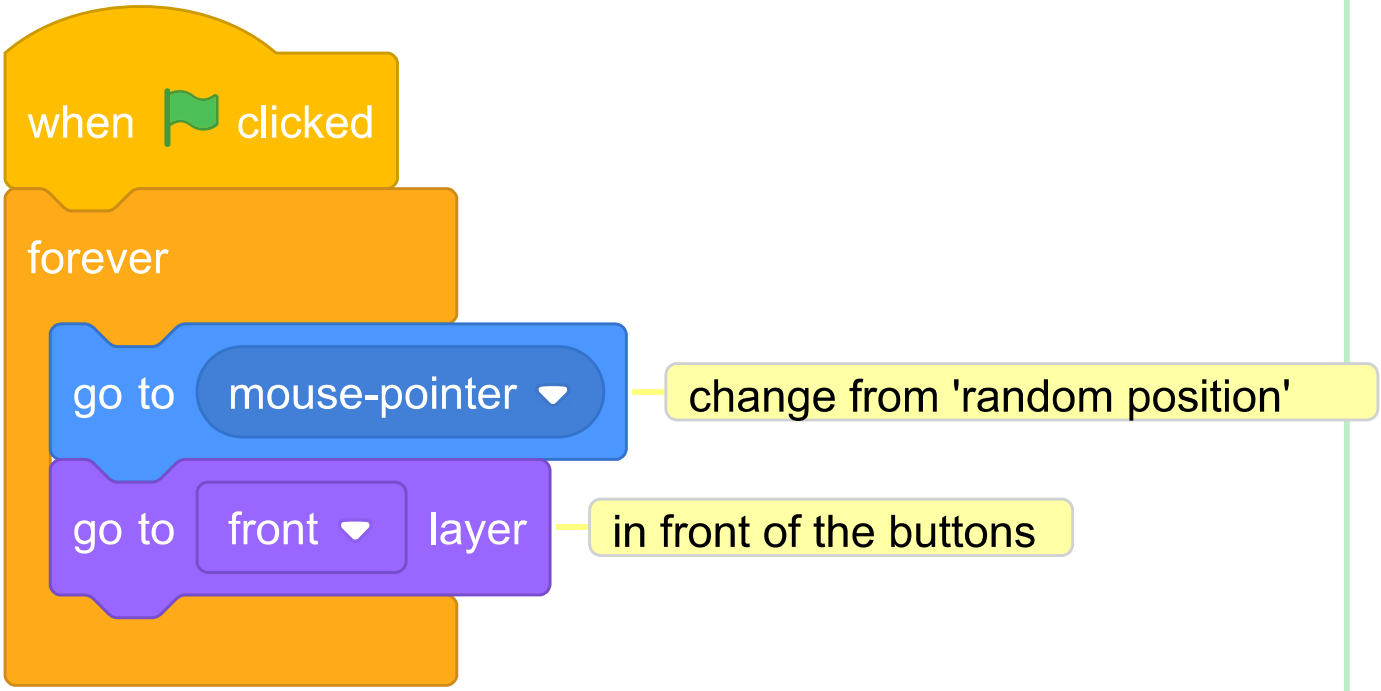
Click **Choose a Sprite** and type `wand` into the search box:





Choose: Add the wand you prefer to your project.

Add code to make the **Wand** sprite follow the `mouse pointer` and stay in `front` of the buttons:



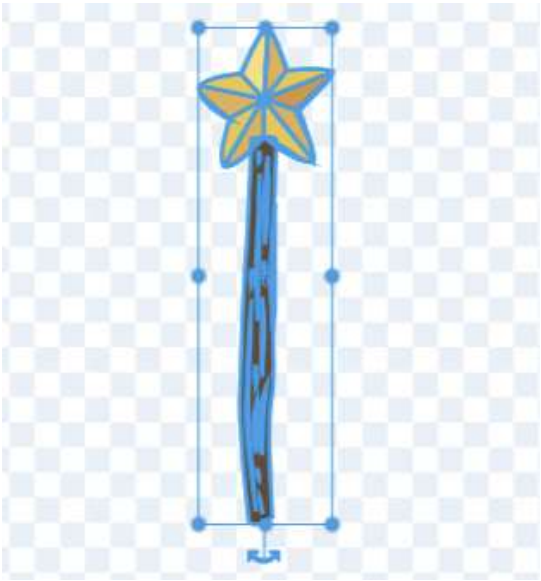
Test: Click on the green flag to run your project. The wand will follow your mouse pointer.

Make the wand bigger and tilted, like you're really using it.

Go to the Sprite pane and change the **Size** property to `200` to make the wand bigger:

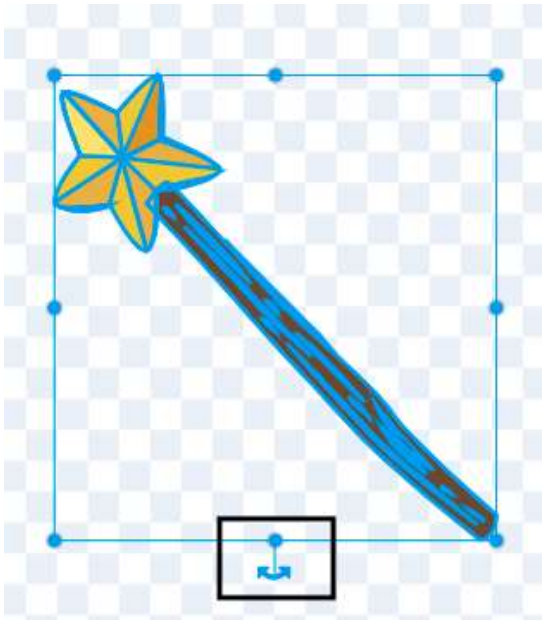
Click on the **Costumes** tab to open the Wand costume in the Paint editor.

Click on the **Select** (Arrow) tool and then draw a rectangle around the whole wand to select all of the parts of the costume.



Then click on the **Group** icon to combine the wand parts.

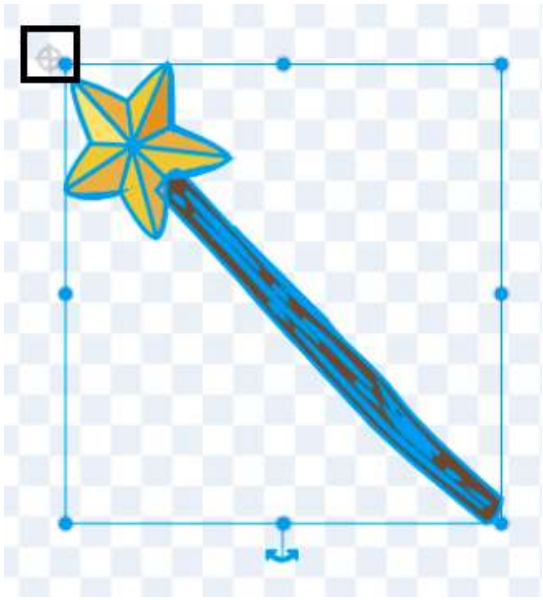
Use the **Rotate** tool on the wand to position the wand at an angle.



Tip: If you can't see the **Rotate** tool, click the **Zoom out** (-) tool at the bottom of the Paint editor to zoom out.

The **Wand** costume gets in the way of the mouse cursor when you try to click the buttons.

Move the wand so that its tip is just away from the crosshair in the centre.



Test: Click the green flag and move the mouse around the Stage. The wand should follow.

If you are signed in to your Scratch account, click on the green Remix button. This will save a copy of the project to your Scratch account.

You can change the title of your project.

Tip: Give your projects helpful names so that you can easily find them when you have lots of projects.

If you do not have a Scratch account, you can click on **File** then **Save to your computer** to save a copy of the project.

Save your project

Step 3 The shrink spell

Now you will get the Fairy to shrink when you click on the shrink button.

Click on the **shrink** sprite in the Sprite list below the Stage.

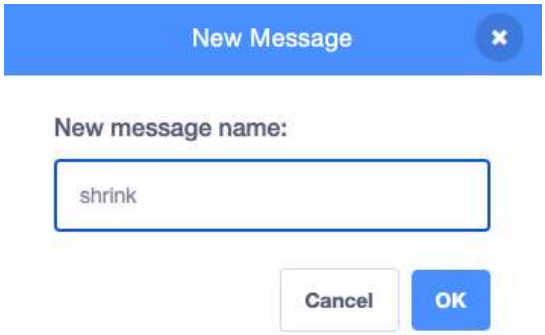
Add a `when this sprite clicked` block:

When you click on the shrink button, you want the **Fairy** sprite to shrink.

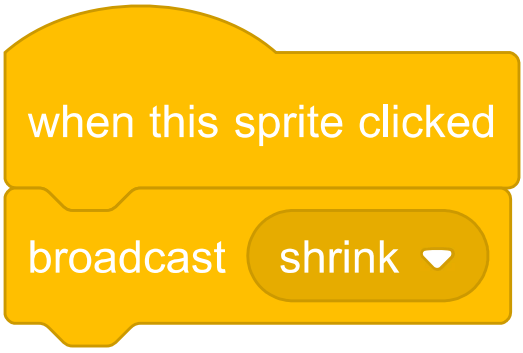
The **shrink** sprite needs to `broadcast` a `message` so that the **Fairy** sprite knows that the shrink spell has been cast.

Add a `broadcast` block:

Click on `message1` and choose 'New message'. Name the new message `shrink`.

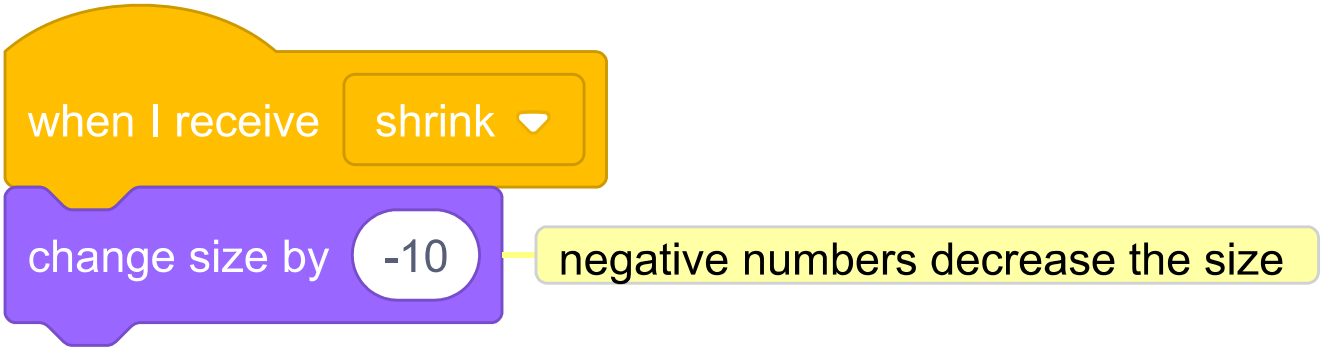


Your code should look like this:



Now when you click on the **shrink** button, Scratch will `broadcast` the `shrink` message, but nothing will happen yet.

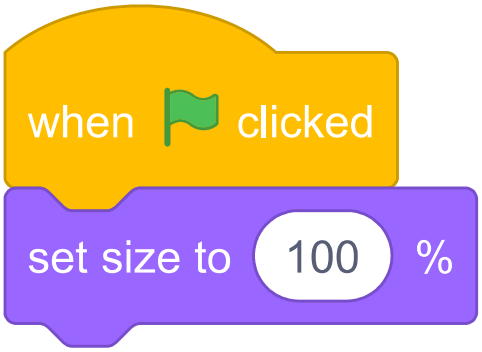
Add code to the **Fairy** sprite to shrink when it recieves a `shrink` message:



Test: Click on the **shrink** button to shrink the **Fairy** sprite. Do this as many times as you like.

Debug: If your **Fairy** sprite grows instead of shrinks, add a minus `-` before the number `10` to make a negative number `-10`.

Add a script to set the **Fairy** sprite to normal size `when the green flag` is clicked:

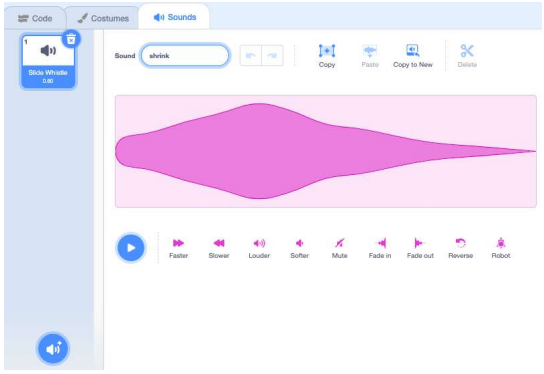


When messages are `broadcast` they can be received by all sprites. When the **Wand** `receives` the `shrink` message it should `play a sound`.

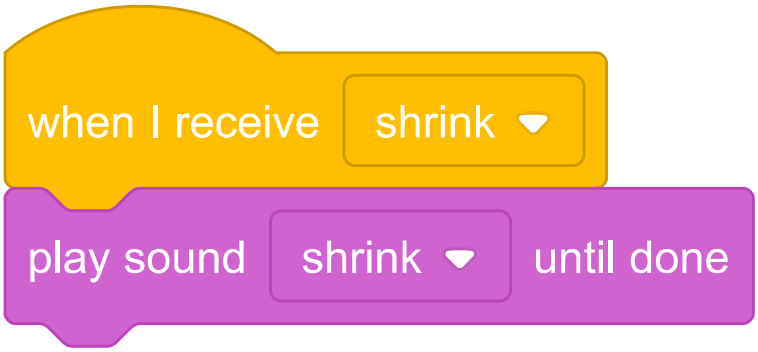
Click on the **Wand** sprite and then the **Sounds** tab.

Add the **Slide Whistle** sound.

Rename the sound to `shrink` so it is easy to find.



Add a script to play the sound:



Test: Click on the green flag to run your project. Click on the **shrink** button to hear the sound and see the **Fairy** shrink.

The **shrink** button `broadcast` a `shrink` message. Both the **Fairy** and the **Wand** sprite `received` the message and responded.

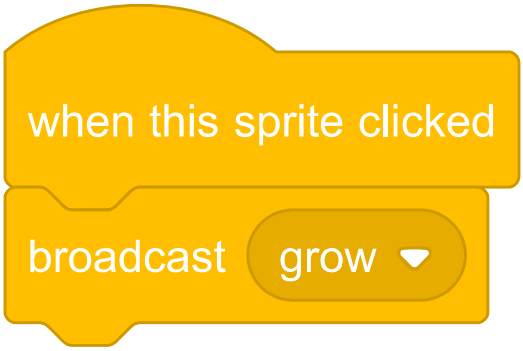
Save your project

Step 4 The grow spell

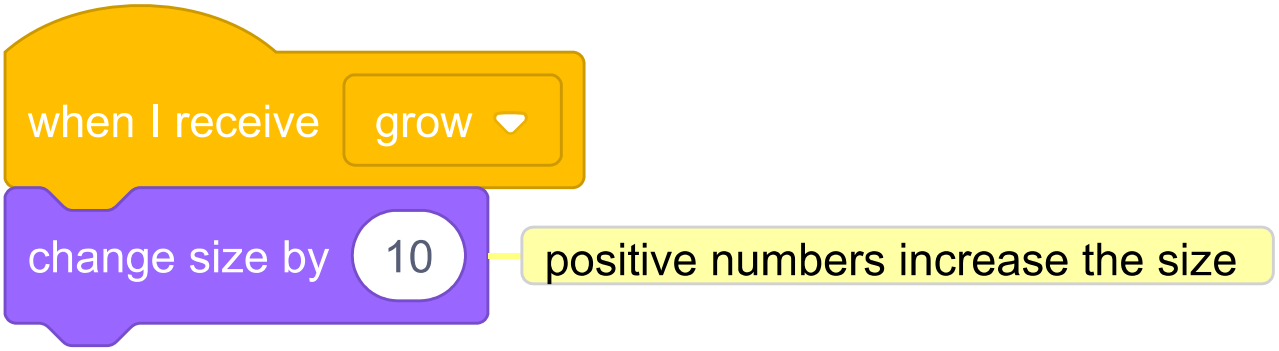
You also need a grow spell to return the **Fairy** sprite to normal size or to make a massive fairy!

Tip: In this step, you will add code to three different sprites. Make sure you select the correct sprite from the Sprite list below the Stage and click on the **Code** tab.

Add a script to the **grow** button sprite to `broadcast` a `grow` message:



Add a script to get the **Fairy** sprite to grow:

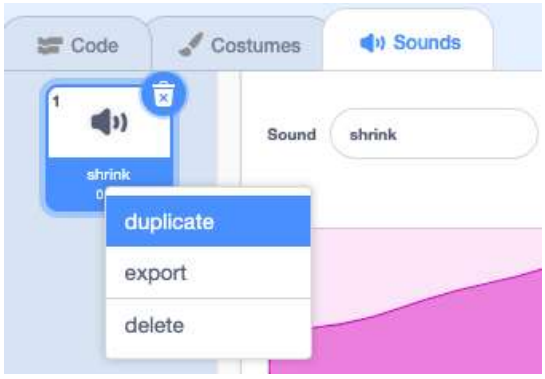


You can reverse the 'shrink' sound to make a 'grow' sound!

> **Songs played backwards quizzes** are music quizzes with a twist. The tracks are reversed, and contestants have to guess the original song — it is not as easy as it sounds.

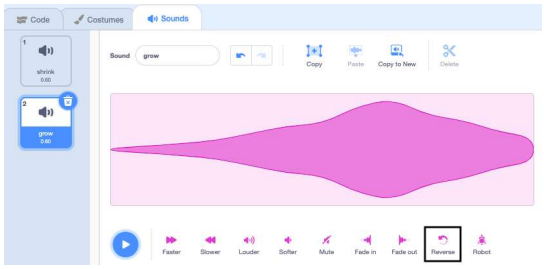
Select the **Wand** sprite and click on the **Sounds** tab.

Right-click (or tap and hold) the **shrink** sound and choose **duplicate**.

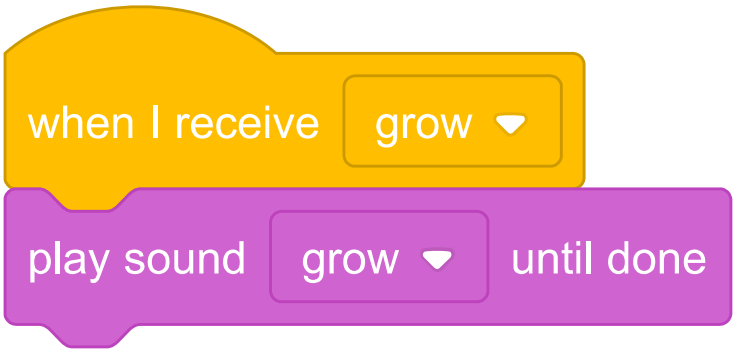


Name the copy `grow`.

Click on the **Reverse** icon to make the sound play backwards.



Add a script to the **Wand** sprite to play the `grow` sound when the `grow` message is received:



Test: Click on the **shrink** and **grow** spell buttons to cast the spells as many times as you like.

Save your project

Step 5 Toad transformation

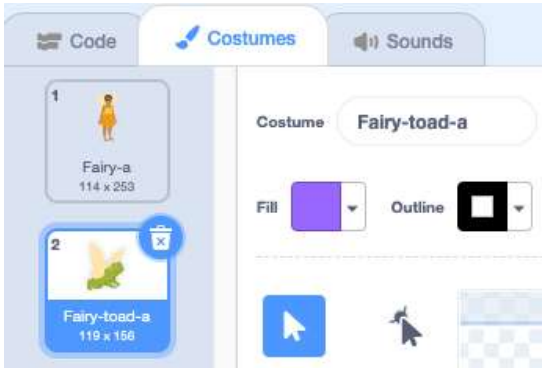
Now it's time for another spell. This time you're going to cast a transformation spell by broadcasting a `toad` message that turns the **Fairy** sprite into a toad!

Maybe she's going on an adventure where being a toad will be more useful.

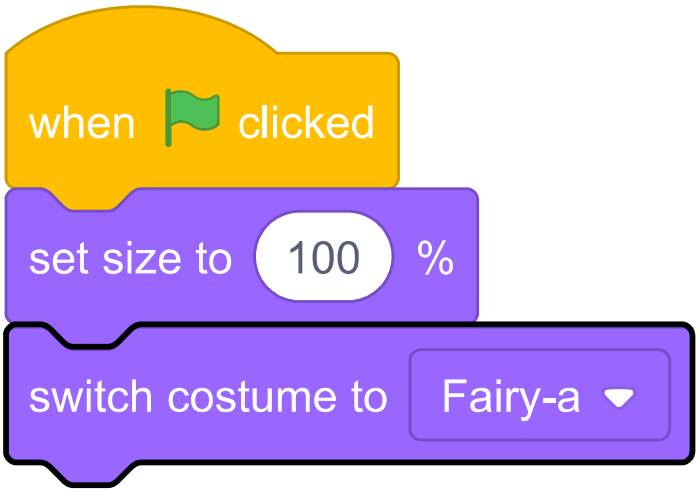
Add a script to the **toad** button sprite to broadcast the 'toad' message:

Select the **Fairy** sprite and click on the **Costumes** tab.

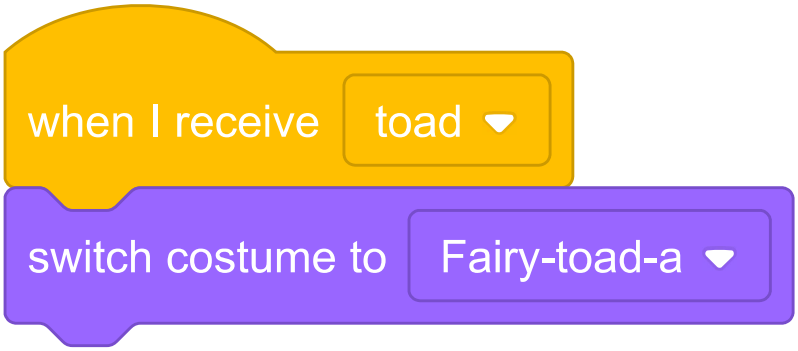
To transform the **Fairy** sprite into a toad you will use **Fairy-a** and **Fairy-toad-a** costumes.



Click on the **Code** tab and add a `switch costume to` block to the end of your existing `when flag clicked` script so the Fairy is in human form when you run your project:

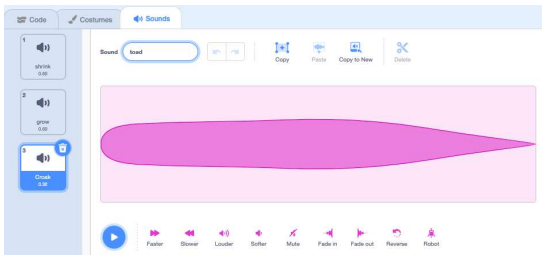


Add a new script to the **Fairy** sprite to turn into a toad:

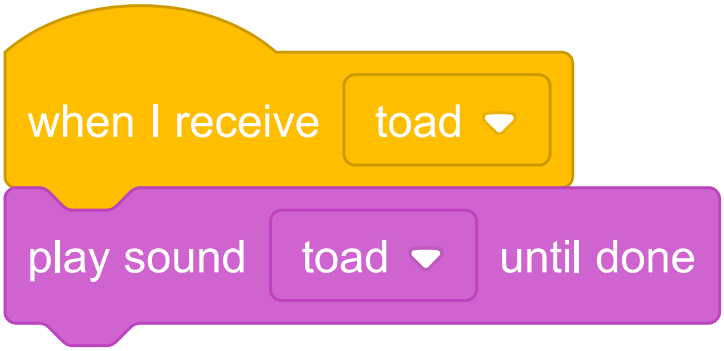


Add the **Croak** sound to the **Wand** sprite.

Rename the sound to `toad`:



Add a script to the **Wand** sprite to play the `toad` sound when the toad spell is cast:

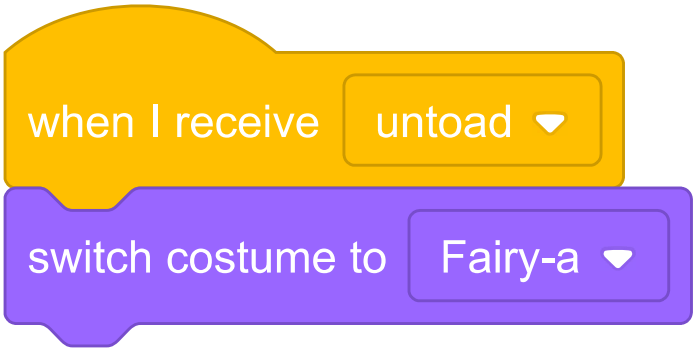


Test: Test that you can turn the **Fairy** into a toad, with a sound effect, when you click the **toad** button. Click on the green flag again to turn the **Fairy** sprite back into a human.

The opposite of a 'toad' spell is an 'untoad' spell.

Add a script to the **untoad** button sprite to `broadcast` the 'untoad' message:

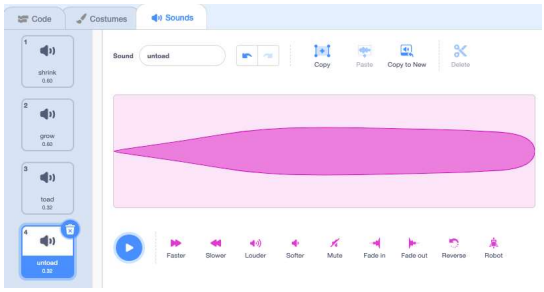
Add a new script to `untoad` the **Fairy** sprite:



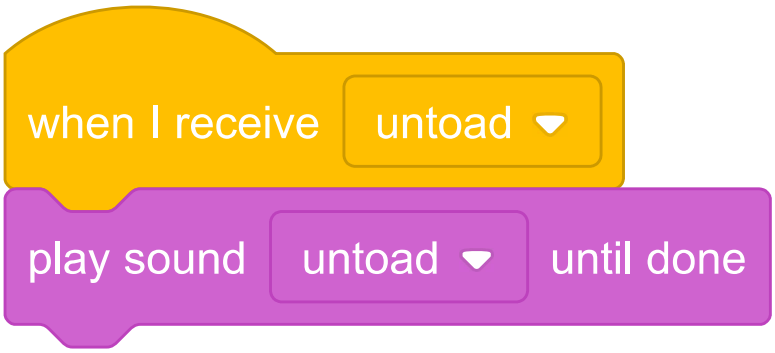
Select the **Wand** sprite and switch to the **Sounds** tab.

Duplicate the **toad** sound and rename it to `untoad`.

Click on the **Reverse** icon so that the **untoad** sound plays backwards.



Add a script to the **Wand** sprite to play the `untoad` sound:



Test: Try the **toad** and **untoad** spells, and try **shrink** and **grow** when the **Fairy** is in toad form.

Save your project

Step 6 Add another character

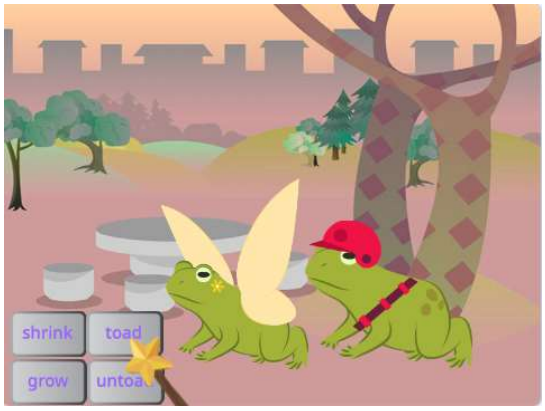
Get a sprite of your choice to respond to the spells. You will need to create a toad costume ‘mash-up’ for the sprite, and add code so the costume changes when the spell messages are broadcast.

Duplicate the **Fairy** sprite.

Delete the **Fairy-a** and **Fairy-toad-a** costumes. You will be left with a **toad** costume.

Add a costume of your choice to the **new sprite**.

We chose the **Batter**:



You might want to change the direction the sprite is pointing in.

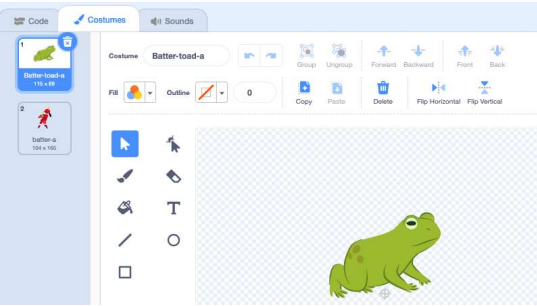
Tip: If your sprite goes upside down you can change its `rotation-style` to `left-right` in the Sprite properties pane or using a code block.

When you grow or shrink a sprite, you want the feet to stay in the same place.

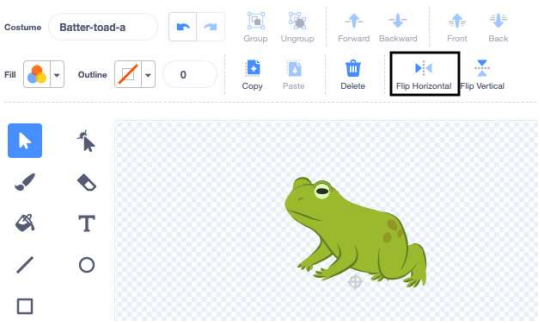
First use the **Select** (arrow) tool to draw a rectangle around the costume and then **Group** it. Then drag your character above the crosshair.

Click on the **toad** costume.

Rename the costume to match your sprite, we used **Batter-toad-a**.



If the toad costume is facing the opposite way to the main costume you can use **Flip Horizontal**.



Now you need to make the toad look like the character. Combining two costumes in this way is called a ‘mash-up’.

You could add a small detail, like a splash of colour, or copy and paste sunglasses or a hat in the Paint editor.

Tip: You can add any costume to your character sprite. Use the **Select** (arrow) tool then click on **Copy** or **Paste**.

Tip: You can group all the objects in a costume. Select them (with the **Select** tool or `Ctrl-a`) and then click **Group**.

Our Batter toad looks like:

Switch to the **Code** tab for your new sprite.

Change all of the `switch costume` blocks to use the correct costumes for your new sprite.

You might also want to change the start `size` of the sprite `when green flag clicked`.

Test: Click on the spell buttons — both characters should respond to the spell broadcasts.

Debug: Check that you have changed the costumes in the `switch costume` blocks for your new sprite.

Save your project

Upgrade your project

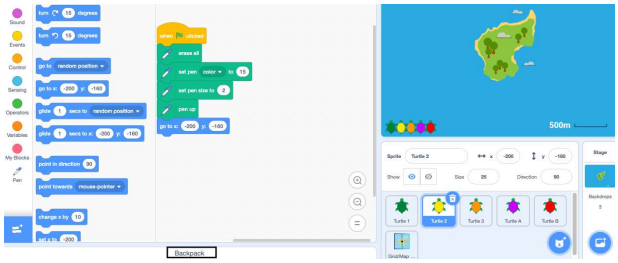
How will you expand your magical world? You could:

- Add more characters
- Add different sound and visual effects to the wand.
- Add more spells — you could make characters disappear and reappear with `hide` and `show`, apply visual effects or turn them upside down.

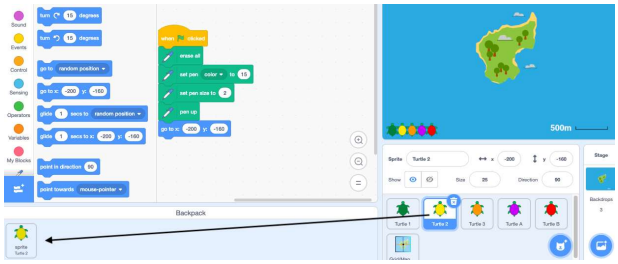
Why not swap characters with a friend? First, swap project links with a friend to see each other's sprites. To save their sprites, use your Scratch backpack or download the sprites to a shared area. Then go back to your project and add the saved sprites.

Using the Scratch Backpack

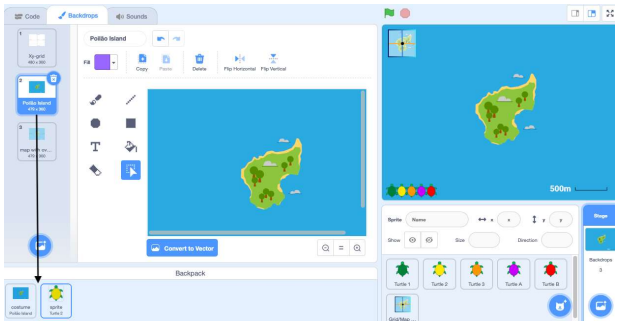
- You can use your Scratch Backpack to store costumes, sprites, sounds, and scripts that you want to copy between projects.
- You can only access your own Backpack, and you must be logged in to your Scratch account to use it.
- To open your Backpack, click on the **Backpack** tab at the bottom of the screen.



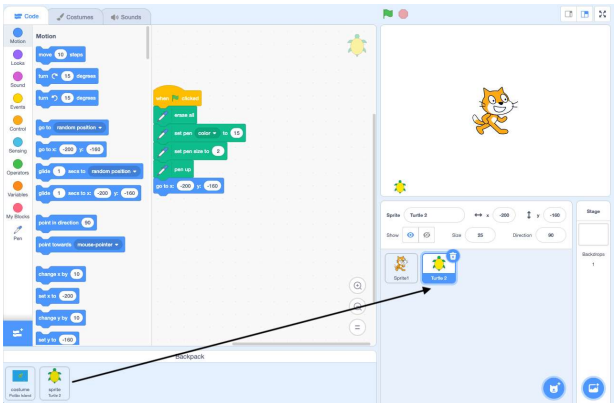
- To add a sprite to your Backpack, drag the sprite from the Sprite list to the Backpack. This will store the full sprite in your Backpack, including all of its costumes, sounds, and scripts.



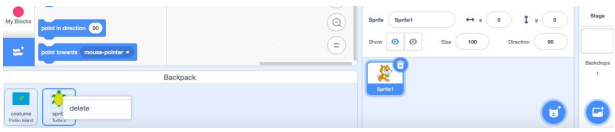
- To add a backdrop to your Backpack, select the Stage pane and click on the **Backdrops** tab, then choose the backdrop that you want and drag it to your Backpack.



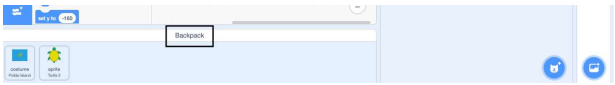
- To use an item in your Backpack in another project, open the project and drag the item from the Backpack to the correct pane or tab.



- To delete an item in your Backpack, find the item in the **Backpack** tab, then right-click (or on a tablet, tap and hold) on the item and select **delete**.

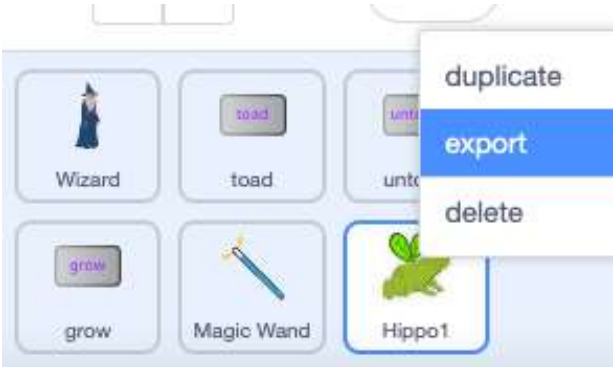


- You can hide your Backpack when you are not using it. To do this, click on the **Backpack** tab at the bottom of the screen.

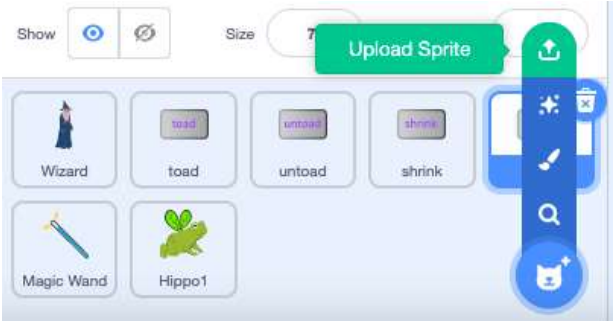


Download a sprite

You can save sprites to your computer by downloading them from your project. Right-click on a sprite in the Sprite list and choose export.



To load a sprite into a project, choose the ‘Upload a Sprite’ option from the ‘Choose a Sprite’ menu.



Create more spells with a friend and add them to your characters. Decide on which spells to create. Make sure you both use exactly the same name for the messages you broadcast.

Completed project

You can view the **completed project here** [(https://scratch.mit.edu/projects/518413238/)](https://scratch.mit.edu/projects/518413238/).

Save your project

What next?

If you are following the **More Scratch** (https://projects.raspberrypi.org/en/raspberrypi/more-scratch) path, you can move on to the **Grow a dragonfly** (https://projects.raspberrypi.org/en/projects/grow-a-dragonfly) project. In this project, you will make a Dragonfly that eats insects.


Dragonfly project
