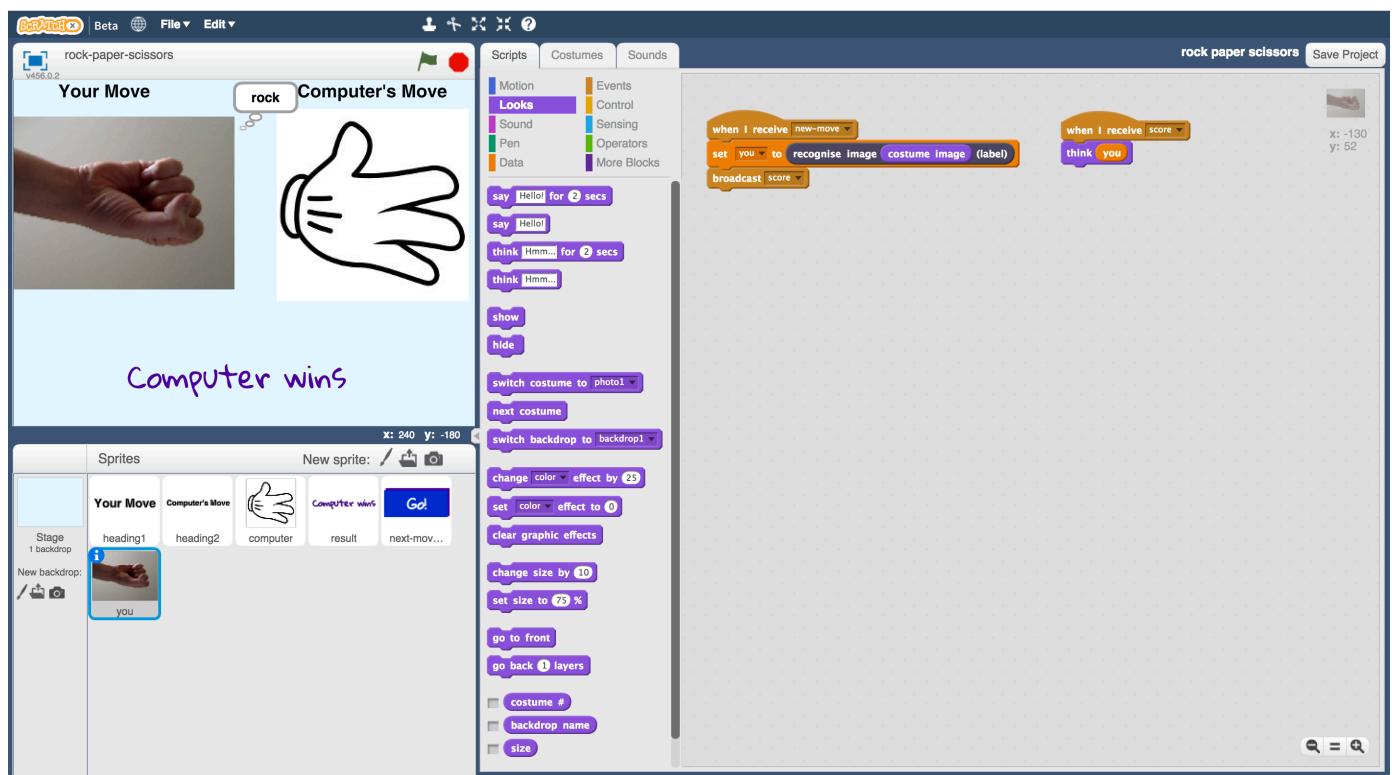


Rock, paper, scissors

In this project you will make Rock, Paper, Scissors in Scratch.

To have your move, you'll take a photo of your hand.

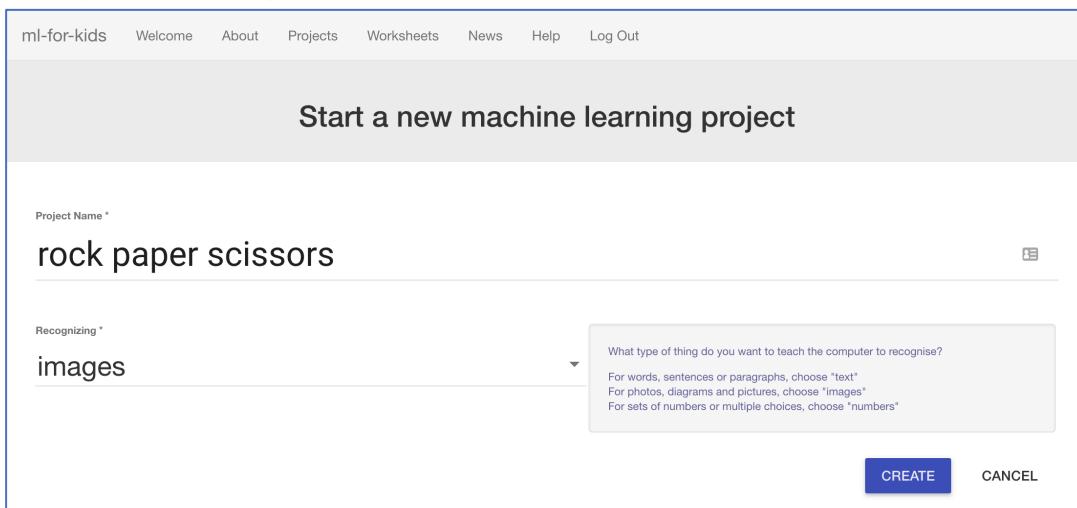
But first, you'll need to train the computer to look at your photos and recognise the different hand shapes of rock, paper, and scissors.



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<http://creativecommons.org/licenses/by-nc-sa/4.0/>

This activity will include you taking pictures of your hand & uploading them.
If you're not happy with that, ask your teacher or group leader for a different activity.

- 1.** Go to <https://machinelearningforkids.co.uk/> in a web browser
- 2.** Click on “**Get started**”
- 3.** Click on “**Log In**” and type in your username and password
If you don't have a username, ask your teacher or group leader to create one for you.
If you can't remember your username or password, ask your teacher or group leader to reset it for you.
- 4.** Click on “**Projects**” on the top menu bar
- 5.** Click the “**+ Add a new project**” button.
- 6.** Name your project “rock paper scissors” and set it to learn how to recognise “**images**”.



The screenshot shows a web page titled "Start a new machine learning project". At the top, there is a navigation bar with links: ml-for-kids, Welcome, About, Projects, Worksheets, News, Help, and Log Out. Below the title, there is a "Project Name *" field containing "rock paper scissors". To the right of this field is a small "X" icon. Below the project name, there is a "Recognizing *" field containing "images". To the right of this field is a dropdown arrow. A tooltip box is open over the "images" field, containing the text: "What type of thing do you want to teach the computer to recognise? For words, sentences or paragraphs, choose 'text'. For photos, diagrams and pictures, choose 'images'. For sets of numbers or multiple choices, choose 'numbers'." At the bottom right of the form are two buttons: "CREATE" and "CANCEL".

- 7.** Click the “**Create**” button

8. You should see “rock paper scissors” in the projects list. Click on it.

The screenshot shows a web interface for managing machine learning projects. At the top, there's a navigation bar with links: ml-for-kids, Welcome, About, Projects, Worksheets, News, Help, and Log Out. Below the navigation is a header titled "Your machine learning projects". A button in the top right corner says "+ Add a new project". In the center, there's a card for a project named "rock paper scissors", which is described as "Recognising images". To the right of the card is a small trash can icon. The entire interface is enclosed in a blue border.

9. Click on “Train”

The screenshot shows the "rock paper scissors" project page. At the top, it displays the project name "rock paper scissors". Below this, there are three main options: "Train", "Learn & Test", and "Scratch". Each option has a brief description and a blue "Train", "Learn & Test", or "Scratch" button respectively. The "Train" section says "Collect examples of what you want the computer to recognise." The "Learn & Test" section says "Use the examples to train the computer to recognise images." The "Scratch" section says "Use the machine learning model you've trained to make a game in Scratch." The entire interface is enclosed in a blue border.

10. Click “+ Add new label” and create a bucket called “rock”.

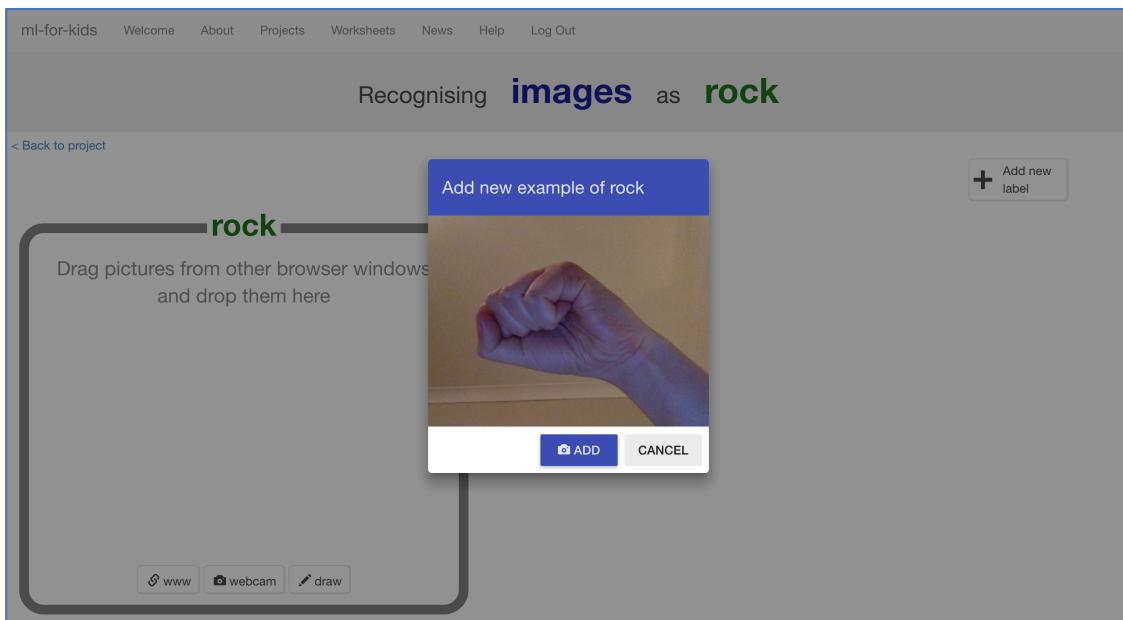
The screenshot shows a page for creating a new label named "rock". At the top, it says "Recognising images as rock". Below this is a link "< Back to project". On the right, there's a button "+ Add new label". The main area features a large rectangular box with a dark gray border, containing the word "rock" in green. Inside the box, there's a placeholder text "Drag pictures from other browser windows and drop them here". At the bottom of the box are three small buttons: "www", "webcam", and "draw". The entire interface is enclosed in a blue border.

11. Click “webcam”

A Preview window shows the current view from your webcam.

You will need to click “Approve” or “Allow” if your web browser asks permission to use your webcam.

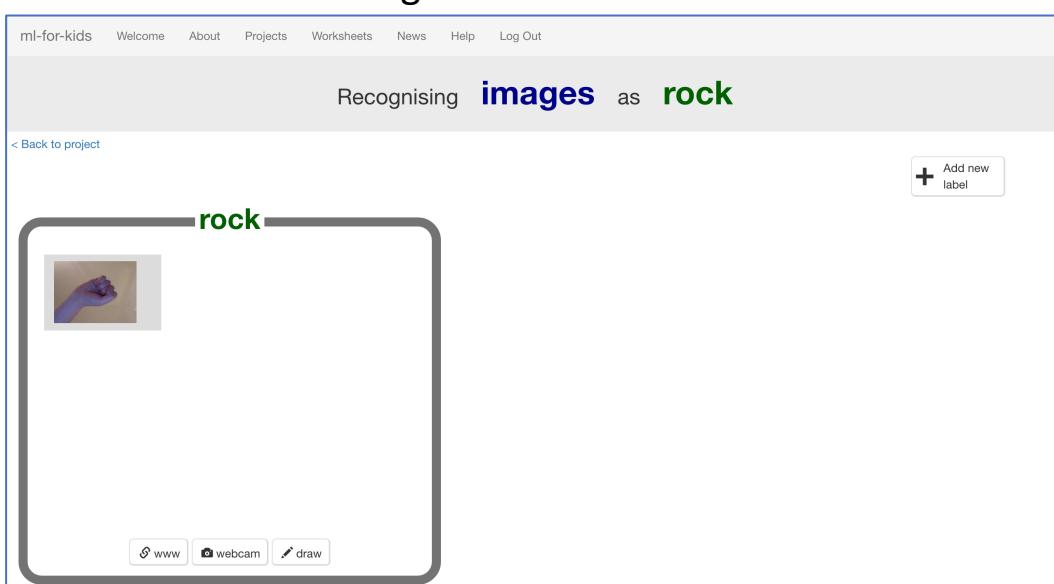
12. Make your hand into a “rock” shape (fist) in front of the webcam



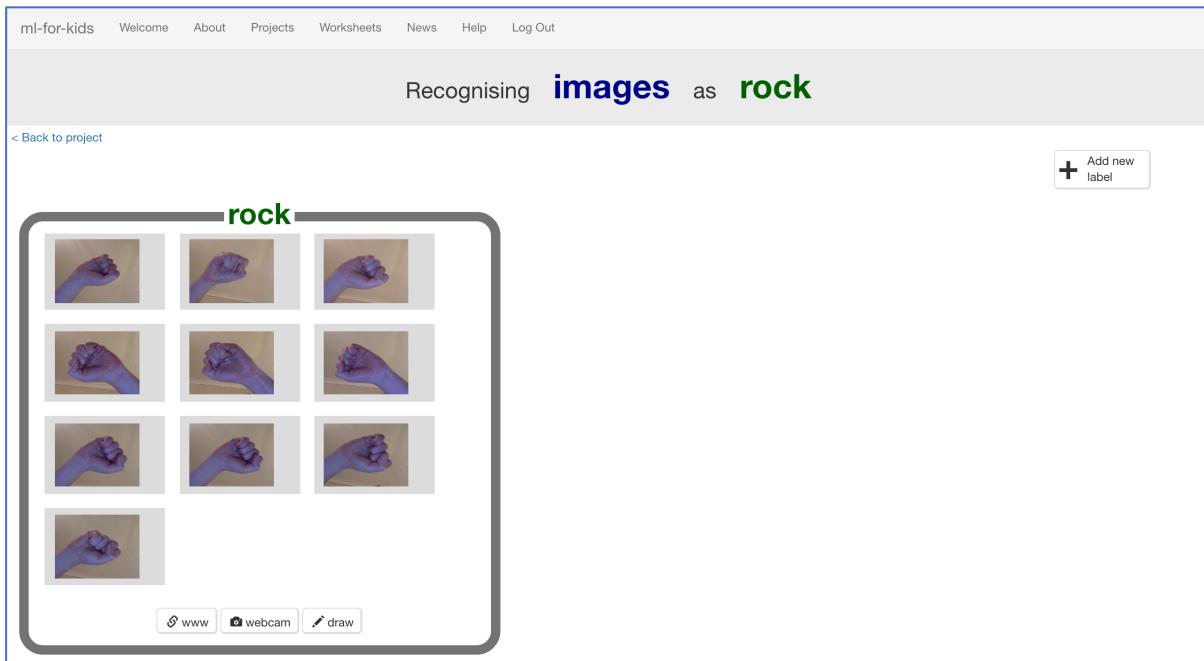
13. When you’re ready, click “ADD” to take a picture

If you’re doing this with a partner, it might be easier for one of you to click on “ADD” while the other makes hand-shapes.

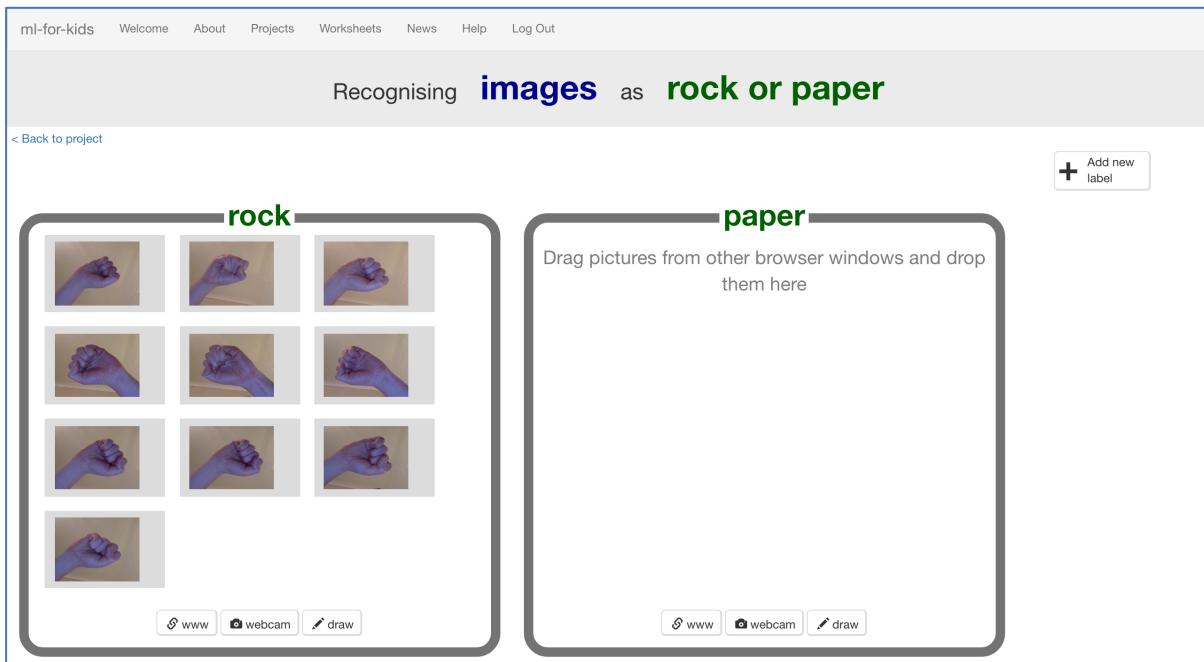
14. Click “webcam” again



- 15.** Repeat until you've got **10** examples of a “rock” shape (fist).
*Try to get a variety of positions and angles.
The more variation the computer has to learn from, the better.*

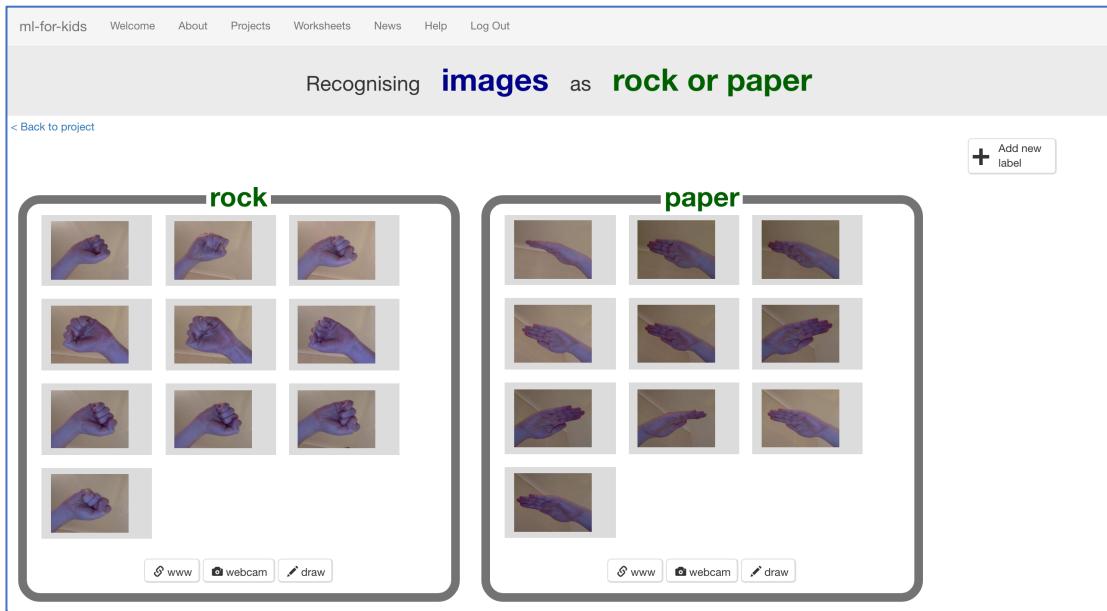


- 16.** Click “+ Add new label” and create one called “paper”

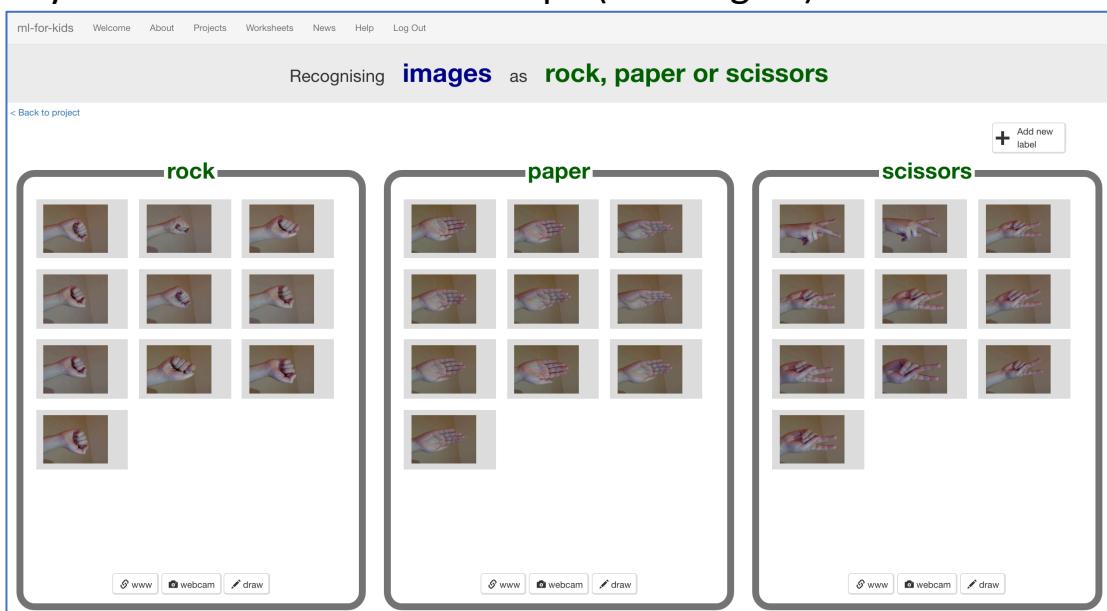


- 17.** Click the “webcam” button in the “paper” bucket
- 18.** Click “ADD” for a photo of your hand in a “paper” shape (flat hand)

- 19.** Repeat until you have **10** photos of your hand in a “paper” shape
Try to get a variety of positions and angles.
The more variation the computer has to learn from, the better.



- 20.** Click “+ Add new label” and create one called “scissors”
- 21.** Use the “webcam” button in the “scissors” bucket to take **10** photos of your hand in a “scissors” shape (two fingers).



- 22.** Click the “< Back to project” link.

23. Click the “Learn & Test” button.

24. Click the “Train new machine learning model” button.

The screenshot shows a web interface for training a machine learning model. At the top, there is a navigation bar with links: ml-for-kids, Welcome, About, Projects, Worksheets, News, Help, and Log Out. Below the navigation bar, the title "Machine learning models" is displayed. Underneath the title, there is a link "[Back to project](#)". The main content area is divided into two sections: "What have you done?" and "What's next?". The "What have you done?" section contains text stating "You've collected examples of images for a computer to use to recognise when images is rock, paper or scissors." followed by a bulleted list: "• 10 examples of paper," "• 10 examples of rock," and "• 10 examples of scissors". The "What's next?" section contains text stating "Ready to start the computer's training?" followed by "Click the button below to start training a machine learning model using the examples you've collected so far." and "(Or go back to the Train page if you want to collect some more examples first.)". At the bottom of the page, there is a box labeled "Info from training computer:" containing the text "Train new machine learning model".

25. Wait for the training to complete. This might take a few minutes.
While waiting, try to complete the machine-learning multi-choice quiz at the bottom of the page.

What have you done so far?

You've started to train a computer to recognise pictures as being rock, paper or scissors. You are doing it by collecting example photos. These examples are being used to train a machine learning “model”.

This is called “supervised learning” because of the way you are supervising the computer’s training.

The computer will learn from patterns in the colours and shapes from each of the photos you’ve given it. These will be used to be able to recognise new photos.

Tips

More examples!

The more examples you give it, the better the computer should get at recognising whether a photo of your hand is rock, paper or scissors.

Try and be even

Try and come up with roughly the same number of examples for each shape.

If you have a lot of examples for one type, and not the other, the computer might learn that type is more likely, so you'll affect the way that it learns to recognise photos.

Mix things up with your examples

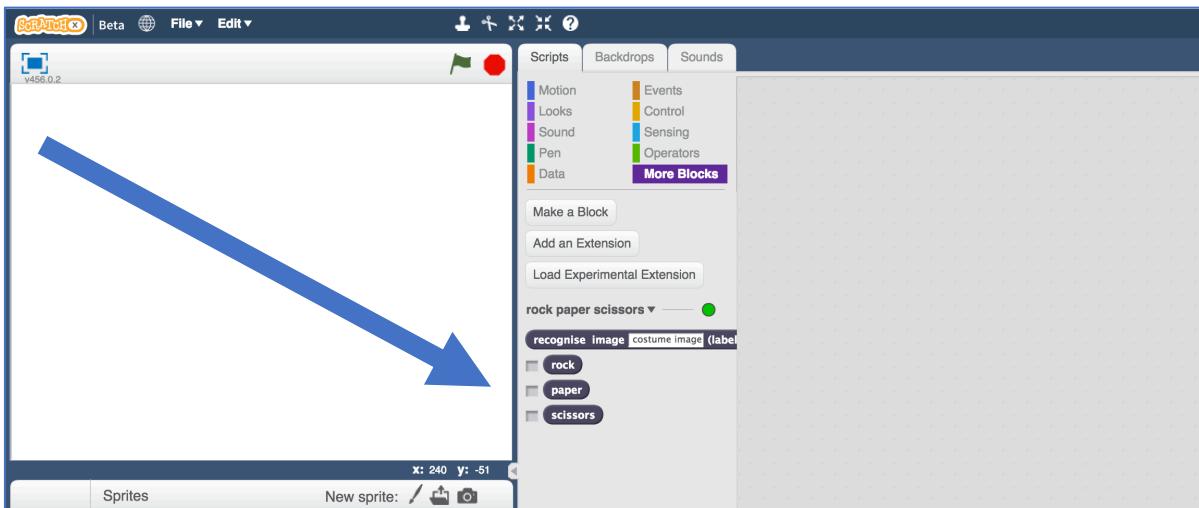
Try to come up with lots of different types of examples.

For example, you could include examples of your hand coming from the left side of the photo as well as examples of your hand coming from the right side.

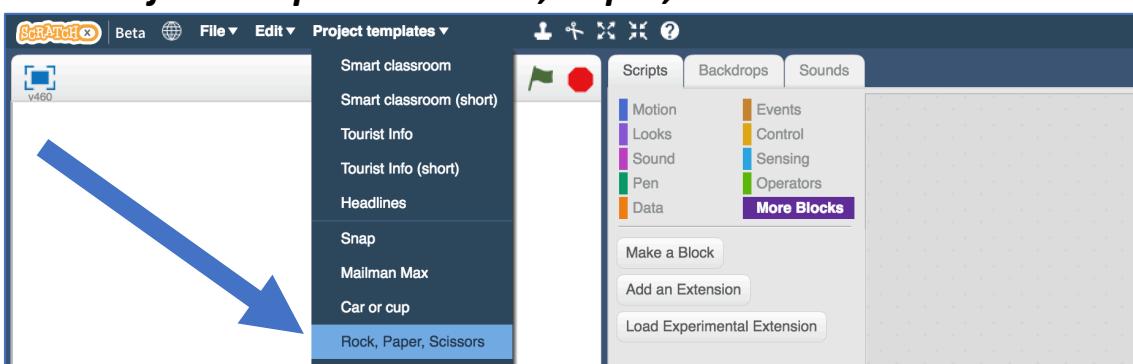
If you'd rather use imgur.com than imagebin...

use <https://dalelane.github.io/webcam-to-imgur> instead

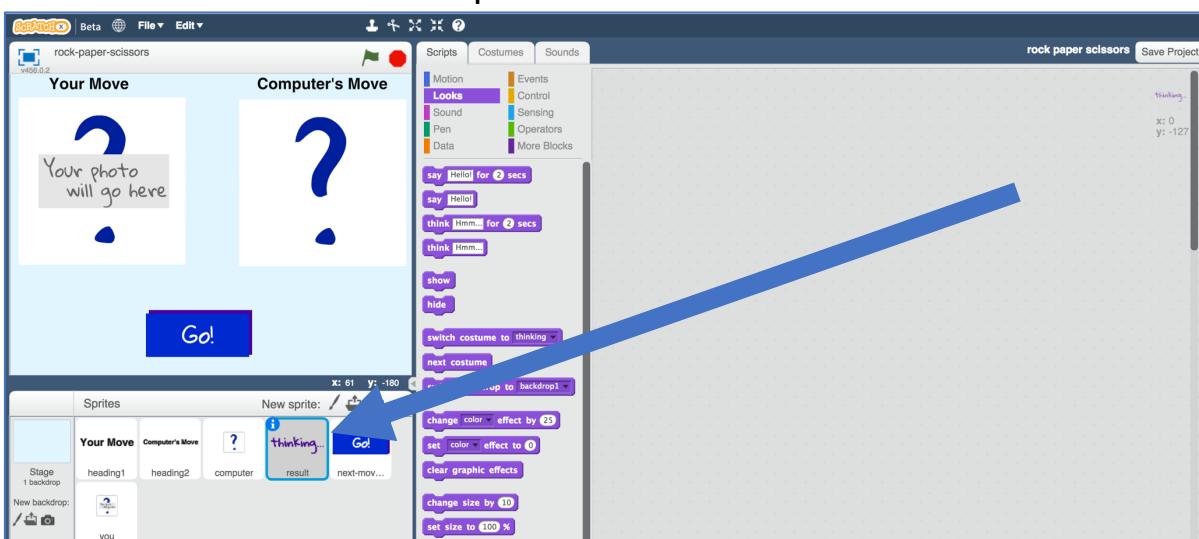
26. Click the “Open in Scratch” button to launch the Scratch editor.
You should see four new blocks in the “More blocks” section from your “rock paper scissors” project.



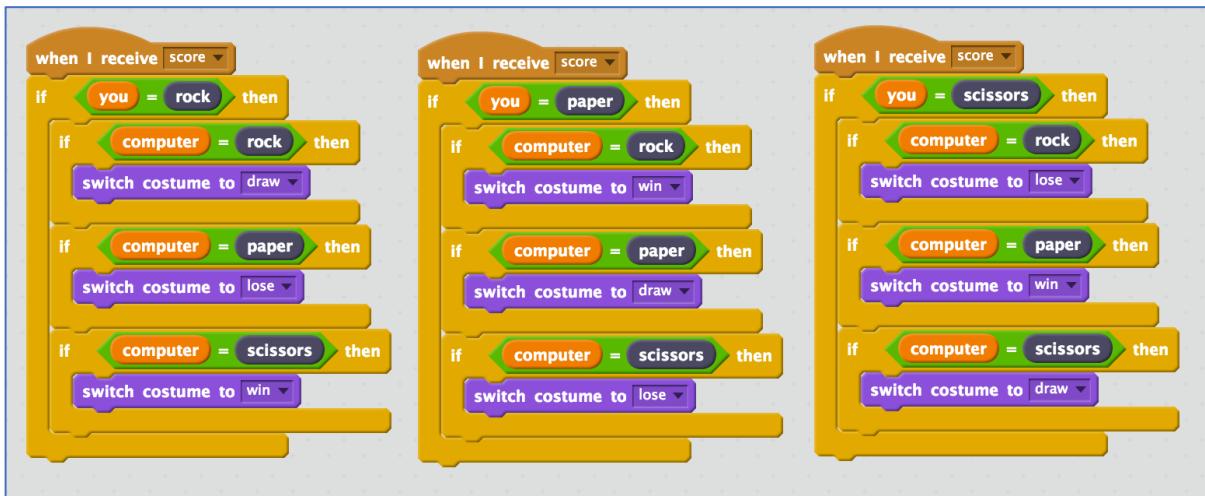
27. Open the Rock, Paper, Scissors project template.
Click Project templates -> Rock, Paper, Scissors



28. Click on the “result” sprite



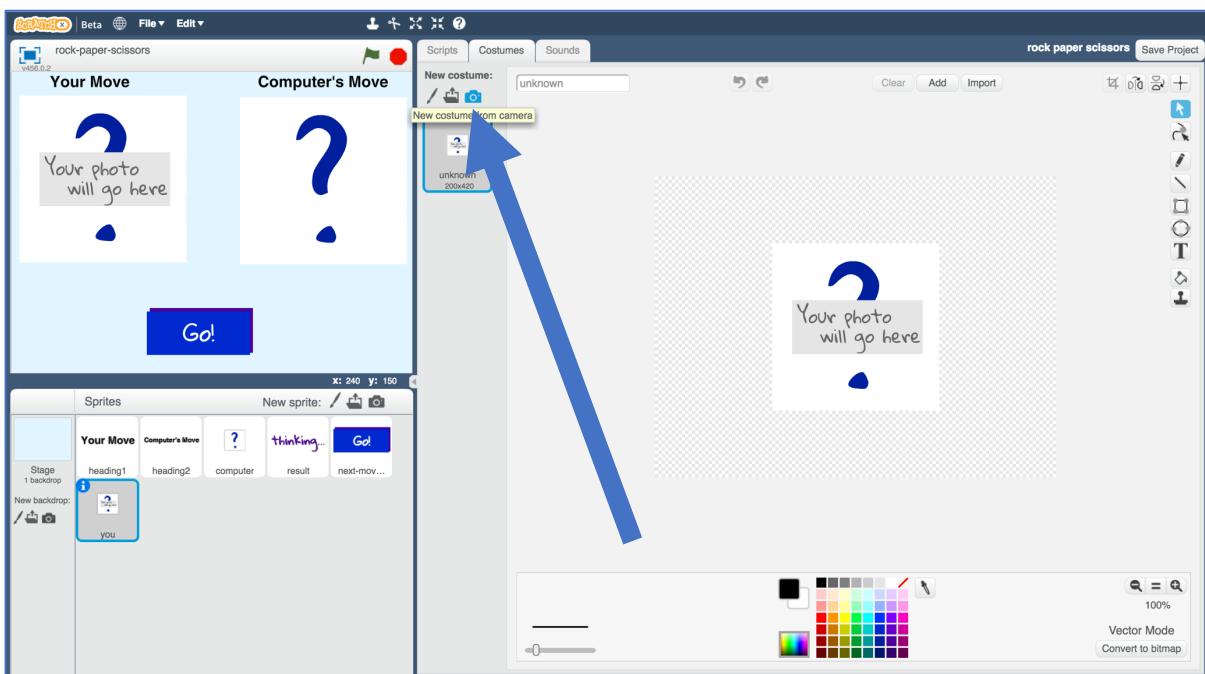
29. Add the following script blocks with the rules for the game to the “result” sprite.



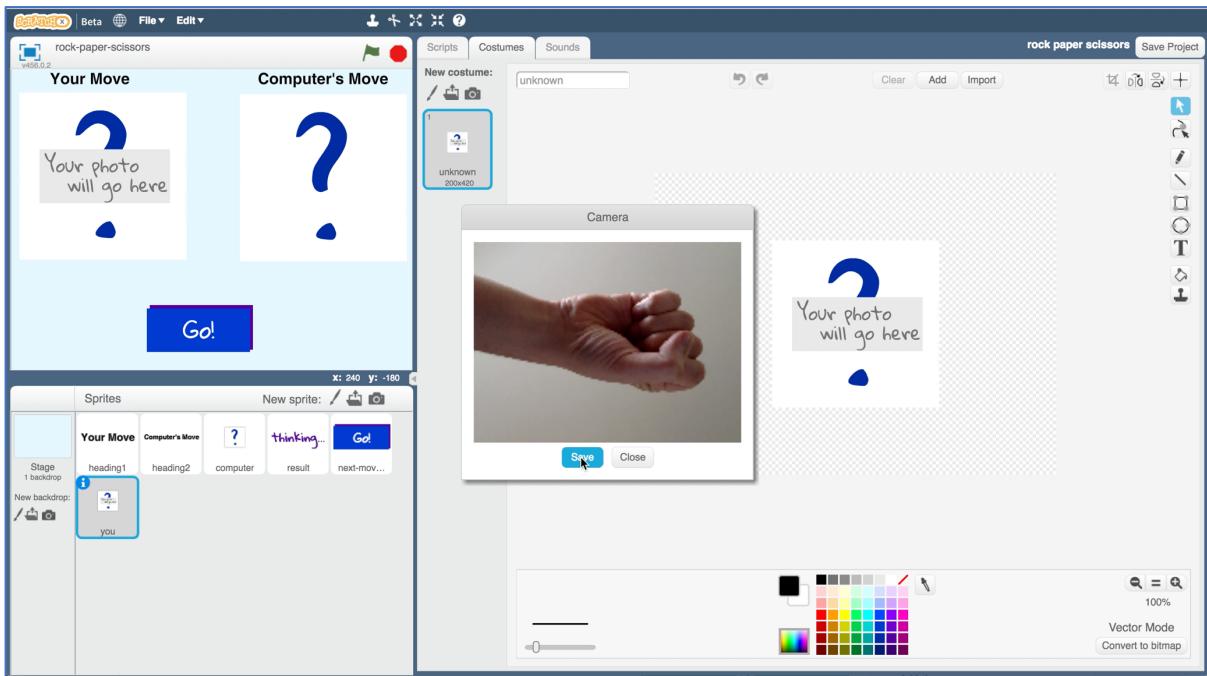
30. Click on the “you” sprite.

31. Click on the “costumes” tab.

32. Click the “New costume from camera” button
It's the camera icon shown below.



33. Take a photo of your hand



34. Click on the “Scripts” tab

35. Add the following script blocks to the “you” sprite to let the computer recognise your move



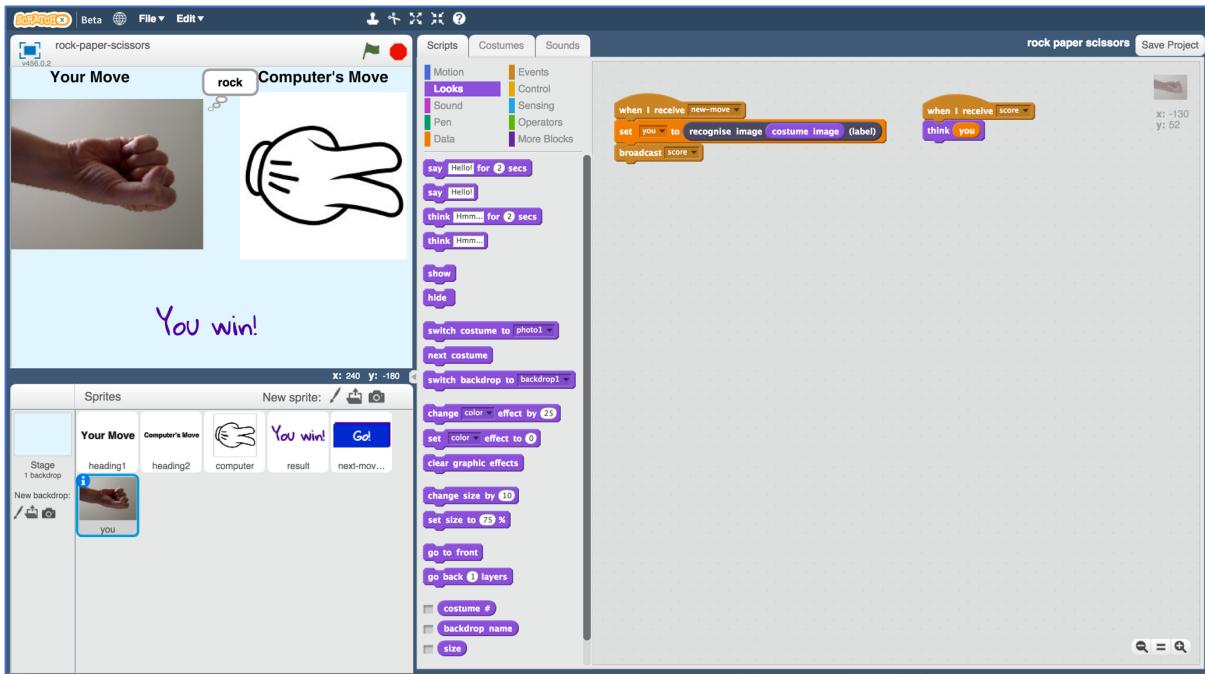
36. Save your project.

Click **File -> Save project**

37. Test your project

Click the **Green Flag**, then click the “Go!” button in the game.

The computer will choose a random picture for its side. It will try to recognise the shape of your hand, and then use the rules you entered to work out who won.



38. If the computer is not very good at recognising your hand shapes, go back to step 21, and add more examples for the computer to learn from. You'll need to repeat step 24 and train a new machine learning model after you've added more examples.

What have you done?

You've made a simple rock-paper-scissors game in Scratch.

The game uses a webcam to take pictures of your hand, and uses machine learning to understand the meaning of the photo.

This is “image recognition” – teaching a computer to recognise images.