

Fireworks Program in Scratch

By Phil Bagge

@baggiepr

code-it.co.uk

How to use this planning

- Confident children could work independently through the instructions starting from slide 5 (The Plan)
- You could use the step by step guide to teach this to less independent children
- Parts of the program could be used with younger or SEN pupils such as the firework design
- You could show pupils a working model and get them to decompose what is happening before creation

Previous Knowledge

- Basic experimentation with Scratch is needed as pupils need to know how to attach and break blocks apart and understand how code links to a sprite or background
- Loops in real life
<http://code-it.co.uk/resources/loops.pdf>
- I would recommend creating a simpler program such as my Spider Maze first
<http://code-it.co.uk/year4/scratchmindmap.html>

Programming Concepts

- Forever iteration loops
- Repeat n times iteration loops
- Random numbers with max and minimum
- Starting blocks of code from within other code by broadcasting

The Plan

The program should

- **Launch** multiple rockets up into the air
- Rockets should **rise** to random locations across the screen
- Rockets should **explode** as fireworks
- Fireworks should **clear** after a while
- Program should **end**

Paint a firework rocket

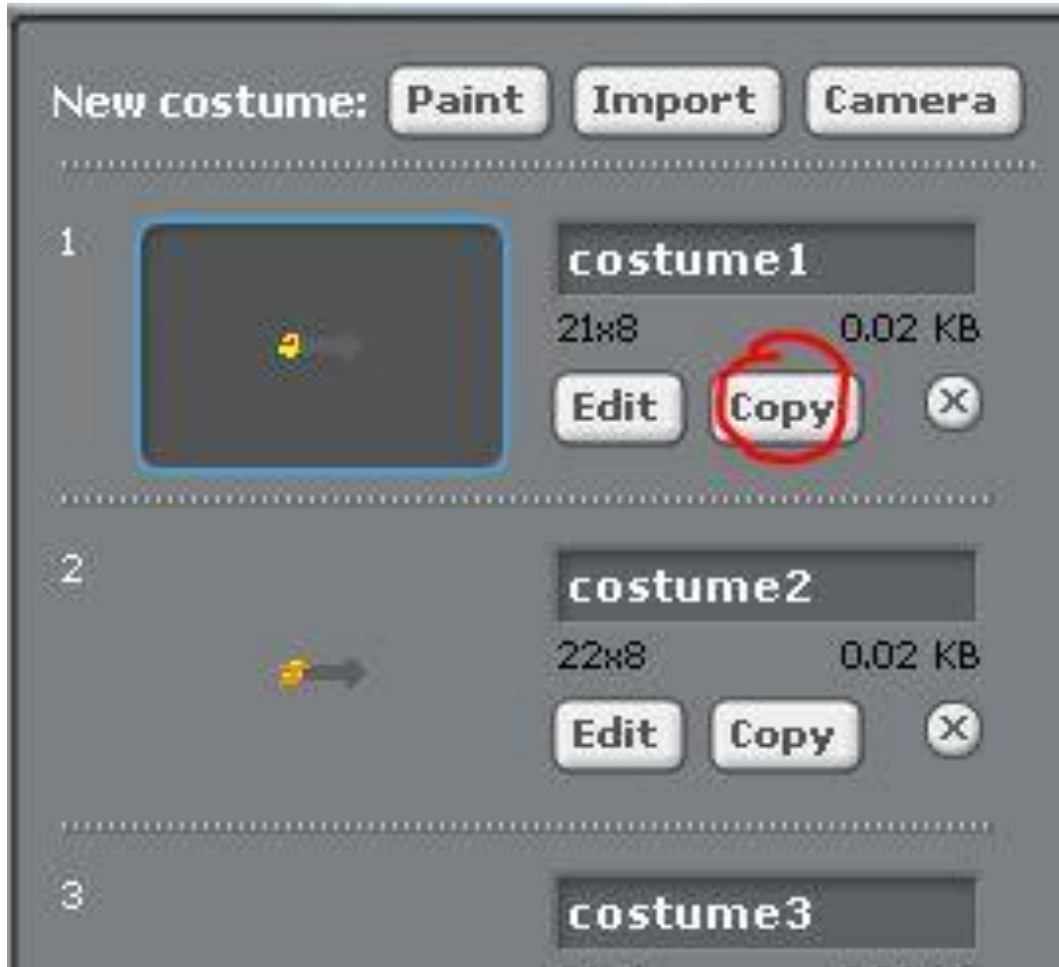
- Right click on the cat and **delete**
- Left click on **Paint new sprite**



- Zoom in fully and paint a simple rocket



Increase number of rocket costumes

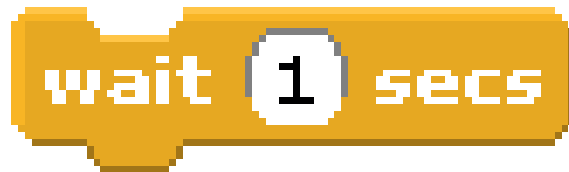


Copy your rocket

Zoom in and adjust the rocket flame

Repeat until you have three or more similar costumes with different colour flames

Rocket flame costume change

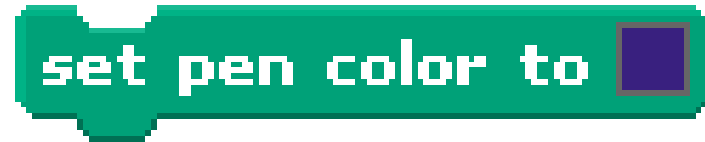


When green flag is clicked
forever loop through
next costume and
wait 0.1 second

Design a firework

What great repeated pattern firework can you create?

You can use other looks blocks if you want



either



When green flag is clicked the pen will go down and the pen colour will be set.

The pen will then repeat a series of moves and turns to make a star shape pattern.

When the repeated pattern has finished the pen will go up.

Mission control



Left click black triangle

Left click new

Type in rocket

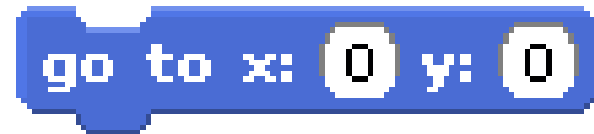
When green flag is clicked
rocket sprite will

Go to x: 0 and y: -165 (start)

Point in direction (0) up

Show the rocket

Broadcast rocket to start
rocket movement



Rocket Movement



Left click black triangle
Left click new
Type in firework



Left click black triangle
select rocket

When I receive rocket
glide 1 secs to x: 0 y: 100
hide rocket
broadcast firework to start
firework



Change rocket movement block so that rocket has random movement



← Last block should look like this before you add random x: and y:



-100 to 100



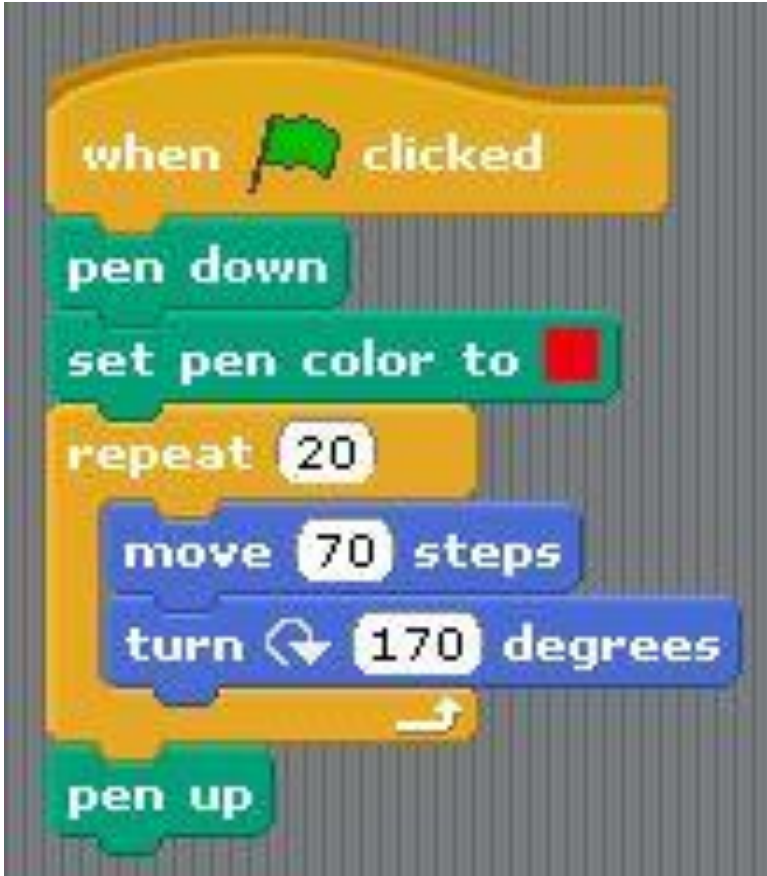
30 to 110

When I receive rocket
glide 1 secs to
x: pick random -100 to 100
y: pick random 30 to 110

Change firework so rocket starts it

Your firework **could** look like this

Change the code so that it no longer starts with a green flag but now starts when it receives firework broadcast by rocket movement block



Left click on the black triangle and make sure it says firework

Create black sky

- Click on stage
- Click edit
- Use bucket tool & black colour to paint black sky
- rename as blacksky



Test & debug your program so far

- Does your rocket fly up?
NO Are glide random numbers correct
- Does your rocket go to a random location in the sky each time?
NO Have you added random blocks?
- Does your firework explode in the sky?
NO Does the rocket movement broadcast firework?
- Does your rocket start in the same place each time you restart the program?
NO Have you got a go to x:0 y:-165 block?
- Does your rocket flame look like it is firing?
NO Have you created a costume change block?

Part 2

Refine (improve) the program

Countdown Backgrounds

Click on stage

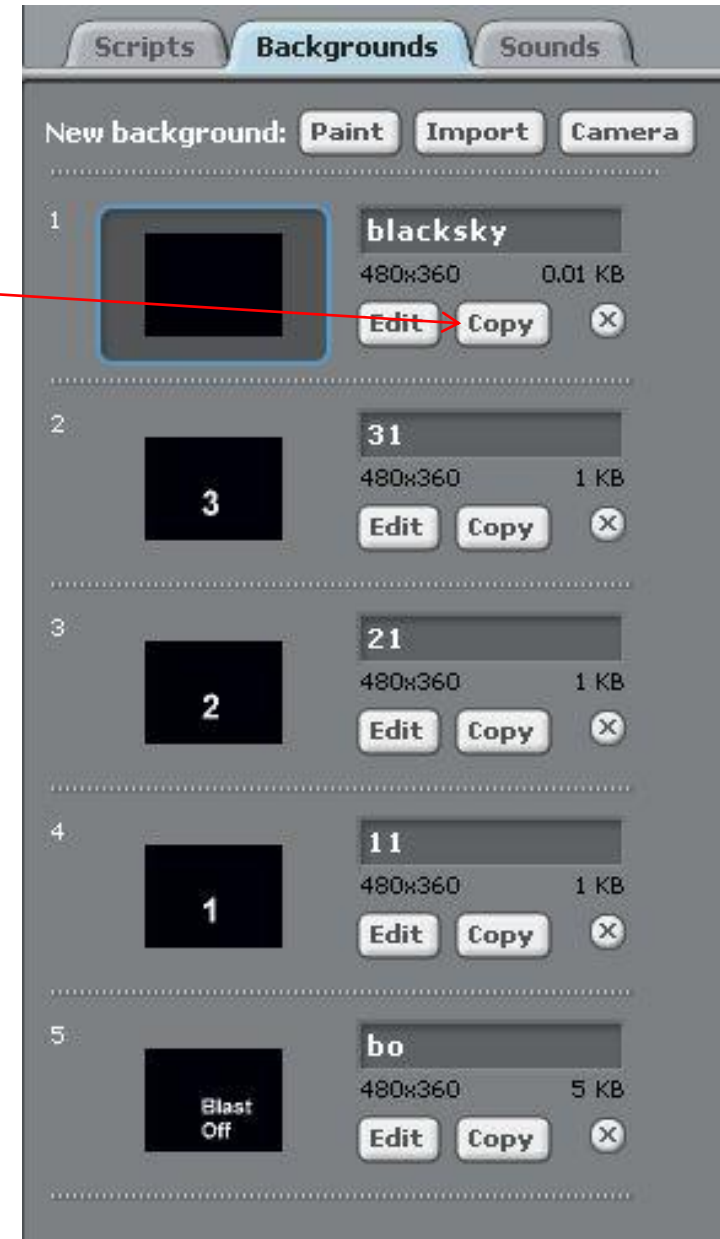
Click copy on blacksky

Edit using text button and
type large 3

Rename as 3

Repeat until you have
backgrounds that display
3, 2, 1 & blast off

Make sure they all have
unique names



Change mission control to broadcast countdown

Mission control looks like this



Broadcast will start a block that runs through the background countdown. 4 seconds are needed by countdown before we launch the rocket



Left click black triangle
Left click new
Type in countdown

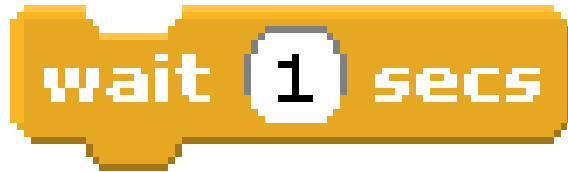
Change it to make it look like this



Create countdown code to cycle through backgrounds before rocket launch



Left click black triangle
Select countdown



← 4 wait
commands

Left click black triangle
and change costume
names



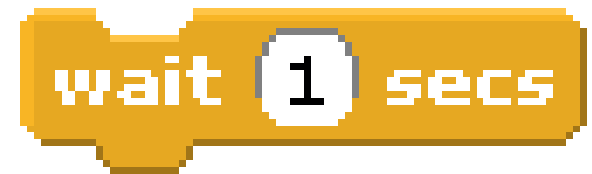
← 4 costume
switch

When I receive countdown
switch to costume 3
wait 1 second
switch to costume 2
wait 1 second
switch to costume 1
wait one second
switch to costume blastoff
wait one second
switch to blacksky

Ending firework display



Your firework code might look something like this



Add code at the end of the firework block to
wait 2 seconds
clear the screen
stop all

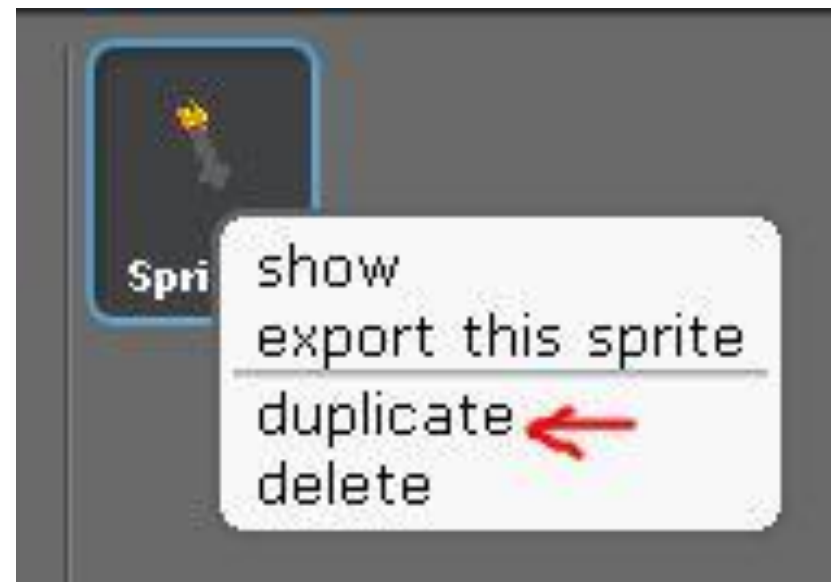
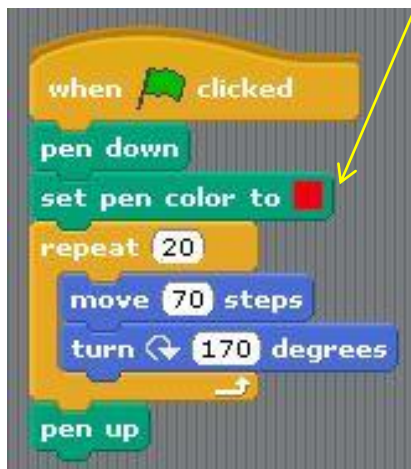
Create multiple rockets and change the colours of the fireworks

Right click on your rocket sprite

Left click on duplicate

Do this lots of times

Edit each sprite to use a different firework colour



Test & debug your program

Remember nearly every
program will have bugs

This is normal!

Can you find and fix them?

Further Challenges

- Can you create a second type of firework and launch it with a similar rocket?
- Can you make your firework fade out?