

Nature Returns



Fire can be very dangerous. But after a bushfire the plants grow back better than ever.

INTRODUCTION

What you will make

You will make an animation that simulates the fire-regrowth cycle.



What you will learn

- Add code to create clones.
- Add code to change costumes and backgrounds.
- Add code to pick random locations and times.

Code Club Australia recognises the Traditional Custodians of the land across Australia and their continuing connection to land, cultures, and communities. Australia's traditional owners are the world's first innovators.

What you will need

HARDWARE

A computer capable of running Scratch 3.
This project is suitable for an iPad.

SOFTWARE

Scratch 3:
either online
[rpf.io/scratchon](https://scratch.mit.edu)
or offline
[rpf.io/scratchoff](https://scratch.mit.edu)

DOWNLOADS

Offline starter project
bit.ly/mhbushfires

Additional notes for educators

Here is a link to the completed project
<https://scratch.mit.edu/projects/450732032/>

Check out our [blog post](#) for this project with tips, curriculum and supporting material at medium.com/@codeclubau

1. PLACING THE GREENERY

To get started, we want to place our bushes around the scene.

- Open the Starter Code here - bit.ly/mhbushfires
- The Bush Sprite will be selected, but you won't be able to see it yet.
- Add this code to place 10 bushes randomly around the scene.



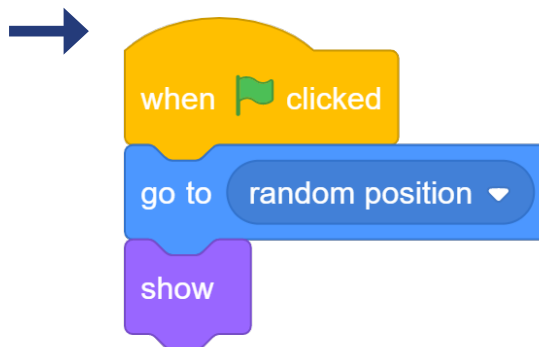
- Next, add code that will place our clones in our scene so that we can see them.
- We don't want them in one place. We'll use this block so they appear randomly on the x and y axis.
- Test your code by clicking the green flag. The bushes should randomly appear around your scene.



2. UNPREDICTABLE FIRE

Fire can be very unpredictable. We're going to simulate this unpredictability by making our fire move in random directions.

- Select your Fire Sprite.
- Add code so that our fire starts in a random location.





- Add code so that your Fire Sprite moves to a random new position several times.



```

when green flag clicked
  go to random position
  show
  repeat 5
    glide 2 secs to random position
  
```



- When the fire has finished burning through our bushes, we want it to burn out.
- We will use the Hide block to hide the fire.



```

show
repeat 5
  glide 2 secs to random position
hide
  
```



- There is a second background on the Stage.
- We want to change the background to give us the feeling that the forest is growing back.
- After we hide the Fire sprite, let's change the background.



```

repeat 5
  glide 2 secs to random position
hide
switch backdrop to regrowth
  
```



- Test your code - what happens when you test it twice? The background doesn't change!
- Let's reset the backdrop at the beginning, when we press the green flag.



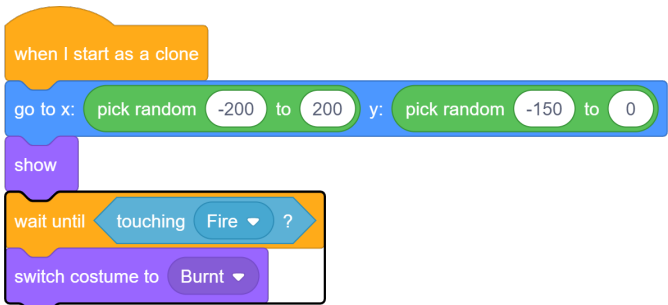
```

when green flag clicked
  switch backdrop to fire
  go to random position
  show
  repeat 5
    glide 2 secs to random position
  
```

3. BURNT, THEN REGROWN

Now that the fire is burning through our scene, we need to show the bushes as burnt and then regrow them.

- Select your Bush Sprite.
- Add code so that the Bushes only burn when they have been touch by the Fire.
- Test your code.



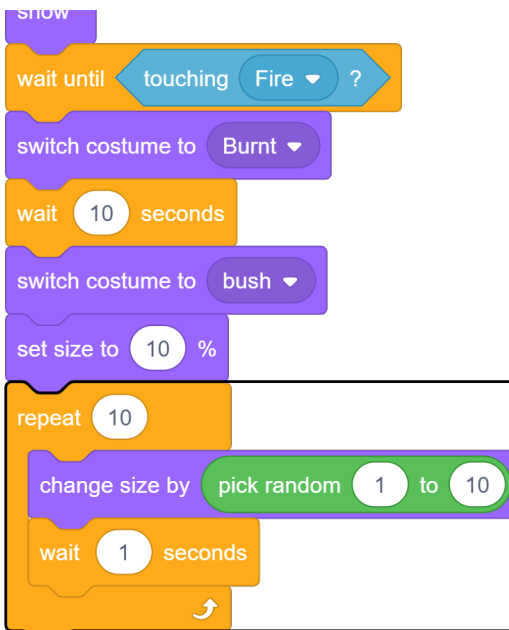
```
when I start as a clone
  go to x: pick random -200 to 200 y: pick random -150 to 0
  show
  wait until touching Fire ?
  switch costume to Burnt
```

- Now that the bush is burnt, we want to wait a little, then regrow it.
- Test your code. Your bushes will start off small, let's make them grow!



```
wait until touching Fire ?
switch costume to Burnt
wait 10 seconds
switch costume to bush
set size to 10 %
```

- Add code to make the Bush grow back to full size.
- We want to do this over time, and at random speed to make it more realistic.



```
show
wait until touching Fire ?
switch costume to Burnt
wait 10 seconds
switch costume to bush
set size to 10 %
repeat 10
  change size by pick random 1 to 10
  wait 1 seconds
```

Challenges:

Smoother Animation

The growth of your bushes is currently not very smooth, can you make the animation smoother?

Hint: You will need more loops, more frequently, with smaller changes to make your animation smoother.

More Randomness!

The position of the fire is random, but the number of direction changes and the time taken in each direction change is still predictable. Can you make these numbers vary randomly as well?

Hint: You will need to use the “pick random” block.

Putting out our fire

At the moment the fire randomly goes out, but often fires only go out with lots of rain or help from the Fire Service. Can you add another sprite, either rain or a fire truck, to help put out the fire?

Maybe this fire is put out by a fire service plane that drops water!

Advanced Challenge: Multiplying Fire

Real fire doesn't just move unpredictably, it also grows when it consumes more bush in certain conditions. Can you modify your code to create clones of the fire as it consumes more bush?

Congratulations you're a
Moonhack changemaker!

Don't forget to talk to an adult
about registering your
participation at
moonhack.com

