

MOONHACK 2020

DRONE PLANTING

ENGLISH

**BROUGHT TO YOU BY CODE CLUB AUSTRALIA
POWERED BY TELSTRA FOUNDATION**



/ AUSTRALIA

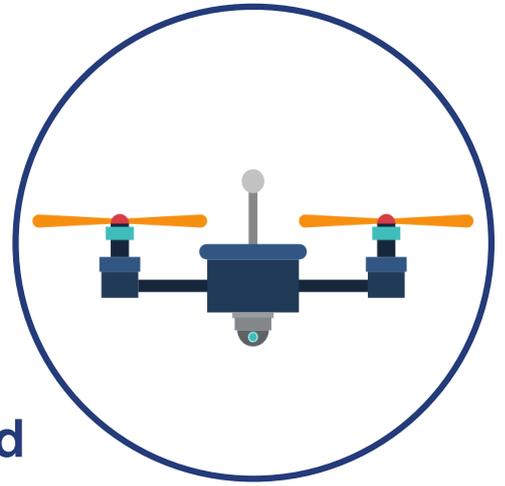


POWERED BY
TELSTRA
FOUNDATION

**SUBMIT AND BE COUNTED AT
[MOONHACK.COM](https://moonhack.com)**



Drone Planting



Sometimes our bush and forests need regenerating. Can you use a drone to plant seeds that grow into trees?

INTRODUCTION

What you will make

You will make a game where your drone drops seeds to regenerate the bush with trees



What you will learn

- Add code to move the drone across your screen and drop seeds
- Add code to grow trees from your seedlings

What you will need

HARDWARE

A computer capable of running Scratch 3

SOFTWARE

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

DOWNLOADS

Offline starter project
bit.ly/mhdroneplanting



Additional notes for educators

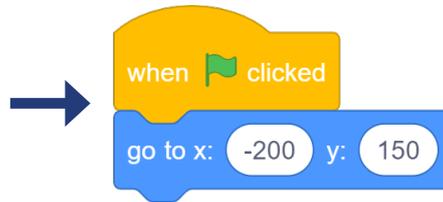
Here is a link to the completed project
<https://scratch.mit.edu/projects/361057154/>

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

1. DRONE

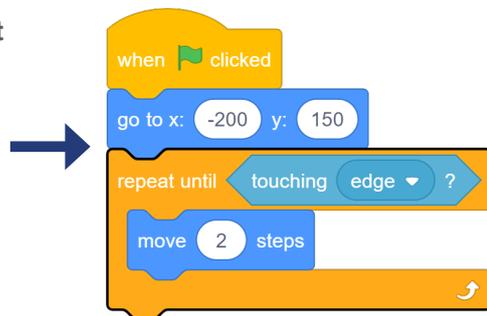
Let's code your Drone to move across the stage.

- Open the Starter Project - bit.ly/mhdroneplanting
- Select 'See Inside'
Add this code to your Drone sprite so that it starts in the top-left of the stage



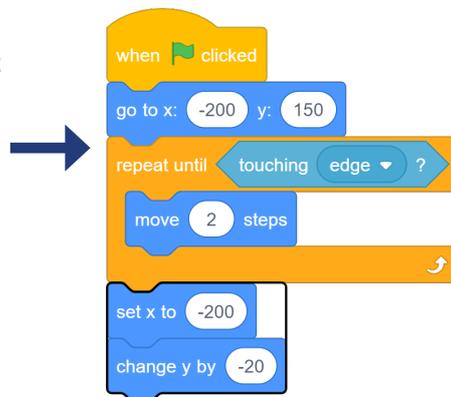
```
when green flag clicked
  go to x: -200 y: 150
```

- Add code so that your drone moves to the right until it reaches the edge of the stage



```
when green flag clicked
  go to x: -200 y: 150
  repeat until touching edge
    move 2 steps
```

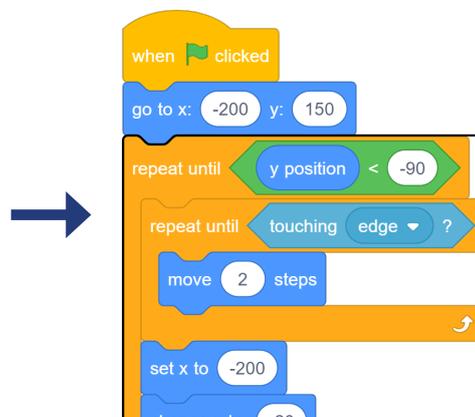
- Test your code by clicking the green flag. It should move across the top of the stage until it reaches the other side
- Add code so that once it has reached the edge, it should go back to left side and move down slightly



```
when green flag clicked
  go to x: -200 y: 150
  repeat until touching edge
    move 2 steps
  set x to -200
  change y by -20
```

- Finally, you need to repeat this movement until your drone is at the bottom of the screen (its y position is less than -90).

Test your drone again, it should move across and down until it gets to the bottom of the screen.



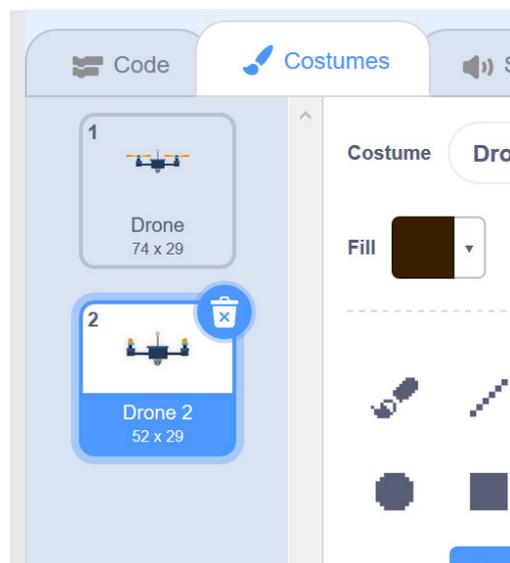
```
when green flag clicked
  go to x: -200 y: 150
  repeat until y position < -90
    repeat until touching edge
      move 2 steps
  set x to -200
```

Challenge: Animate your Drone

You may have noticed your drone has two slightly different costumes

Can you use this block to animate your drone as it moves?

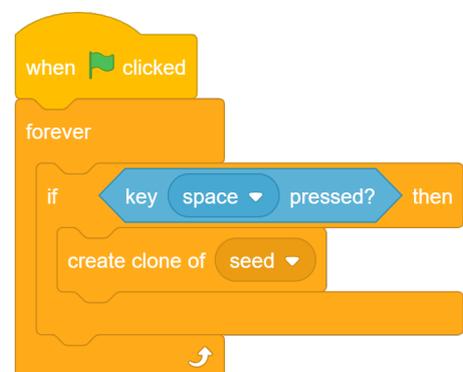
next costume



2. SEEDS

Let's code your drone to drop seeds to plant trees

○ Add code to your drone sprite to create a new seed clone whenever the space key is pressed





Add code to your seed sprite, so that it is hidden when the game starts

```

when green flag clicked
  hide
  
```



Then add code so that each new clone appears wherever the drone is

```

when I start as a clone
  go to drone
  show
  
```



Test your code by clicking the green flag. A seed clone should appear wherever space bar is pressed.

Now you need to make the seeds fall to the ground

```

when I start as a clone
  go to drone
  show
  repeat until touching edge
    change y by -3
  
```

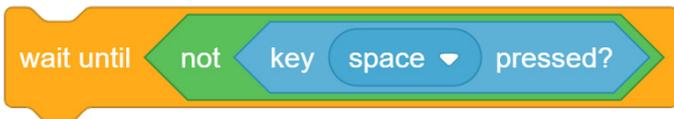


Test your seeds again. This time they should fall to the ground



Challenge: Too many seeds

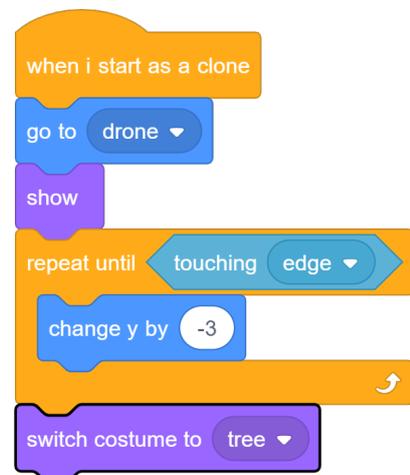
Have you noticed that lots of seeds are dropped if you hold down the space bar? Can you use either (or both) of these blocks to fix the problem?



3. GROW YOUR TREES

Let's code your seeds so that they grow into trees when they reach the ground

- Your seed has multiple costumes, including three different tree.
- When the seed hits the ground, you can change the seed to one of the tree costumes





Test your code

All the trees look the same!

You want lots of biodiversity. You'll notice that each costume has a number next to it. Instead of choosing the costume by name, you can choose it by number by using the pick random block.



```

change y by -3
switch costume to pick random 2 to 4

```



Test your code again!

That's much better, but there's still one problem: trees don't come fully formed! They have to grow from a seed!

To simulate tree growth, you will need the trees to start out small. Set the size to 10%



```

change y by -3
switch costume to pick random 2 to 4
set size to 10 %

```



To grow your trees, you will need to tell them to increase in size. You can do it many times in a loop to simulate growth



```

switch costume to pick random 2 to 4
set size to 10 %
repeat 20
  change size by pick random 1 to 10

```



That looks great, but our trees are growing way too fast! You can add a wait block to slow down the growth a bit



```

switch costume to pick random 2 to 4
set size to 10 %
repeat 20
  change size by pick random 1 to 10
  wait 0.5 seconds

```

Challenge: Smoother growth

When your trees grow, have you noticed they grow in small jumps? Can you smooth out this

Hint: You don't need to add any new blocks, just change the numbers in your growth loop

Challenge: Add your own tree

Can you create your own tree costume to further increase the biodiversity of our forest?

Hint: You will need to update your code to include your new costume when you switch the tree costume

Congratulations you're a
Moonhack changemaker!

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

