Drone Planting

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

# INTRODUCTION

<table>
<thead>
<tr>
<th>What you will make</th>
<th>What you will need</th>
</tr>
</thead>
<tbody>
<tr>
<td>You will make a game where your drone drops seeds to regenerate the bush with trees</td>
<td><strong>HARDWARE</strong></td>
</tr>
<tr>
<td></td>
<td>A computer capable of running Scratch 3</td>
</tr>
<tr>
<td></td>
<td><strong>SOFTWARE</strong></td>
</tr>
<tr>
<td></td>
<td>Scratch 3: either online rpf.io/scratchon or offline rpf.io/scratchoff</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What you will learn</th>
<th>Additional notes for educators</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Add code to move the drone across your screen and drop seeds</td>
<td>Here is a link to the completed project <a href="https://scratch.mit.edu/projects/361057154/">https://scratch.mit.edu/projects/361057154/</a></td>
</tr>
<tr>
<td>• Add code to grow trees from your seedlings</td>
<td>Check out our blog post for this project with tips, curriculum and supporting material at medium.com/@codeclubau</td>
</tr>
</tbody>
</table>

[220x513]

[64x469]
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 [ ] 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 [ ] 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 [ ] 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 [ ] 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.

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

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

Now you need to make the seeds fall to the ground.

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 trees. 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.

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%

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

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