



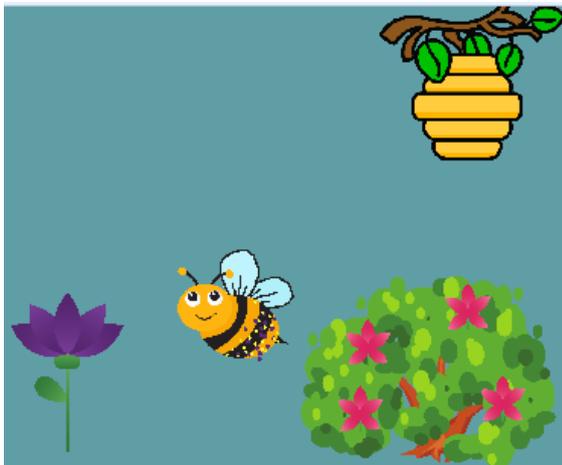
Un-Bee-lievable!

Bees are important for the pollination of flowers and food! They are a vital part of our food chain.

INTRODUCTION

What you will make

You will make a game to help the bee pollinate the flower and grow fruit.



What you will learn

- You'll learn how to create your own blocks.
- You'll learn how to create and broadcast a message.

What you will need

HARDWARE

A computer capable of running Scratch 3

SOFTWARE

Scratch 3:
either online
<http://rpf.io/scratchon>
or offline
<http://rpf.io/scratchoff>

DOWNLOADS

Offline starter project
bit.ly/CCAbee

Additional notes for educators

Here is a link to the completed project
<https://scratch.mit.edu/projects/407283973/>

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.

1. CONTROL YOUR BEE

Let's set up the controls for the movements of our bee.



- Open the starter project: bit.ly/CCAbee



- Be sure to select the **bee** sprite.



- Make sure the **bee** sprite is displayed using the **show** block.



- Set her starting position using **go to x: y:**.



- Add this code to help the bee plan her journey.



- We want to be able to control our bee until she gets to the flower.

- Add these blocks.





- If we press the down arrow we want our bee to **move down**.



```

think I need to collect pollen from the purple flower! Let's go! for
repeat until touching flower
  if key down arrow pressed? then
    change y by -2
  
```



- We want to be able to control our bee in all directions.
- Add code to **move up, left and right** too.
- Test your code!
- You'll notice your bee gets to the flower and then stops. Let's fix that!



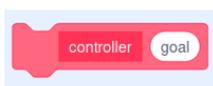
```

change y by -2
if key up arrow pressed? then
  change y by 2
if key left arrow pressed? then
  change x by -2
if key right arrow pressed? then
  change x by 2
  
```



- We want to keep this code, but make our own block that does all of this!
- Click **My Blocks**.
- Then click **Make a Block**.
- Name your block **Controller**.
- Click **Add an input** and rename your input to **goal**.
- Your custom block should look like this:

The 'Make a Block' dialog shows a preview of a red block with 'controller' and 'goal' inputs. Below are three options: 'Add an input number or text', 'Add an input boolean', and 'Add a label'. There is also a checkbox for 'Run without screen refresh' and 'Cancel'/'OK' buttons.

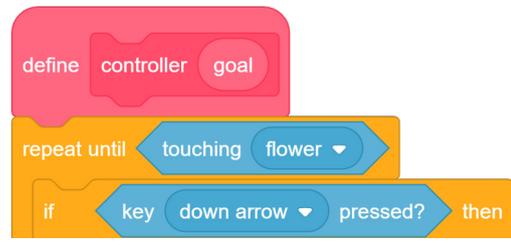
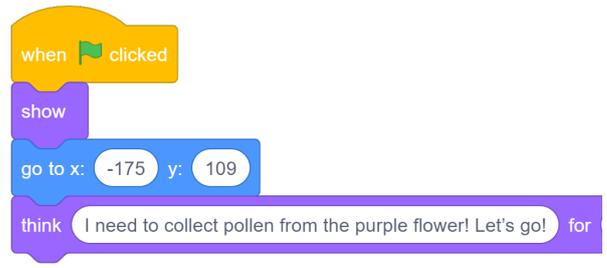




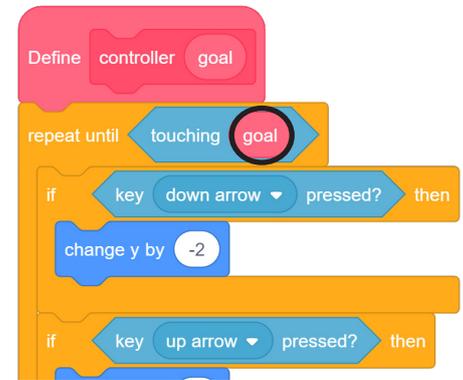
- Press OK. You should now have a **define block** that looks like this



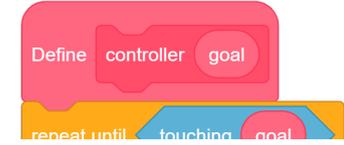
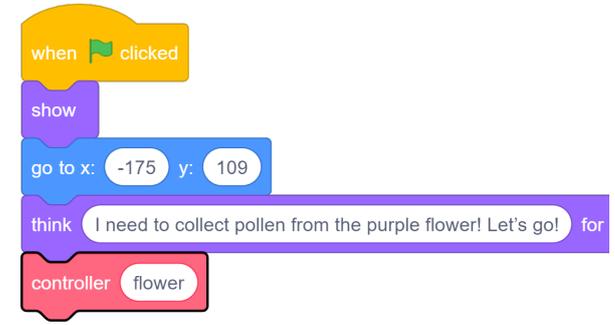
- Separate the arrow controls and attach to your new **define controller block**.



- Drag the **goal oval** from your define controller block in the **touching block**.
- Every time you use your new **controller block**, it will run all of the code under the define block.



- Finally, add your new block under the existing code of your main program.
- Change the text to 'flower'.



- Test out your code.
- You should now be able to move your bee using the **controller** in all four directions until it touches the flower and stops.

2. COLLECT YOUR POLLEN

When a bee lands on a flower it collects pollen in the pollen baskets that are located on their legs and abdomen.



- After the bee reaches the flower, add code so that her **costume** changes.
- This costume is the pollen that she has collected.



```
go to x: -175 y: 109
think I need to collect pollen from the purple flower! Let's go! for 2 sec
controller flower
switch costume to purplebeecostume
think I can use this pollen to pollinate another flower. Where should I go?
```



- Next, we want the player to fly the bee to the bush in order to pollinate the flowers.
- We can use our **controller** block again, but with a different **goal**.



```
controller flower
switch costume to purplebeecostume
think I can use this pollen to pollinate another flower. Where should I
controller bush
```



- Try it out! You should now be able to fly to the purple flower to collect the pollen, and then to the bush to pollinate it. What happens when you start the game again?



- The bee shouldn't have pollen before she's visited the flower!
- Let's reset her **costume** when the game is started.

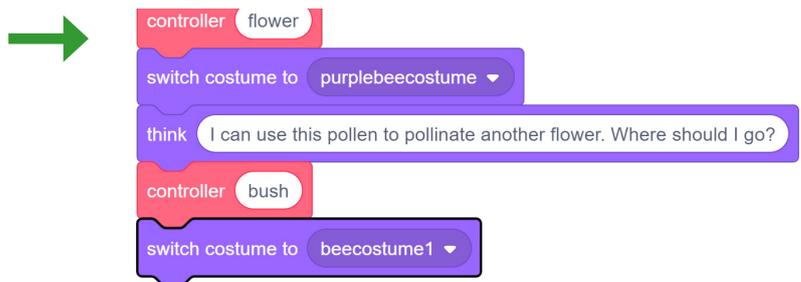


```
when clicked
show
switch costume to beecostume1
go to x: -175 y: 109
think I need to collect pollen from the purple flower! Let's go!
```

3. BROADCAST A MESSAGE

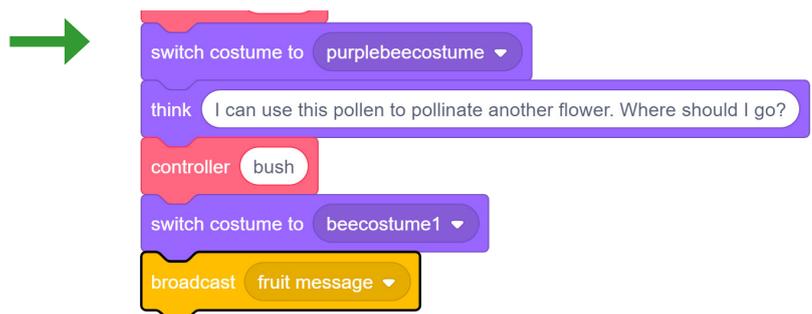
When the flowers on the bush receive pollen from the bee the seeds in the flowers turn into fruit. Create a broadcast message to send to the fruit to start growing.

- Once our bee deposits her payload of pollen, she doesn't need it anymore. Change the **costume** back to the base costume.



A Scratch code block for the bee controller. It starts with a 'controller' block for 'flower'. Below it is a 'switch costume to' block set to 'purplebeecostume'. Then a 'think' block with the text 'I can use this pollen to pollinate another flower. Where should I go?'. Below that is another 'controller' block for 'bush', followed by a 'switch costume to' block set to 'beecostume1'.

- Next, we want our bee to pollinate the flower.
- Add a **broadcast** block.
- Change the name to **fruit message** by clicking the **drop down arrow**.

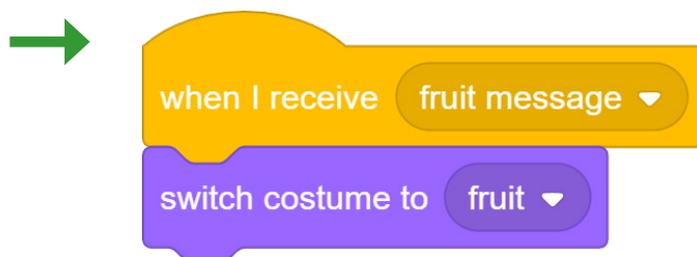


A Scratch code block for the bee controller. It starts with a 'switch costume to' block set to 'purplebeecostume'. Then a 'think' block with the text 'I can use this pollen to pollinate another flower. Where should I go?'. Below that is a 'controller' block for 'bush', followed by a 'switch costume to' block set to 'beecostume1'. At the bottom is a yellow 'broadcast' block set to 'fruit message'.

- Now that we've pollinated the flower, we want the bush to bear fruit
- Select your **bush sprite**.



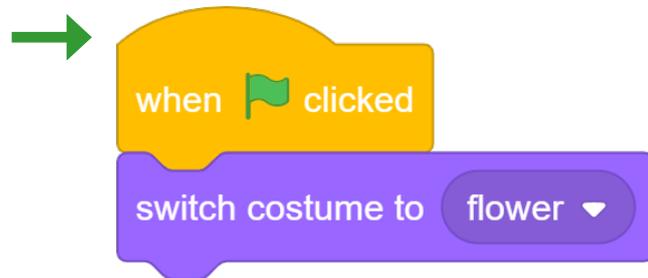
- Add the code to make the flower change **costume** when it receives the **fruit message**.



A Scratch code block for the flower controller. It starts with a yellow 'when I receive' block set to 'fruit message'. Below it is a purple 'switch costume to' block set to 'fruit'.

- Test your code. When your bee pollinates the flower, does it change costume?
- What happens when you play again? Your flower starts off with the wrong costume!

- Add the following code to change the bush back to the **flower** costume when the green flag is clicked.



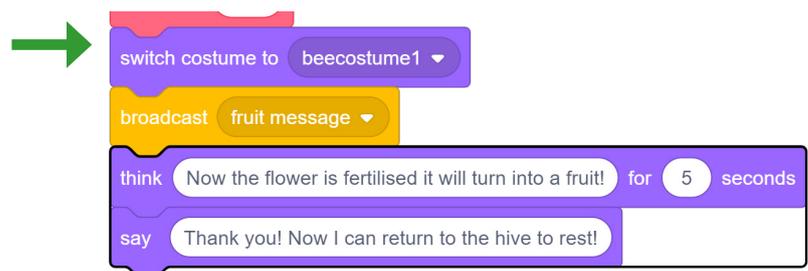
5. SEND THE BEE BACK TO THE QUEEN

Once the bee lands on the bush and has changed costumes she needs to return to the hive.

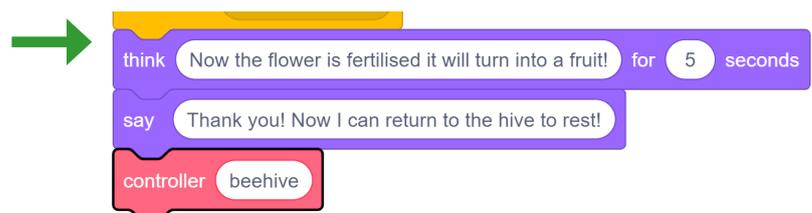
- First, click on the **bee sprite**.



- Next, we want our bee to say something.

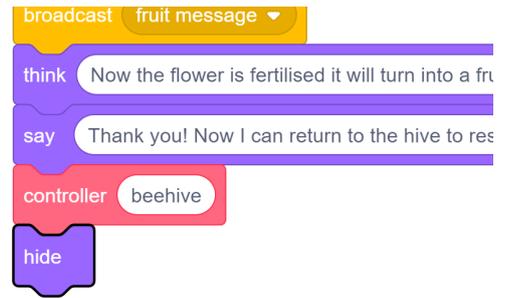


- We want to use our **controller** one more time.
- This time the **goal** is the beehive.





- When she gets to the beehive, she should go inside to tell the other bees where the pollen is.
- **Hide** the bee sprite.
- You're finished! Test your game!



CONGRATULATIONS

You've finished this project! Try one of the challenges below, or maybe add your own?

Challenges:

Add a costume

Can you add another Bee costume so some pollen shows on the bee when she flies back to the hive? This pollen will be made into honey in the hive.

Advanced Challenge: End screen celebration

Can you create a new sprite? Create a new sprite that shows a jar of honey. When the bee returns to the hive and disappears can you make the jar of honey appear on the stage?

Find out more...

Bees are vital for the existence of the planet. They pollinate flowers which allow fruits and vegetables to grow, just like in our game!

In our bee game, our bee collects some pollen and then distributes it to another flower that turns into fruit. After our game, the bee would do a little dance to communicate to other bees where the nectar and pollen are. Then they would all go out to find it!

We've written a blog post, all about a different kind of bee – one that is robotic! If you want to find out more about real and robotic bees head to our blog for more info - medium.com/code-club-australia

And don't miss the other coding resources available on our website. There are videos, interview and more lessons all about Agriculture and other topics!

codeclubau.org/projects/topics/agriculture/