

Let's BEE Scientists!

Experiment Pack

Thank you for being part of our experiment!

Together we can BEE Scientists!

We are testing to see which artificial flowers (that the High schoolers from Living Learning Blue Mountains) made attract what kind of pollinators.

Your garden is one site in the experiment.

So if we have 30 gardens, we have 30 sites to compare!

We are hoping to publish the results of this experiment in a scientific journal, with the high schoolers as authors of the scientific study.

To do this we need to try our best to keep the methods and data consistent! So thank you so much for being the scientists that you are 😊

This Experiment Kit Includes

- Experiment Checklist
- How to guides:
 1. How to: Pollinator Bingo
 2. How to: Garden Flower List (“Which flowers are in your garden”)
 3. How to: Artificial Flower SETUP!
 4. How to: Artificial Flower SURVEY TIME!
 5. How to: Submit your data!
 6. How to: Label your flowers!
- Data sheets
 1. Pollinator Bingo (Lets play pollinator BINGO!)
 2. Flower List (On back of bingo; “Which flowers are in your garden”)
 3. Artificial Flower Survey
- Artificial flowers (6 varieties)
-

Experiment Checklist (tick when complete)

1.	Artificial Flower Survey (sheet)	Done	Data submitted
2.	Pollinator Bingo (Data sheet)		
3.	Flowering Plant List (Data Sheet)		
4.	Photos in circle North/South/East/West		
5.	Video of Artificial flower survey		
6.	Video of Bingo		

If you have questions,

Please email Julie sparksandflames@gmail.com, or Amelie amelie.vanderstock@s

Let's BEE Scientists
Experiment

How to: Pollinator BINGO!

(1) Walk around the garden for **10 minutes** with a buddy

→ Try and observe (and film!) **all the different kinds** of (**currently flowering**) plants in your garden area.

→ *In home gardens we will survey the whole garden, but if your garden is very large survey no more than 2 tennis courts worth!!!*

Observer (a) is **filming** (on a smartphone/ipad/camera)

Observer (b) is **writing** (ticking the BINGO boxes!).

Both observers can be bee-sy spotting pollinating insects!!

Filming guidelines (Observer a)

- Film for 10 minutes continuously
- Label your video as bingo_YourFullName e.g. **bingo_EMBERHENNINGER**
- Try and get all the insects on flowers you see (as close as you can!) in the video
- Try and get all the different flowers you see in the video (even if no insects land)
- Don't forget to Submit your videos! (see HOW to submit data guidelines)

Bingo Guidelines (Observer b)

- Tick the boxes **ONLY IF you see** that kind of insect
- Remember the goal is NOT to find all the insects! The goal is to see what insects are there IF they are there. If you don't find any insects that's still an AWESOME outcome!!!
- If you are not sure, put a question mark in the tick box and make sure you get the filmer to film the insect as close as possible☺ Then we can figure it out later!

How to: Garden Flower List!

- You can do this at the same time as your bingo. Or you can do it before/after.
- Please list the different kinds of (currently flowering) plants in your garden.
- If you don't know the name, please give it a descriptive name (e.g. yellow small spikey) and take a photo of it
- Label any flower photos as DescriptiveName_ YourFullName e.g. **sunflower_EMBERHENNINGER**
- Don't worry if you don't know all the names (the photos and videos can help us figure it out later!)

How to: Artificial Flower Survey SET UP!

When to do your surveys

It's important we only survey for pollinators when it's a good day for them!

Please only survey if it is:

- (a) Sunny/only a bit cloudy, (b) Temperature 18oC - 32oC, (d) Between 10am and 5pm,
- (d) Wind little- none (this one is flexible, so long as its not blowing about wildly!)

Setting up your Artificial flower circle

- Set up your flower circle ANYWHERE in the garden.
- Please make a circle with 160cm diameter and the flowers evenly spaced around it in a random order. One way to do that is described below but you might have another way of achieving the same result!

Measure a straight line 160cm across and put an artificial flower at each end (any of the flowers, chosen without looking). Also place an object to mark half way along the line (80cm). Place a book with it's corner at this half way point so that you can use the corner of the book to help you measure a right angle and turn the tape measure so it is perpendicular to the first line you measured. With the 80cm mark on the tape measure at the centre point you marked, place a flower at each end of the tape measure (at 0cm and 160cm). Measure half way between two of the flowers that are next to each other and place an object to mark this point. Stretch your tape measure out to 160cm again, and turn the tape measure so that it touches the half way point you just marked, with the 80cm mark on the tape measure at the centre of the circle. Place another flower at each end of the tape measure (at 0cm and 160cm). You can use the book again to find the final line which will be perpendicular to the last one you laid out. Again with the 80cm mark at the centre place the last two flowers at the ends of the tape measure at 0cm and 160cm). The straight line in between each flower should be just over 60cm (it's okay if it's not exact!)

Preparing the “nectar”

- Dissolve caster sugar in (warm) water in a 50:50 ratio (half sugar, half water)
- Stir or wait until sugar dissolves (you can't see the sugar crystals anymore)
- Wait until you've set up the circle in the garden THEN fill the Eppendorf tubes (the plastic tube thing) in the centre of the flowers to the top using a transfer pipette (plastic squidgy syringe thing)

Please do your surveys anywhere from 1 minute to 1 hour after you have set up the flower circles and filled the nectar!!!

otherwise the ants might come marching in one by one....

Note: You should do your Artificial flower surveys and Pollinator Bingo surveys as close together as possible (so straight after each other is ideal). This is so that we capture the information about the flowers flowering, the pollinators buzzing, and the artificial flower attractiveness at (almost) the same time.

How to: Artificial Flower Survey SURVEY TIME!

(1) Take Four Directional Photos

- Stand in the middle of your artificial flower circle
- Take a photo of your garden facing (approximately) North, South, East and West so that you have 4 photos in opposite directions.
- Label your photos the same as for films **Site number_Location** e.g. **16_BMOG_North**

(2) Observe (& film) the artificial flower circle for **10 minutes** with a buddy

- Stand outside your flower circle so you can see all the flowers. Feel free to (mindfully!) move around the circle to get a closer look at the pollinators.

Observer (1) is **filming** (on a smartphone/ipad/camera)

Observer (2) is **writing** on the data sheet

Both observers can be bee-sy spotting pollinating insects!!

One of these observers should also be a **time keeper!**

So long as there are **at least two people**, you can have as many observers as you like around the flower circles. Extra observers could also film to increase our chances of getting close-ups of all the pollinators! This is different to the Bingo. **ONLY** two observers should do Bingo together to “standardize” our surveys.

Filming guidelines (Observer 1)

- Film the flower circle for 10 minutes continuously
- At the start of your video, read the Date, Location and Observer names at the top of the data sheet (e.g. it is the 14th of November, we are in our garden at the corner of Blackheath St and Station street in Leura and Ember and Amelie are observing!)
- If you have extra people, multiple people filming from different angles of the circle is great!
- Label your video as the **flowers_YourFullName** e.g. **flowers_EmberHenninger**
- If you see an insect come to a flower, try film it up close (without pausing the video) to help identify it later.
- Don't forget to Submit your videos! (see HOW to submit data guidelines)

Writing on the data sheet Guidelines (Observer 2)

- Fill in all relevant information on your survey sheet.
- If you see so many insects on a particular flower that you run out of room, use another sheet to record this information. But remember to fill in all the relevant information at the top as well!
- When naming your insects, just give your best guess. (You can use the bingo pictures to help you!). Make sure you ask the filmer to film the insect as close as possible, then we can figure it out later!

Trickier information to fill out on the sheet:

- **Distance from nearest flowers:** Using a tape measure, the distance to the nearest patch of REAL flowers. A patch of flowers should be at least the size of an A4 sheet of paper. A single dandelion doesn't count! (But 10 dandelions together might;) If your circle is in a big patch of flowers then it will be 0cm from the nearest flower☺

- **Time that timer started:** E.g. 9 45am

How to: Submit your data!

When you have finished your surveys, please take a photo of your data sheets (for safe keeping) and then bring the paper sheet to class next week. Please also submit your videos as soon as is convenient.

Paper Data Sheets (Artificial Flower Surveys & Pollinator Bingo)

Submit your data sheets next time you attend a Let's BEE scientist class. We also recommend (from personal experience) photographing the data sheet immediately as a back up plan. Also if you cannot bring in the paper copy you can email the photo to sparksandflames@gmail.com

Videos:

1. Label videos before submitting!

Label Artificial flower survey videos as **flowers_YourFullName** eg flowers_EMBERHENNINGER

Label Pollinator Bingo videos as **bingo_YourFullName** eg bingo_EMBERHENNINGER

2. Submit your videos!

Option 1: Dropbox

Using your email address, we can invite you to our "SUBMIT VIDEOS to Lets BEE Scientists" Dropbox. You will receive an email invitation. Please follow the instructions to upload your video to the Dropbox.

Option 2:

You can bring your video to the next Let's BEE scientists class on a thumbdrive to transfer to Amelie's computer. You could also use Air drop if your video is on an apple device.

If you have questions,

Please email Julie sparksandflames@gmail.com, or Amelie amelie.vanderstock@sydney.edu.au

How to: Label Flowers

Please label your flowers near the base of the Stick 😊

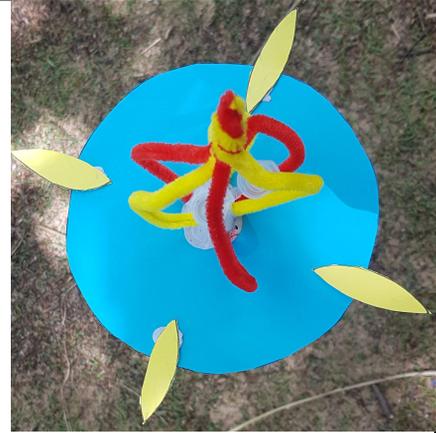
A

Fancy
Mostly
Yellow



B

Fancy
UV- Blue



C

Blue
Plastic



D

Blue
Paper



E

Yellow
Plastic



F

Yellow
Paper



G

Black
Plastic



H

Black
Paper

