

Pipetting a Flower

Version 100825

In this activity, students will use a 2–20 μL micropipette to reveal a secret code that determines different traits of a flower, such as stem length, leaf color, and number of petals. While completing the activity, students will practice how to correctly use an adjustable volume micropipette, discover how codes can provide instructions for traits in living organisms, and use their results to build and design a flower.

Laboratory Safety

1. Wear lab coats, gloves, and eye protection as required by district protocol.

Materials Required

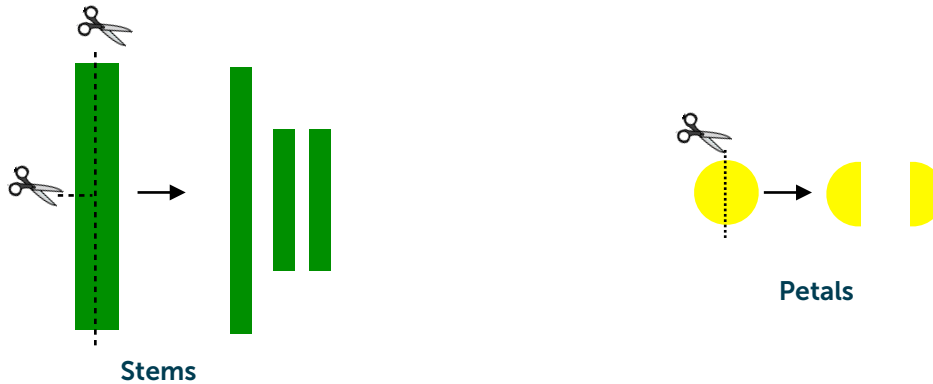
Set up for 8 workstations, with students working in groups of 3

Item	Quantity needed for 8 workstations
White vinegar	1 mL
Bromothymol Blue Indicator	1 mL
Tray Sheets	1 sheet of 100 wells
2 - 20 μL micropipette	8
Pipette tips	100
Yellow circle stickers	16
Green sticker sheets	1
Green leaf stickers	16 dark green, 16 light green
0.65 mL microcentrifuge tubes	10
Sharpies	8
Printed Handouts	8

Teacher Preparation

Before Class

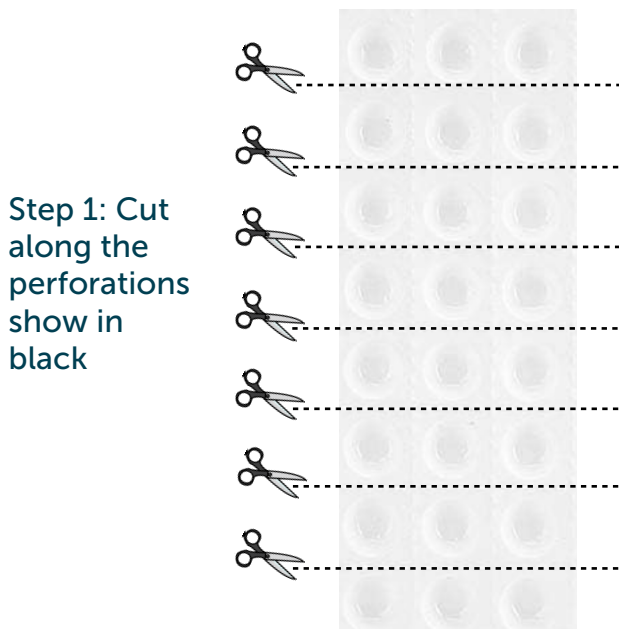
- Cut long and short stems out of [green sticker sheets](#). Prepare 8 each short and long stems.
- Flower petals are made by cutting [yellow circle stickers](#) in half. Prepare 32 petals.



- Print and laminate [Student Instructions and Code Sheet \(Page 3\)](#), qty 8
- Print copies of ["Flower Garden" \(Page 4\)](#), qty 8
- Dispense 100 μL bromothymol blue into eight 0.65 mL microcentrifuge tubes

Day of activity

- For each group of 24 students working in groups of 3, prepare 3X sheets as shown below



Step 2: Using a dropper bottle or transfer pipette, drop 1 drop of water or vinegar into each well according to the image to the right
 W = Water V = Vinegar

W	W	W
W	W	V
W	V	W
W	V	V
V	W	W
V	W	V
V	V	W
V	V	V

NOTE: Make sure you don't touch the liquid in the well with your tip.

Student workstations to include:

- 3 prepared strips to each workgroup
- 1 tube of bromothymol blue
- 2-20 μL pipette, set to 10 μL
- Pipette tips
- Stickers for parts of the flower
- Print out of the Flower Garden
- Sharpie for labeling trays

Student Instructions and Code Sheet

1. Select three tray sheets. Each tray represents a different trait of a flower. Use a Sharpie to label them **S** for Stem, **L** for Leaf, and **F** for Flower.
2. Use your micropipette to place 10 μL of bromothymol blue into each circle (well) on the trays. Watch how the colors change to reveal your flower's code.
3. Each trait is coded for using the three wells. For example, ●●● in the Stem Length codes for tall stem, while ●●● in the Leaf Color codes for Dark Green Leaves, and ●●● in the Flower Sheet codes for 1 petal only on your flower.
4. Use the key below to decode your flower's stem length, leaf color, and number of petals.
5. Build your flower using the traits from your code, and plant your flower in the garden!

Code	Stem Length
● ● ●	Tall
● ● ●	
● ● ●	
● ● ●	
● ● ●	Short
● ● ●	
● ● ●	
● ● ●	

Code	Leaf color
● ● ●	Dark Green
● ● ●	
● ● ●	Light Green
● ● ●	
● ● ●	Dark Green
● ● ●	
● ● ●	Light Green
● ● ●	

Code	Number of Flower Petals
● ● ●	1
● ● ●	
● ● ●	2
● ● ●	
● ● ●	3
● ● ●	
● ● ●	4
● ● ●	

