

TEACHING THE GENOME GENERATION

MICROPIPETTING EXERCISE

BEFORE YOU BEGIN

This is an opportunity for you to improve student micropipetting skills before beginning the TtGG procedures.

Students should watch Using a Micropipette — University of Leicester
www.youtube.com/watch?v=uEy_NGDfo_8&sns=em

This protocol is adapted from Bard College Citizen Science
“Pipetting Exercise”



PRE-REQUISITES & GOALS

STUDENT PRE-REQUISITES

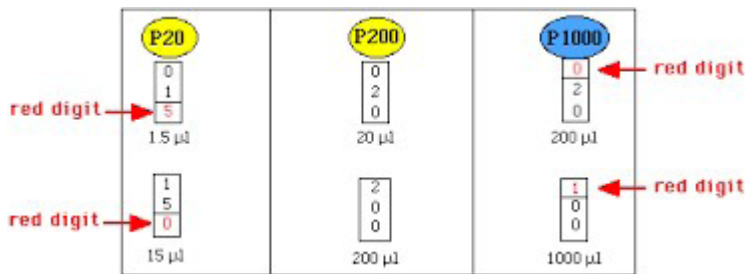
Prior to implementing this lab, students should understand:

- The major working parts of a micropipettor
- Units of volumetric measurement (μL)

STUDENT LEARNING GOALS

Perform proper micro-pipetting technique.

PRACTICE READING THE MICROPIPETTOR



Tip: Before starting the exercise, you may wish to give the students the opportunity to practice setting the micropipettors to various volumes then check for their accuracy.

Tips for pipetting:

1. The numbers displayed in the micropipettor window represent different volumes for different sized pipettors.
2. Keep the micropipettor vertical at all times to keep solution in the tip and not in the body of the pipettor.
3. Each micropipettor uses size specific tips that should fit snugly with minimal pressure.
4. When picking up a solution, depress plunger to the first stop before inserting the tip into the solution and stay below the surface when drawing up the solution.
5. Change tips when changing solutions or after combining solutions.
6. Small volumes should be directly expelled into larger volumes or onto the side of the tube.
7. Depress the plunger to second stop to expel all volume from pipettor.

MATERIALS

REQUIRED LAB MATERIALS

Markers for labeling

Micropipettors & tips
(1000, 200 & 20)

1.5 mL tubes

Tube holders/racks

Gloves

Deionized water

Food coloring
(Red, Yellow & Blue)

WORKSTATION NEEDS

*Distribute these materials
to each workstation*

Micropipettors and tips

Food coloring

1.5 mL tubes

Deionized water

Tube holders

Markers for labeling

PROTOCOL STRUCTURE

ALL STEPS 30 minutes

PROCEDURE

□ STEP 1

Obtain six 1.5 mL tubes and label them R1, O1, Y1, G1, B1 & V1

□ STEP 2

Using the P1000 micropipettor, add 900 μ L of deionized water into the R1, Y1 and B1 tubes.

NOTE: The same tip can be used for this step since the same solution is being expelled into each clean tube.

□ STEP 3

Using the P200 micropipettor, add 100 μ L of red food coloring to R1. Mix the two solutions. Cap the tube.

NOTES:

- When combining two solutions, always mix by flicking the bottom of the tube or by inversion 10 times.
- Always collect solution at the bottom of the tube by “self” or mechanical centrifugation.

□ STEP 4

Repeat STEP 3 by adding yellow and blue food coloring into the Y1 and B1 tubes, respectively.

□ STEP 5

To create V1, add:

- 100 μ L of R1 using the P200 and
- 10 μ L of B1 using the P20.

□ STEP 6

To create O1, add:

- 100 μ L of Y1 using the P200 and
- 20 μ L of R1 using the P20.

□ STEP 7

To create G1, add:

- 100 μ L of Y1 using the P200 and
- 20 μ L of B1 using the P20.

□ STEP 8

Create a dilution of your stock colors by obtaining six new 1.5 mL tubes. Label them R2, O2, Y2, G2, B2 and V2.

□ STEP 9

Using the P1000 micropipettor, add 1 mL of deionized water into each new tube.

□ STEP 10

Using the P200, put 100 μ L of R1, O1, Y1, G1, B1 and V1 into the R2, O2, Y2, G2, B2 and V2 tubes containing water, respectively.

Expected result is to have six tubes with 1.1 mL of colored water representing a rainbow.

Sources of Potential Error:

The most common errors for MICROPIPETTING EXERCISE are incorrect micropipetting, not changing tips between steps, not mixing solutions and not collecting solutions at the bottom of the tube.