



# Gel Loading Practice MiniLab Student's Guide

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This MiniLab contains enough supplies for  
**20 groups**  
to perform activities

## Laboratory Safety

1. Exercise caution when working with reagents.
2. Never consume reagents or gels.
3. Gloves and eye protection should be used whenever needed as part of good laboratory practice.
4. Always wash hands thoroughly after handling biological material or reagents.

## Objectives and Background

### Objectives

1. To learn how to use a micropipette to measure and transfer small volumes of liquid.
2. To learn how to load a gel.
3. To practice the aforementioned skills with good laboratory technique.

### Background

The purpose of this laboratory is to introduce you to an important tool in biotechnology: the micropipette. This tool allows the researcher to transfer small and exact volumes of liquids when setting up experiments. Researchers working with DNA may need to analyze DNA samples by separating them with gel electrophoresis. Micropipettes are a crucial tool to transfer volumes of samples into a small cavity (called a **well**) in the gel.

Today, you will practice using a micropipette by loading colored samples into wells. Be careful! Gels are made of a fragile material called agarose and it is easy to pierce through the wells.

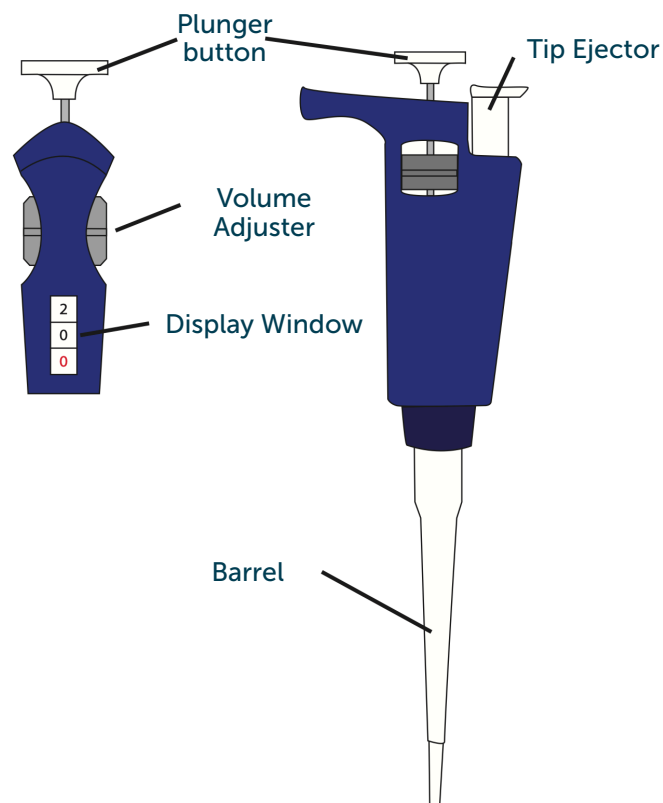
## Part I: Using a Micropipette

### Materials

- 1 loading dye aliquot
- 1 micropipette (measures 2.0-20.0  $\mu\text{L}$ )
- Pipette tips
- Practice sheet

### Procedure

1. With the micropipette, review the parts of the tool. Locate the plunger button, tip ejector, volume adjuster, display window, and the barrel.



2. The display window shows the volume the micropipette will load or dispense. The top digit indicates 10's of  $\mu\text{L}$ , the middle digit indicates 1's of  $\mu\text{L}$  and the bottom digit indicates 1/10's of  $\mu\text{L}$ .

By turning the volume adjuster, practice setting the micropipette to the four volumes listed in Table 1.

**Caution:** Never set a P-20 micropipette lower than 2.0  $\mu\text{L}$ , or higher than 20.0  $\mu\text{L}$ . It can seriously damage or destroy the tool.

2	1	0	0
0	2	4	2
0	4	5	0
20.0 $\mu\text{L}$	12.4 $\mu\text{L}$	4.5 $\mu\text{L}$	2.0 $\mu\text{L}$

**Table 1**

3. Load the micropipette:

- a. Set the micropipette to 20.0  $\mu\text{L}$ .
- b. Place a pipette tip on the micropipette by lowering the end of the barrel onto a tip and pushing firmly down. Do not touch the tip with your fingers to avoid contamination.
- c. With your thumb, push the plunger button down to the first stop.
- d. Insert the pipette tip vertically into the surface of the loading dye and **slowly** release the plunger, allowing the plunger to come back up and pick up the loading dye into the micropipette tip. **Do not touch the tip, turn the micropipette upside down or lay it down on a table when there is liquid in the micropipette tip.**

4. Dispense the sample:

- a. Set the practice sheet on a level surface.
- b. Hold the micropipette with the loading dye in the micropipette tip vertically over a spot on the practice sheet so the end of the tip lightly touches the surface.
- c. Slowly push the plunger button down to the first stop to dispense most of the sample. Continue pushing slowly to the second stop to dispense the rest of the sample.
- d. While holding the plunger button down at the second stop, pull the tip up and out of the liquid. This prevents you from accidentally pulling liquid back into the tip.
- e. Slowly release the plunger button.
- f. Keep the tip on the barrel to practice more. Keep in mind, when you are using the micropipette for transferring DNA you will change the tip for each new sample. When finished, eject the tip into the waste container by pushing the ejector button

5. Practice loading and dispensing samples with the volumes from Table 1 onto the corresponding circles on the practice sheet.

**Precision comes with practice! It is also important to practice dispensing samples without adding air bubbles.**

## Part II: Loading a Gel

### Materials

- 1 loading dye aliquot
- 1 micropipette (measures 2.0-20.0  $\mu\text{L}$ )
- Pipette tips
- Practice gel
- Water (enough to cover the gel)


### Procedure

1. Take a practice gel. Gently peel and remove the seal.
2. Set the practice gel on a level surface, preferably a dark or a colored surface. Slowly pour water over the gel, just enough to ensure that the wells are covered.
3. With a micropipette, tips, and some loading dye, practice loading each well.
  - a. Using the technique from Part I, load 10.0  $\mu\text{L}$  of sample into a pipette tip.
  - b. Hold the pipette tip vertically over the gel.
  - c. Steady your pipetting hand by placing your elbow on the table. For additional support, use your other hand.
  - d. Gently insert the tip below the surface of the water and hover over a well opening. Do not touch the bottom or sides of the well to avoid breaking the gel.
  - e. Carefully and slowly dispense the sample into the well. Because the sample is denser, it will easily sink down into the well. Avoid introducing air bubbles into the well to prevent any sample from being blown out.
  - f. With the plunger still depressed, gently pull the pipette tip vertically up and out of the well. Do not touch the sides of the well to avoid breaking the gel.
  - g. When your pipette tip is clearly out of the gel tray, gently release the plunger. Do not release the plunger button while your pipette tip is still in the well as you will inadvertently pick up the loading dye that you just dispensed into the well.
  - h. Practice loading samples across the gel. How many wells did you successfully load?
  - i. Lift the practice gel to eye level and inspect your wells. The dye should settle nicely to the bottom of the well. If you have poked the tip through, you will see dye leaking from the well to the bottom of the plastic container.

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