

QUICK GUIDE: Pipetting

WHAT IS A PIPETTE?

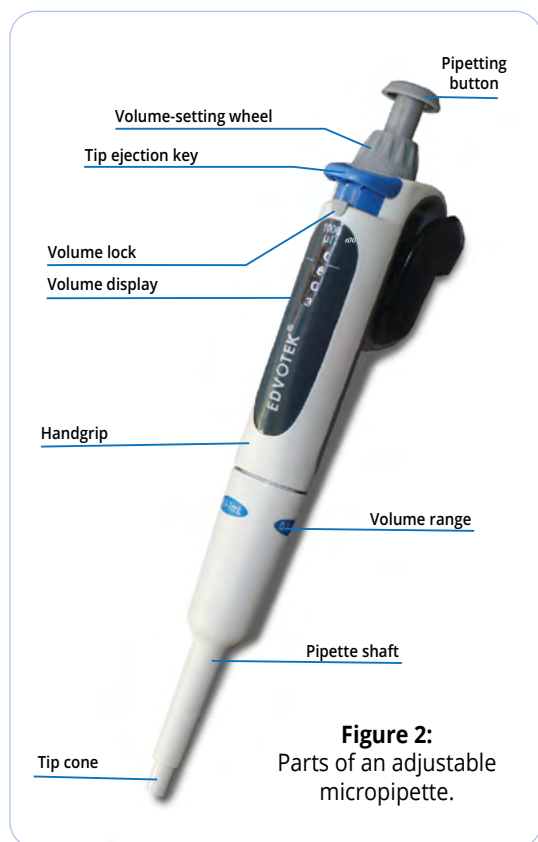
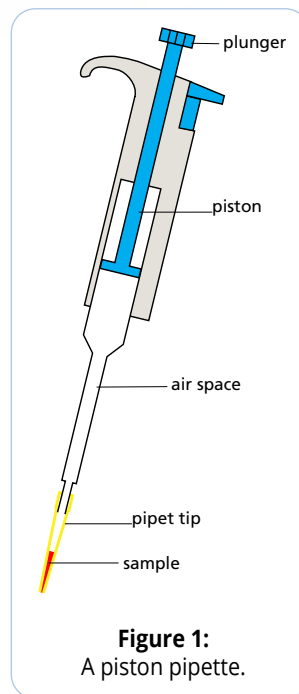
Pipettes are a large group of laboratory tools that scientists use to measure and manipulate liquids. There are many different kinds of pipettes, ranging from the more simplistic transfer pipette to a multichannel pipettes. The one this QuickGuide will focus on is the micropipette! The micropipette is used to measure small volumes, usually ranging from 2 μL to 1,000 μL .

HOW DO MICROPIPETTES WORK?

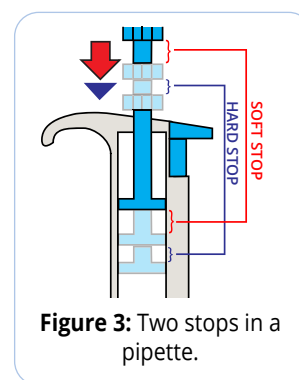
Inside the micropipettes is a solid disk and tightly fitted tube. When the user depresses a plunger, the disk moves down which pushes air out of the tube and the connected tip. Next, the user immerses the tip into a solution and releases the plunger which creates a vacuum. This vacuum causes the liquid in the sample to flow up into the tip. The volume of this liquid (sometimes called the load volume) is equivalent to the volume of air displaced by the downward moving piston. Therefore, load volumes can be set to a specific value by calibrating the piston's height.

HOW TO USE AN ADJUSTABLE MICROPIPETETTE

Because pipettes are so frequently used in the lab, pipetting quickly becomes an almost instinctive action. However, the pipetting process can be far from intuitive and fluid at first. The major steps of pipetting are: prepare, aspirate, dispense, re-aspirate and re-dispense, and finally purge. These are briefly described below:



1. **PREPARE:** Set the volume by dialing the pipette to the appropriate value and adding a tip.
2. **ASPIRATE:** Create a vacuum by pushing the plunger down and placing the tip into the sample. Then slowly release the plunger. Finally, pause to make sure the liquid has moved into the tip. **NOTE - This step is slightly complicated by the fact that most micropipettes have two plunger positions. Depressing the button to the first "soft" stop creates a vacuum that matches the set volume. This will result in the correct amount being aspirated. However, depressing the button to the second "hard" stop will expel additional air and create a larger vacuum than desired. While a great feature for purging, using the second stop when aspirating will create an inaccurate measurement.*
3. **DISPENSE:** Place the tip where you want to add the sample and push the plunger down. This increases the pressure inside the pipette which causes the liquid to flow out. However, it also creates a new vacuum so make sure to lift the tip out of the solution before releasing the plunger.



IMPORTANT PIPETTING GUIDELINES:

- Use the correct pipette for the volume you are pipetting.
- Use the correct tip for the pipette you are using.
- Switch pipette tips between samples to avoid contamination. Also, switch pipette tips if the tip comes in contact with anything other than the samples or sample vessels.
- Keep pipettes vertical or vertically angled with the tip or tip cone facing down. This is especially important when there is liquid in the tip. Laying a pipette down that has a liquid filled tip can contaminate both the sample and pipette. In some cases, it can also damage the pipette.
- For maximum accuracy and to avoid contamination, depress and release the plunger using smooth and slow movements.
- Apply a consistent technique between samples.

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