

[MUSIC PLAYING]

PRESENTER: It is used to determine the concentrations of various solutions. In this video, we'll take you through the proper procedure. The number one rule of titration.

[ALARM BLARING]

A quick review of burette preparation. Please see the volumetric techniques video for more information. Here is the titrant you'll be using.

Take your burette and fill it with a few milliliters of titrant. Then tilt and rotate the burette to coat the interior surface with titrant. Finally, allow the burette to drain completely, then fill to above the 0 mark.

Firmly and securely clamp the burette to its stand. Hold on a minute, there are air bubbles in the tip. We can't have those. In order to get rid of them, quickly rotate the valve back and forth, letting small amounts of liquid pass through the tip intermittently, then slowly drain your burette to 0, or at least close to it.

It is not vital that you drain to exactly 0 so don't spend all your lab time doing this. Drain to relatively near it and just be sure to record your starting level of titrant. Let the burette stand for one minute to allow drainage from the interior walls.

But wait, an idea. Before you start your titration, why not try an initial rough titration. It really will help. With this, we want to get an idea of where the endpoint is. So here we go.

But wait, it's overshot. What? How'd that happen? [SHOUTS]

No worries. It was a rough titration to get an idea of the end point. Be sure to take note of how much titrant you used so you have a rough idea of when you're near the end point during the actual titration.

So let's discuss the end point. You really should know what you're shooting for. Here are three titrations. Which one has a barely detectable shade of pale pink? Hint, that's what we're looking for.

Ta-da, there are your answers, the middle one. It's perfect. Here's the undershot one. Obviously, it needs more base. And here's the overshot one. Too much base. This time, going above and beyond is not commendable.

But here, it's perfect. It's a clear solution with a barely detectable shade of pale pink, just what we're looking for. So now we know what we're aiming for, we can move on to the actual titration. Hang on to your lab coats. Wee!

First, record initial burette value. Remember, you don't have to start at 0. You could start here, or here, or even here. It doesn't matter. Just be sure to record the starting value.

Here is our indicator. This allows color changes to be seen. You want to add one or two drops to the solution depending on what kind of acid it is. The titration can be carried out rapidly at first since you have a general idea of where the endpoint is due to your rough titration earlier.

Always remember to swirl after each addition of titrant. Notice how the color disappears upon swirling. But when you know you're nearing the end point, what should you do?

Well, when near the end point, slowly add titrant in small increments. Closely monitor any color changes. Small increments can mean one drop at a time.

Remember to swirl after each addition. Since we want to reach the end point within a fraction of the drop, we need to slowly approach the end point. How do we do it? Well, we could use the plastic tip, as seen here. This allows for smaller drops to come through the tip of the burette.

And this is the parafilm that will secure the plastic tip to the burette. First, you want to take the plastic tip and fit it onto the burette, then take the parafilm and wrap it around the tip and the tip of the burette. You must stretch the parafilm in order for it to adhere to the glass burette and the plastic tip.

Stretch and wrap, stretch and wrap, then tear off the end when you're done. Make sure it's firm and secure and then readjust the burette. But before you start to slowly approach the end point, remember to empty air bubbles from the plastic tip.

But you may be wondering, what is the difference in drop size anyway? Take a look here. These are drops from a regular burette tip. And here are small drops from the plastic tip. Notice their size compared to the regular burette.

So you think you've reached the end point. You must take care of one last thing. There is that last drop. In order to make sure you're reading the burette properly, you must pick up this drop.

Use the inside wall of your flask and touch the tip of the burette. This picks up the drop and allows it to run down the side. Make sure you tilt, rotate, and swirl the flask in order to pick up any stray drops that are on the inside walls. You can't let those renegade drops get away now.

But have you really reached the end point? Make sure it's a clear solution with a barely detectable shade of pale pink. Also, the color should be persistent.

That's when you know you've reached the end point. But be careful, end point color is not permanent. It will disappear within a few minutes due to carbon dioxide absorption from the air. So now, it's time for wrapping things up.

Let the burette stand for one minute to allow drainage from the interior walls, then record the final burette value. Subtract the final volume from the starting volume and you'll have the amount of titrant used. Ta-da! Now you're capable of making your TA's dream titration come true. Good luck!

Remember, this video is intended to help you prepare for lab by providing a demonstration of the proper experimental technique. It is not intended as a replacement for reading your lab manual or the supplementary material. In order to become a great experimentalist, it is important that you understand both theory and technique. Now, it's your turn. Good luck.

[MUSIC PLAYING]