

Chapter 9: Instructions for Students with Color Vision Deficiency or Color Blindness

Chemistry relies to some degree on qualitative observations and data. However, if you perceive color differently than most people sometimes making these observations can be challenging. People who perceive color differently than the average person are described as having *color vision deficiency* or *color blindness*.

Follow the instructions below to complete the Techniques to determine concentration Pt 1: Titrations Lab.

Download the Color Blind Pal App

- Apple: <https://apps.apple.com/gb/app/color-blind-pal/id1037744228>
- Android: https://play.google.com/store/apps/details?id=com.colorblindpal.colorblindpal&hl=en_US

The Color Blind Pal app allows you to focus your camera on something and it will verify the color of that item. To begin, open the app and click on the "i" in the circle to pull up the settings page.

- Read through "How to use this app"
 - Note that you can capture the entire screen using the "Freeze" button. Then you can move the target around the screen to get the target placed over the item you would like to make a color observation about in the picture.
 - You can take screenshots of images you capture in the Color Blind Pal app with your phone camera for future reference.
- Select your color vision deficiency type

You are now ready to complete the lab.

- Open the BeyondLabz platform and navigate to the "Titrations" lab using the instructions in the report.
- In the lab you will dispense NaOH (base) into HCl (acid) with two indicators, phenolphthalein and bromocresol green. These indicators will cause the HCl to undergo a color change at the equivalence point where all of the HCl has been neutralized.
- During your scout titration with phenolphthalein, hold your phone camera up to the screen and center the target on the beaker containing HCl. The color read out will initially be "grey" since the solution is colorless. Once the endpoint is reached, the solution will turn to a red color (Figure 1).

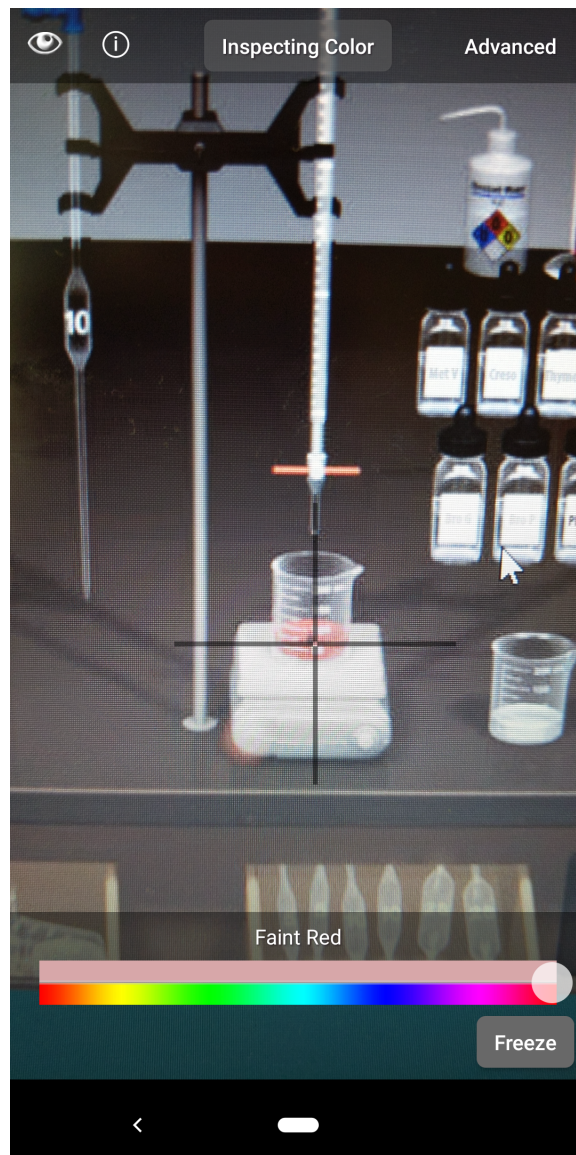


Figure 1: Image captured using the Color Blind Pal App captured in the Titrations lab in BeyondLabz. The target is placed over the beaker containing HCl and phenolphthalein after the endpoint has been reached to read out the color as "Faint Red".

- Click "Freeze". This will freeze the image as a picture and place the target over the beaker. The text color read out will be displayed at the bottom of the screen as "Faint Red".
- Use the color change to make the quantitative measurement of the amount of NaOH needed to reach the endpoint in your careful titrations in the lab.
- Repeat the above steps for the bromocresol green experiment.