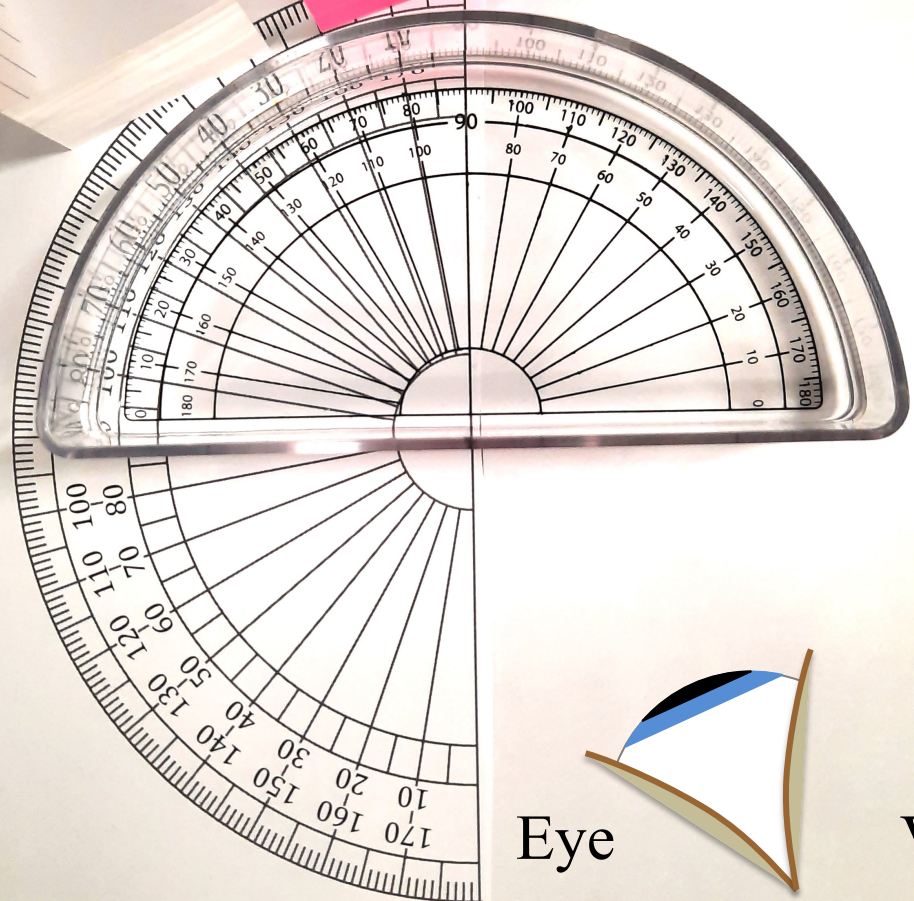
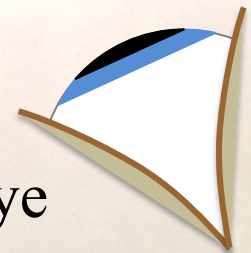


Protractor tank atop printed
protractor – align centers!



Eye

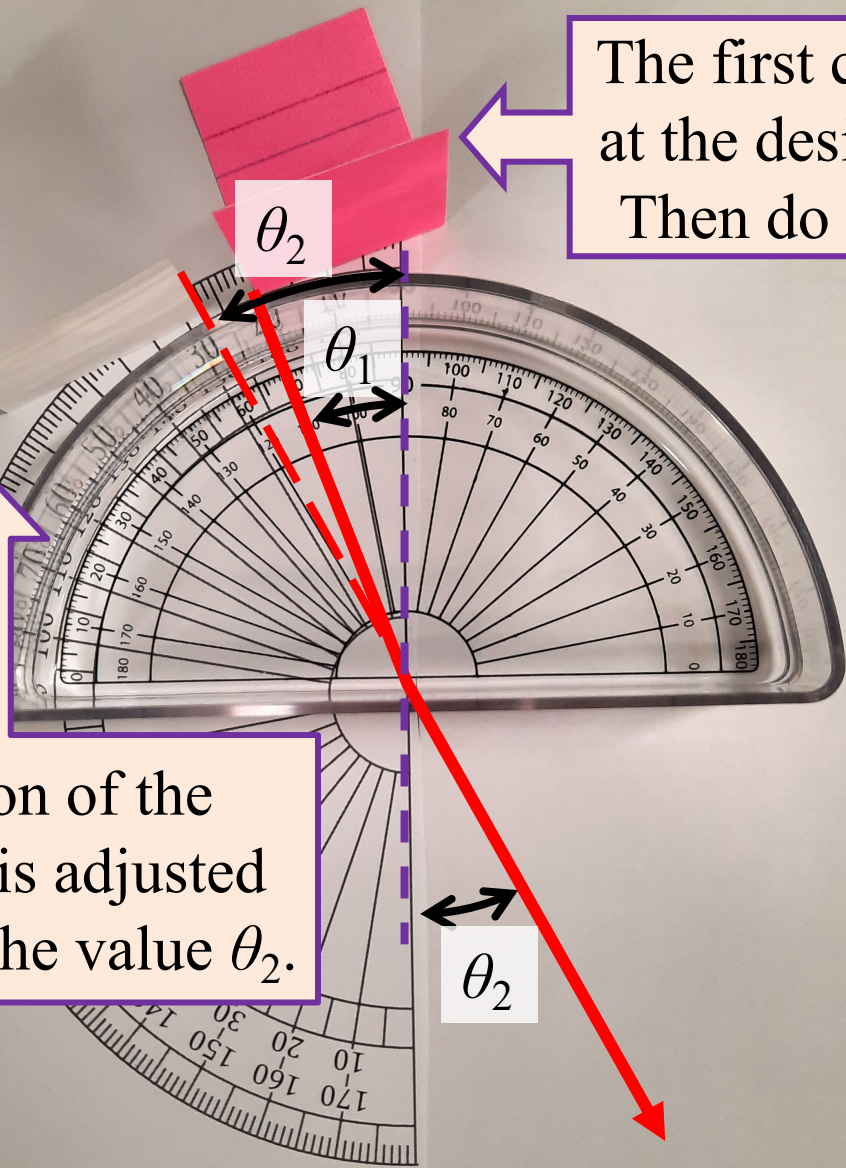


View from here!

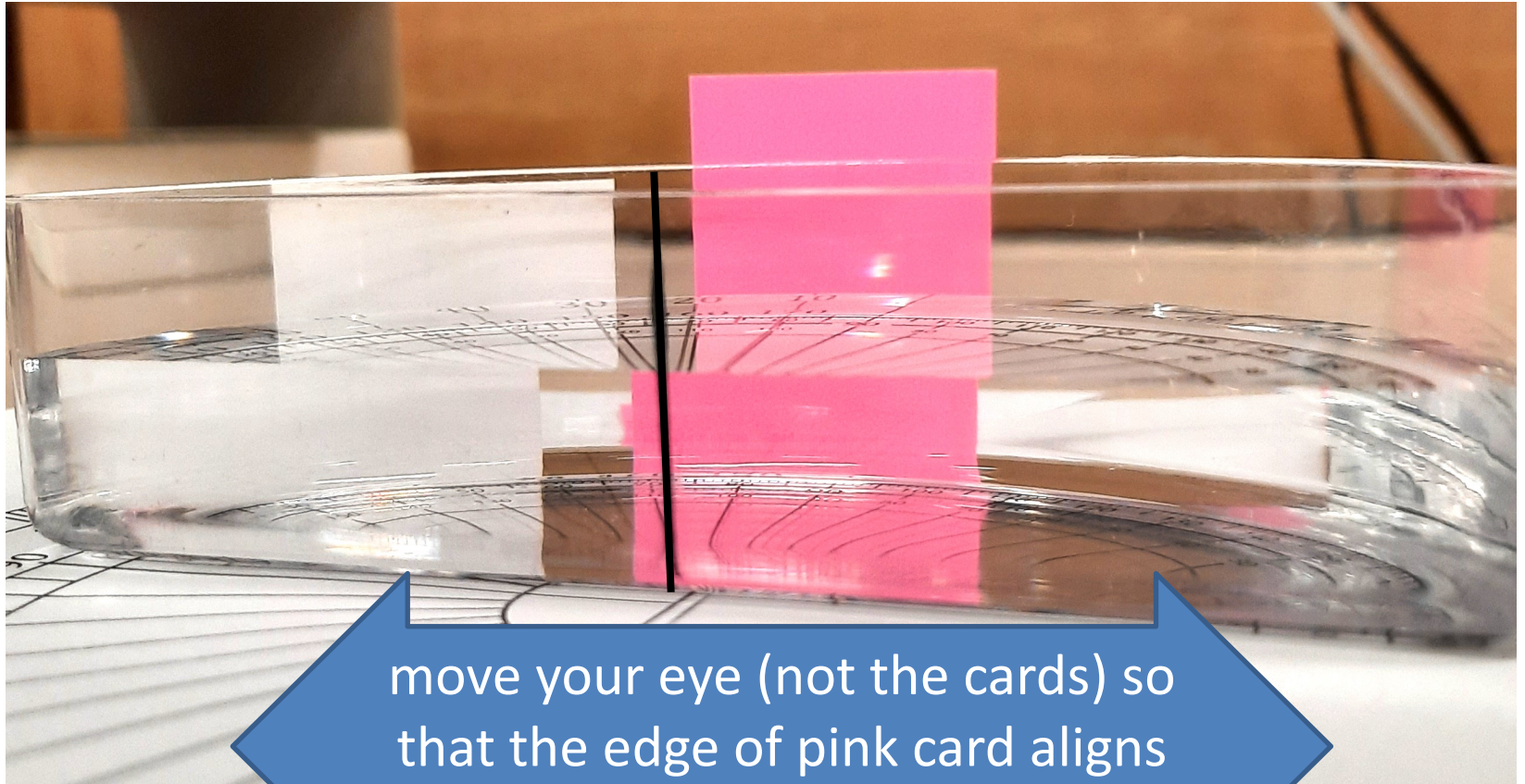
Mini-Lab: Index of Refraction

1. Goal: Determine the index of refraction for water and verify Snell's Law.
2. Add water to the protractor tank, about $\frac{3}{4}$ full. Keep the table dry! Place tank atop three pieces of paper.
3. Place one card at the desired angle of incidence. Once aligned, do not move!
4. Now adjust the position of your eye (*i.e.* your viewing location) and the second card until the *left* edge of the first card (as seen through the *water*) aligns with the *right* edge of the second card (as seen through the air) and the black line on the tank. See photos that follow...
5. Repeat the process for five or six different angles.

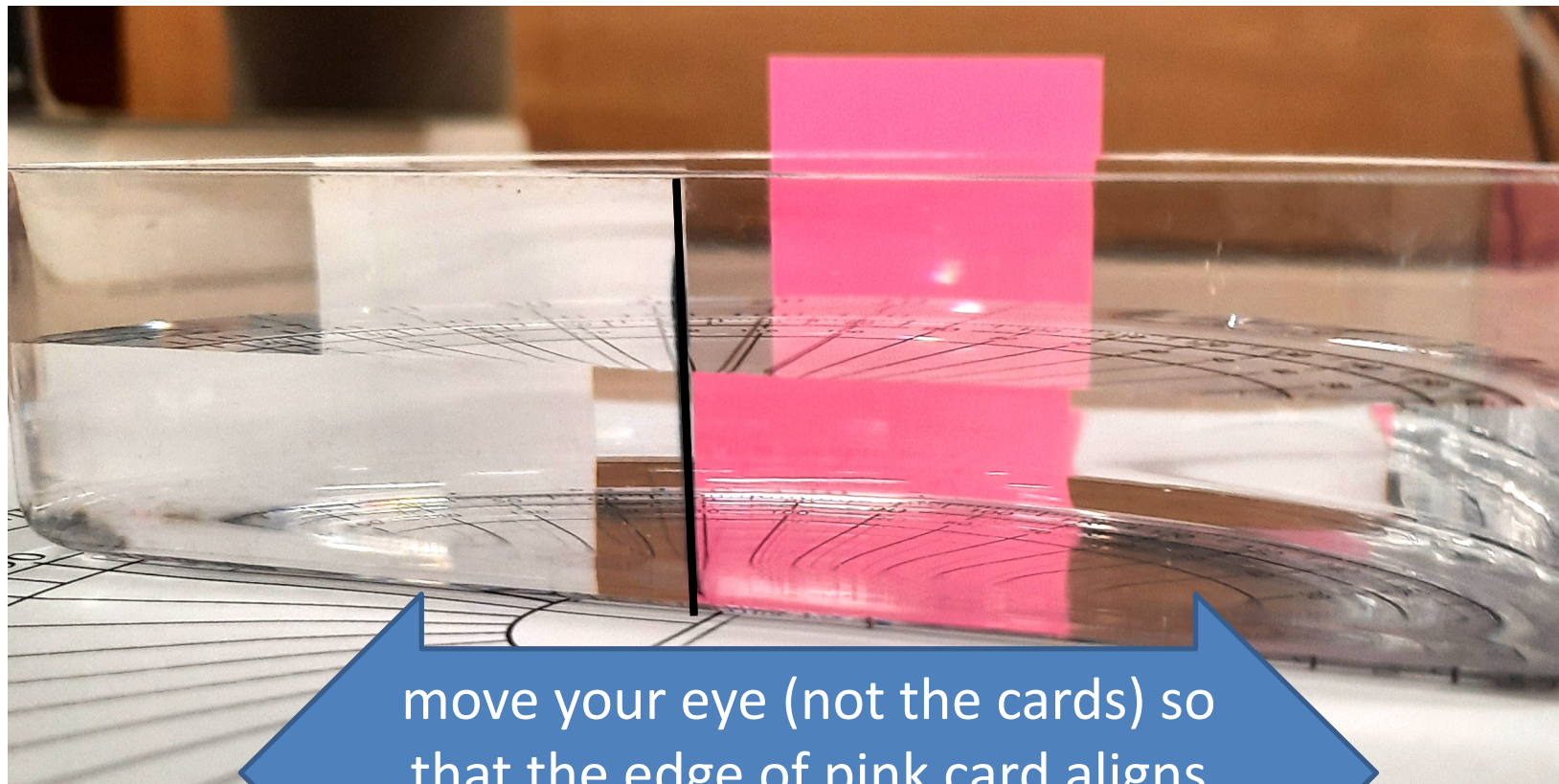
The first card is placed at the desired angle θ_1 . Then do not move it!



The position of the second card is adjusted to determine the value θ_2 .

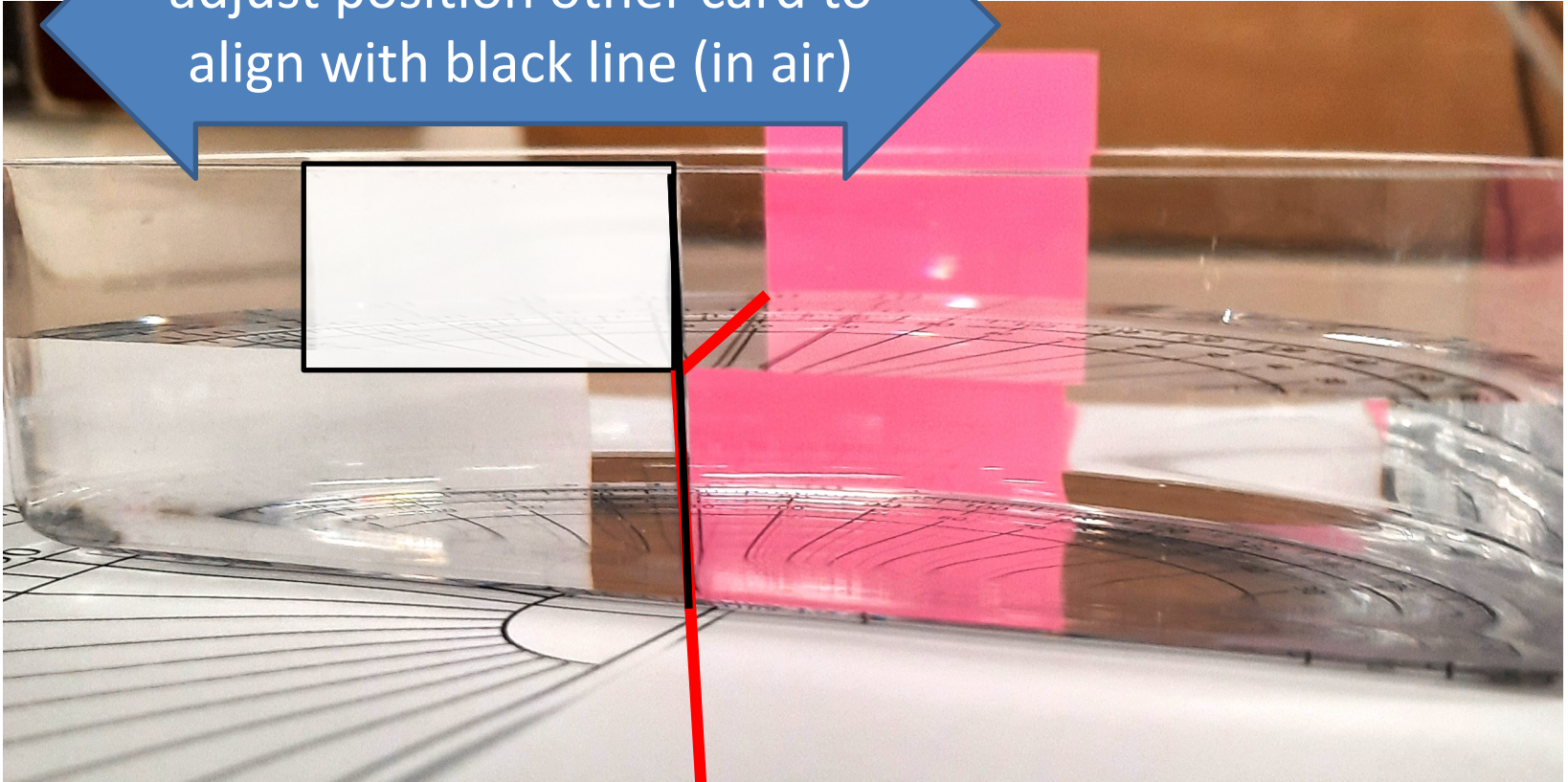


move your eye (not the cards) so
that the edge of pink card aligns
with the black line (in the water)

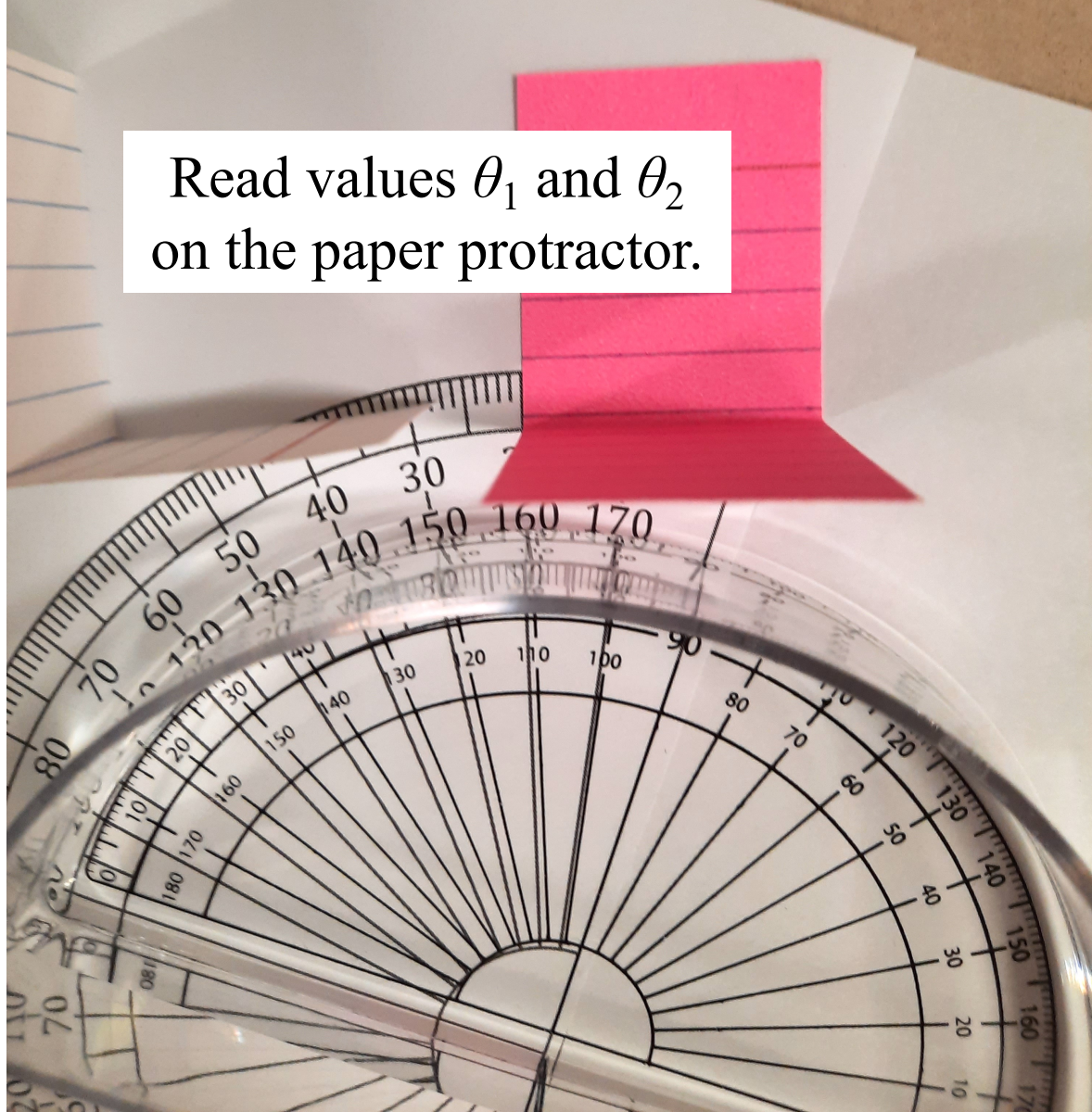


move your eye (not the cards) so
that the edge of pink card aligns
with the black line (in the water)

adjust position other card to align with black line (in air)



Read values θ_1 and θ_2
on the paper protractor.



Mini-Lab: Index of Refraction – Data Analysis

1. Make a table with five columns – one each for θ_1 and θ_2 , two more columns of calculated values that can be used to produce a linear graph of the angle data, and a column of the index of refraction calculated for each trial.
2. Determine the mean value and percent deviation in the column of index values.
3. Determine the percent error in the mean value given the accepted value $n = 1.33$.
4. Produce a linear graph of the data and use the slope of the best fit line to determine another experimental value for the index of refraction and the percent error.
5. Discuss error.