

Full Name:

Ideal Gas Constant Lab Report

LibreTexts page: [8: Gases](#)

(<https://chem.libretexts.org/link?214685>)

Please don't edit, rearrange or delete anything that is already in this document. Just add your answers inside the boxes.

You can use shortcuts for superscripts and subscripts when needed:

X^2 Superscript Ctrl+.

X_2 Subscript Ctrl+,

IMPORTANT:

Graphs have to include all titles (graph title and axis titles), units, equations and trendlines.

Show calculations for partial credit.

Use units in your calculations.

Remember, slope has units too!

V_{read} - Volume according to the syringe markings.

V_{actual} - Volume accounting for any air in the syringe when V_{read} is zero ml.

T_{room} and P_{room} - Temperature and pressure in the room during the experiment.

Overview:

1. Obtain Experimental Data
2. Plot P vs V_{read}
3. Plot P vs $1/V_{\text{read}}$
4. Calculate V_{actual}
5. Plot P vs. $1/V_{\text{actual}}$

- Using 2-State approach calculate n using initial V_{actual} when $V_{\text{read}} = 0$, P_{room} and T_{room} compared to STP values.
- Calculate R using slope from P vs. $1/V_{\text{actual}}$.

- Open this [Google Sheet](#) and observe the data stream. When the stream is over, copy the data to your own Google Sheet.
- Pressure data streams in kPa by default. Convert it to atm (make a new column). Watch the following YouTube on how to use a formula on a column of data. It is also posted in Google Classroom.
<https://youtu.be/RgB7CoVCxMQ>
- GRAPH 1. Make a plot of P vs V_{read} . Give it a title Graph 1. Take a snapshot of your graph and the data you used to plot it and insert below.



- GRAPH 2. Make a plot of P vs $1/V_{\text{read}}$. Give it a title Graph 2. Take a snapshot of your graph and the data you used to plot it and insert below.



5. Using Graph 2, find V_{actual} , when $V_{\text{read}} = 0$.

V_{actual} (at $V_{\text{read}} = 0$) =

6. In your Google sheet Convert all V_{read} values to V_{actual} (make a new column).
7. Convert all V_{actual} values to $1/V_{\text{actual}}$ (copy to a new dataset along with the P values).
8. GRAPH 3. Use the new dataset to make a plot of P vs $1/V_{\text{actual}}$. Give it a title Graph 3. Take a snapshot of your graph and the data you used to plot it and insert below.



9. Fill out the table below for all values except n_1 . For State 1 use values of T_{room} , V_{actual} , P_{room} . State 2 is STP for one mole of a gas.

State 1 (Room)		State 2 (STP)	
T_1		T_2	
V_1		V_2	
P_1		P_2	
n_1	<i>Calculate below</i>	n_2	

10. Using 2-State approach calculate n using initial V_{actual} , when $V_{\text{read}} = 0$, P_{room} and T_{room} compared to STP values.

$n_1 =$

11. Calculate R using slope from Graph 3.

$R =$