

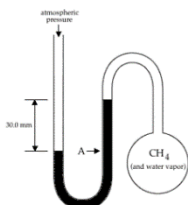
Name: \_\_\_\_\_

Period: \_\_\_\_\_

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**Directions:** Any worksheet that is labeled with an \* means it is suggested extra practice. We do not always have time to assign every possible worksheet that would be good practice for you to do. You can do this worksheet when you have extra time, when you finish something early, or to help you study for a quiz or a test. If and when you choose to do this Extra Practice worksheet, please do the work on binder paper. You will include this paper stapled into your Rainbow Packet when you turn it in, even if you didn't do any of this. We want to make sure we keep it where it belongs so you can do it later if you want to (or need to). If you did the work on binder paper you can include that in your Rainbow Packet after this worksheet. If we end up with extra class time then portions of this may turn into required work. If that happens you will be told which problems are turned into required. Remember there is tons of other extra practice on the class website...and the entire internet! See me if you need help finding practice on a topic you are struggling with.

- 1) A sample of  $\text{CH}_4$  is confined in a water manometer. The temp of the system is  $30.0^\circ\text{C}$  and the atmospheric pressure is  $98.70\text{ kPa}$ . What is the pressure of  $\text{CH}_4$ , if the height of the water in the manometer is  $30.0\text{ mm}$  higher on the confined gas side than on the open to the atmosphere side. (Density  $\text{Hg} = 13.534\text{ g/mL}$ )  $94.2\text{ kPa}$



- 2) Three  $1.00\text{ L}$  flasks at  $25.0^\circ\text{C}$  and  $1013\text{ hPa}$  pressure contain:  $\text{CH}_4$  (flask A),  $\text{CO}_2$  (flask B) and  $\text{NH}_3$  (flask C). Which flask (or none) contains  $0.041\text{ mol}$  of gas? All flasks
- 3) What is height (in mm) of a column of methane if the pressure at the base of the column is  $1.50\text{ atm}$ ? (The density of  $\text{Hg}$  is  $13.534\text{ g/cm}^3$  and methane is  $0.717\text{ kg/m}^3$ .)  $2.15 \times 10^7\text{ mmCH}_4$
- 4) Calculate  $K_p$  for each of the two reactions (happening in the same flask):  
 $2\text{FeSO}_4(\text{s}) \rightarrow \text{Fe}_2\text{O}_3(\text{s}) + \text{SO}_3(\text{g}) + \text{SO}_2(\text{g})$   
 $\text{SO}_3(\text{g}) \rightarrow \text{SO}_2(\text{g}) + \frac{1}{2}\text{O}_2(\text{g})$   
 After equilibrium is reached,  $P_{\text{total}}$  is  $0.836\text{ atm}$  and partial pressure of oxygen is  $0.0275\text{ atm}$ .  $0.218$
- 5) The vapor pressure of solid iodine at  $30.0^\circ\text{C}$  is  $0.466\text{ mmHg}$ .
- How many milligrams of iodine will sublime into an evacuated  $1.00\text{ L}$  flask?  $6.26\text{ mg}$
  - If  $2.00\text{ mg}$  of  $\text{I}_2$  are used, what will the final pressure be?  $0.149\text{ mmHg}$
  - If  $10.00\text{ mg}$  of  $\text{I}_2$  are used, what will the final pressure be?  $0.466\text{ mmHg}$
- 6) A gas has a pressure of  $4.62\text{ atm}$  when its volume is  $2.33\text{ L}$ . What will be the pressure in torr when the volume is changed to  $1.03\text{ L}$ ?  $7940\text{ torr}$
- 7) A sample of hydrogen at  $47^\circ\text{C}$  exerts a pressure of  $0.329\text{ atm}$ . The gas is heated to  $77^\circ\text{C}$  at constant volume. What will be its new pressure?  $0.360\text{ atm}$
- 8) A weather balloon at Earth's surface has a volume of  $4.00\text{ L}$  at  $31^\circ\text{C}$  and  $755\text{ mm Hg}$ . If the balloon is released and the volume reaches  $4.08\text{ L}$  at  $728\text{ mm Hg}$ , what is the temp in degrees Celsius?  $26^\circ\text{C}$

- 9) How big a volume of dry oxygen gas at STP would you need to take in order to have the same number of oxygen molecules as there are hydrogen molecules in  $25.0\text{ L}$  at  $0.850\text{ atm}$  and  $35^\circ\text{C}$ ?  $18.8\text{ L}$
- 10) At a deep-sea station  $200.0\text{ m}$  below the surface of the Pacific Ocean, workers live in a highly pressurized environment. How many liters of gas at STP must be compressed on the surface to fill the underwater environment with  $2.00 \times 10^7\text{ L}$  of gas at  $20.0\text{ atm}$ ?  $4.00 \times 10^8\text{ L}$
- 11) One method of estimating the temperature of the center of the sun is based on the assumption that the center of the sun consists of gases that have an average molar mass of  $2.00\text{ g/mol}$ . If the density of the center of the sun is  $1.40\text{ g/cm}^3$  at a pressure of  $1.30 \times 10^9\text{ atm}$ , calculate the temperature in degrees Celsius.  $2.26 \times 10^7\text{ }^\circ\text{C}$
- 12) The nitrogen in a  $30.0\text{ L}$  container at  $740\text{ torr}$  and  $55^\circ\text{C}$  and the hydrogen in a  $20.0\text{ L}$  container at  $650\text{ torr}$  and  $15^\circ\text{C}$  are pumped into a  $25.0\text{ L}$  container at  $32^\circ\text{C}$ . What is the final pressure?  $1376\text{ torr}$
- 13) I have a special, ideal balloon. This balloon does not exert any pressure on the gas inside it. I start by taking the balloon and inflating it to  $4\text{ L}$  in Wilmington DE last night. The weather channel said that the temperature was  $45.0^\circ\text{F}$ , and the pressure was  $30.27\text{ inches of Hg}$ .
- First, I take the balloon scuba diving and go down to a depth of  $100\text{ ft}$  where the pressure is  $7\text{ atm}$ . and the temp is  $54.2^\circ\text{F}$ . What is the volume of the balloon?  $7\text{ L}$
  - Next I take the balloon out to Colorado. In Denver when I arrive at the airport the temp is  $68.4^\circ\text{F}$  and the barometric pressure is  $640\text{ mmHg}$ . Now what size is the balloon?  $0.6\text{ L}$
  - Next is a hike up to the top of Longs Peak ( $14,256\text{ ft}$ ) where the pressure is  $470\text{ torr}$  and the temperature is  $-20^\circ\text{C}$ . Now what size is the balloon?  $5.91\text{ L}$
  - Next, I take the balloon on an airplane trip home and let it out the window. The 747 is flying at  $40,000\text{ ft}$  where the pressure is  $80.0\text{ torr}$  and the temp is  $-60.0^\circ\text{C}$ . What is the volume of the balloon here?  $29.2\text{ L}$
  - And last of all the balloon soars up into the stratosphere where the pressure has dropped to  $0.8\text{ torr}$  and the temperature is  $0^\circ\text{C}$ , what size is it just before it pops?  $3743\text{ L}$

## Dougherty Valley HS Chemistry - AP Gas Laws – Extra Practice

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**EVEN MORE PRACTICE!** Hard work now during the chapter will set you up for success and save you time long term! Make smart, mature choices!

**10)** Consider doing some of the Honors Chem worksheets! (You would be surprised how many AP Chem students miss points on exams for Honors level questions and not even the AP level questions! You will hear me all year long saying “don’t lose points in AP Chem for Honors level material!”)

<https://mychemistryclass.net/HCrainbowpacket9.html>

**11)** Read, take notes, try some problems from your Tro online Textbook. (Remember that the textbook often covers more material than we need for this class. If it isn’t something I talked about in my lectures/handouts/worksheets, then you can skip it! I won’t officially assign reading or problems from the textbook because it isn’t a very efficient way to teach this class, but some students might need to read the textbook sections, or do extra practice in order for things to “click” differently for them. That is ok! Not everyone is going to need the same amount or type of studying. A lot of this class is figuring out what you personally need to do in order to feel successful. You will have access to the textbook all year, don’t forget about it!)

Chapter 5: Gases

[mlm.pearson.com/northamerica/masteringchemistry/](http://mlm.pearson.com/northamerica/masteringchemistry/)

**12)** Don’t forget that there is extra practice on the class website too! AP Chem Tab → Study Materials Link → Scroll to the chapter we are on → Extra Study Materials Link. (I don’t always have answer keys for the extra materials. If there is one, it will be in the folder!)

**13)** Don’t forget that there is extra practice on GoFormative too! [www.goformative.com](http://www.goformative.com)  
(Another teacher made some assignments on GoFormative the year the school was Remote due to Covid. I have not proofread all the remote assignments, but I have published them so they are available for you to try if you would like!)



**14)** Don’t forget that there is extra practice on AP Classroom too! <https://myap.collegeboard.org>  
(AP Classroom is a bit clunky, doesn’t allow me to easily post questions in the order we go, sometimes crashes, still has old material we no longer cover, etc. BUT it is a source of questions that we know came from College Board! You can use the “tags” I made to pull up practice that is just on the chapter you are interested in studying.)

**15)** ScienceGeek.net has some good online practice tests. I haven’t checked all of them, but the ones I have checked are pretty good!  
<https://www.sciencegeek.net/APchemistry/APtaters/directory.shtml>



**16)** Don’t forget that you can sign up for my Access periods! You must sign up by Tuesday 8am of the week you want to attend. The links are on the front page of my class website and at the top of my Class Calendar.

**17)** Don’t forget that our school has free peer tutoring available through the Academic Leadership class! The links are on the top of my Class Calendar.