Dougherty Valley HS Chemistry - AP
Atomic Structure – Extra Practice

Worksheet #2*

Name: **Period:** **Seat#:**

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.

Formulas and Constants							
$c = \lambda\upsilon$	$E = h\upsilon$	$E = \frac{hc}{\lambda}$	$E_n = -\frac{Rhc}{n^2}$	$\lambda = \frac{h}{mv}$	$\frac{1}{\lambda} = R\left(\frac{1}{2^2} - \frac{1}{n^2}\right)$	$c = 2.998 \times 10^8$ m/s $h = 6.626 \times 10^{-34}$ J·s	$Rhc = 2.18 \times 10^{-18}$ J $R = 1.0974 \times 10^7$ m^{-1}

1) Sketch an orbital diagram for n=1 through n=5.

2) Calculate the energy of an electron in the n=2 energy level of hydrogen. Calculate the energy of an electron in the n=3 energy level. What is the difference in energy of these two levels? If a photon of light had this energy, what would its wavelength be?
E_2=-5.45E^{-19} J, E_3=-2.42E^{-19} J, Δ=3.03E^{-19} J, λ=6.6E^{-7} m

3) Use the Rydberg equation above to calculate the wavelength of a photon when n=3. How does this compare with your answer in question 2? *λ=6.56E^{-7} J*

4) An electron moves from the n=5 to the n=1 quantum level and emits a photon with an energy of 2.093×10^{-18} J. How much energy must the atom absorb to move an electron from n=1 to n=5? What is the wavelength of this energy? *λ=9.491E^{-8} m*

5) An electron moves with a velocity of 2.5×10^8 cm/s. What is its wavelength? (The mass of an electron is 9.109×10^{-28} g.) Remember: J = Kg•m^2/s^2 *λ=2.9E^{-10} m*

6) Calculate the wavelength (in nanometers) associated with a 1.0×10^2-g golf ball moving at 30. m/s (about 67 mph). How fast must the ball travel to have a wavelength of 5.6×10^{-3} nm? *λ=2.2E^{-25} nm, 1.18E^{-21} m/s*

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!

7) 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!")*
www.mychemistryclass.net/HCrainbowpacket2NEW.html
https://mychemistryclass.net/HCrainbowpacket3.html

8) 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 2: Atoms and Elements
Chapter 7: The Quantum Mechanical Model
Chapter 8: Periodic Properties of the Elements
mlm.pearson.com/northamerica/masteringchemistry/

9) 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!)*

10) Don't forget that there is extra practice on GoFormative too! 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!

11) 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.)