Name Key **Unit 3: Atomic Theory**

If you can do all the things listed below, you are ready for the Unit 4 test.

Place a checkmark next to each item that you can do! If a sample problem is given, complete it as evidence.

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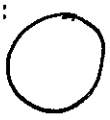
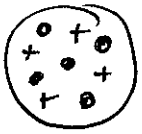
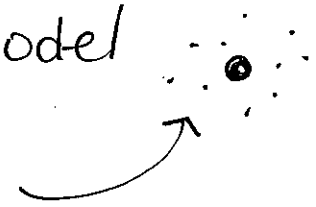
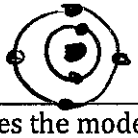
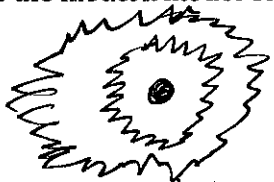
|---|---|
| **____1. I can describe John Dalton's contribution to our understanding of the atom.** | Dalton's Model: Cannon Ball Model<br>What it looked like:  solid sphere |
| **____2. I can describe JJ Thomson's contribution to our understanding of the atom.** | Thomson's Experiment: Cathode Ray tube!<br>Thomson's Model: plum pudding  <br>What it looked like: Negative particles in a positive "soup" |
| **____3. I can describe Ernest Rutherford's contribution to our understanding of the atom.** | Rutherford's Experiment: Gold Foil Experiment<br>Rutherford's Model: Nuclear model  <br>What it looked like: |
| **____4. I can describe Niels Bohr's contribution to our understanding of the atom.** | Bohr's Model: Specific Energy Levels for electrons<br>What it looked like:  planetary Model |
| **____5. I can describe how Schrodinger, Heisenberg, Pauli, Dirac, and others contributed to our understanding of the atom.** | What does the modern model of the atom look like?  <br>Where, in an atom, are electrons likely to be found according to the modern model? Areas of probability called orbitals |

**____6. I can state the chronological order of atomic models.**

From oldest to newest, list the models that we have used to describe an atom.

Dalton, Thomson, Bohr, Wave mech.

or

Cannonball, Plumpudding, Planetary, Wave mechanical

**____7. I can state the three subatomic particles, their location in an atom, their charges, and their masses (in amu).**

| | Particle #1 | Particle #2 | Particle #3 |
|---|---|---|---|
| **Name** | Proton | Electron | Neutron |
| **Charge** | +1 | -1 | 0 |
| **Mass** | 1 | Neg (~0) | 1 |
| **Location in Atom** | NUC | outside NUC | NUC |

**____8. I can explain why atoms are electrically neutral.**

Atoms are electrically neutral because the number of ~~proton~~ is equal to the number of electron.

**____9. I can define mass number and atomic number.**

**Definitions:**

mass number : Proton + Neutrons [weight of Atom]

atomic number # of protons

**____10. Given the mass number, I can determine the number of protons, neutron, and electrons in an atom.**

In an atom of $^{212}Po$, how many protons are present?

84 84

In an atom of 212Po, how many electrons are present?

84 84

In an atom of 212Po, how many neutrons are present?

84 128

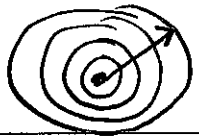
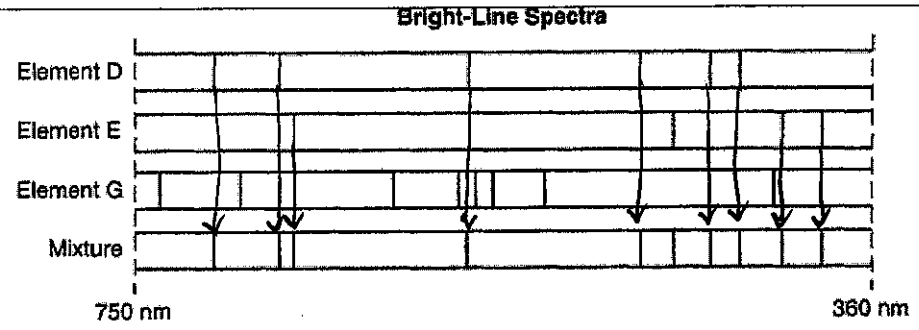
**____11. I can use the Periodic Table to determine the atomic number of an element.**

How many protons are in an atom of selenium?

34

How many protons are in an atom of silicon?

14

| | |
|---|---|
| **___12. I can calculate average atomic mass given the masses of the naturally occurring isotopes and the percent abundances.** | Element Q has two isotopes. If 77% of the element has an isotopic mass of 83.7 amu and 23% of the element has an isotopic mass of 89.3 amu, what is the average atomic mass of the element?<br>$(.77)(83.7) = 64.449$<br>$+$<br>$(.23)(89.3) = 20.539$<br>$= 84.988 \rightarrow 84.99$ |
| **___13. Given the mass number and the charge, I can determine the number of protons, neutrons, and electrons in an ion.** | How many protons are in $^{19}F^{1-}$?<br>10 — 10<br>How many neutrons are in $^{19}F^{1-}$?<br>10 — 9<br>How many electrons are in $^{19}F^{1-}$? → gained 1 $e^-$<br>10 — 11 |
| **___14. I can state the relationship between distance from the nucleus and energy of an electron.** | As the distance between the nucleus and the electron increases, the energy of the electron increases |
| **___15. I can state the relationship between the number of the principal energy level and the distance to the atom's nucleus.** | As the number of the PEL increases, the distance to the nucleus increase<br>  |
| **___16. I can explain, in terms of subatomic particles and energy states, how a bright line spectrum is created.** | A brightline spectrum is created when<br>Excited $e^-$ return to ground state |
| **___17. I can identify the elements shown in a bright line spectrum.** |  <br>Which element(s) is/are present in the mixture?<br>D + E |
| **___18. I can define valence electrons.** | **Definition:**<br>valence electron — outermost $e^-$ |

| | |
|---|---|
| **____19. I can locate and interpret an element's electron configuration on the Periodic Table.** | How many valence electrons does an atom of rubidium have in the ground state?<br>1<br>How many principal energy levels contain electrons in an atom of iodine in the ground state?<br>5 |
| **____20. I can identify an electron configuration that shows an atom in the excited state.** | Which electron configuration represents an atom of potassium in the excited state?<br>A) 2-8-7-1 C) 2-8-7-2<br>B) 2-8-8-2 D) 2-8-8-1 |
| **____21. I can draw Lewis electron dot diagrams for a given element.** | Draw the Lewis electron dot diagram for the following atoms:<br>Li Be B C N O F Ne |
| **____22. I can define and state the importance of "octet of valence electrons."** | **Definition:**<br>octet of valence electrons<br>Full outer shell!<br>The importance of having a complete"octet of valence electrons" is<br>That the atom will or will not bond! |