

Review: Unit 2: Atomic Structure and Nuclear Chem - Honors

Parts of an Atom

1. Complete the table below.

| Subatomic Particle | Charge | Relative Mass (AMU) | Location in the Atom |
|--------------------|--------|---------------------|----------------------|
| | | | |
| | | | |
| | | | |

2. What causes an atom to be **electrically charged**?
3. Which subatomic particles are responsible for giving an atom its **mass**? Where are these particles located? Why is the other particle not included in the mass number?
4. Look at how the periodic table is arranged. What **number** is used to determine the order of the elements? (What is it CALLED, not where is it located)

Atoms, Ions, and Isotopes

5. How does an atom become an **ion**?
6. Circle the correct choice to complete the sentences below.
- Sulfur must (**gain/lose**) electrons to become S^{-2} . S^{-2} is an example of a (**cation/anion**).
 - Calcium must (**gain/lose**) electrons to become Ca^{+2} . Ca^{+2} is an example of a (**cation/anion**).
 - If an two atoms of the same element have different masses, then they are called (**isotopes/ions/atoms**) and they have different numbers of (**protons/neutrons/electrons**).
7. Determine the **mass number** of an atom with 9 protons, 12 neutrons, and 8 electrons. Write the **isotopic symbol** for this atom.

Name:

Date:

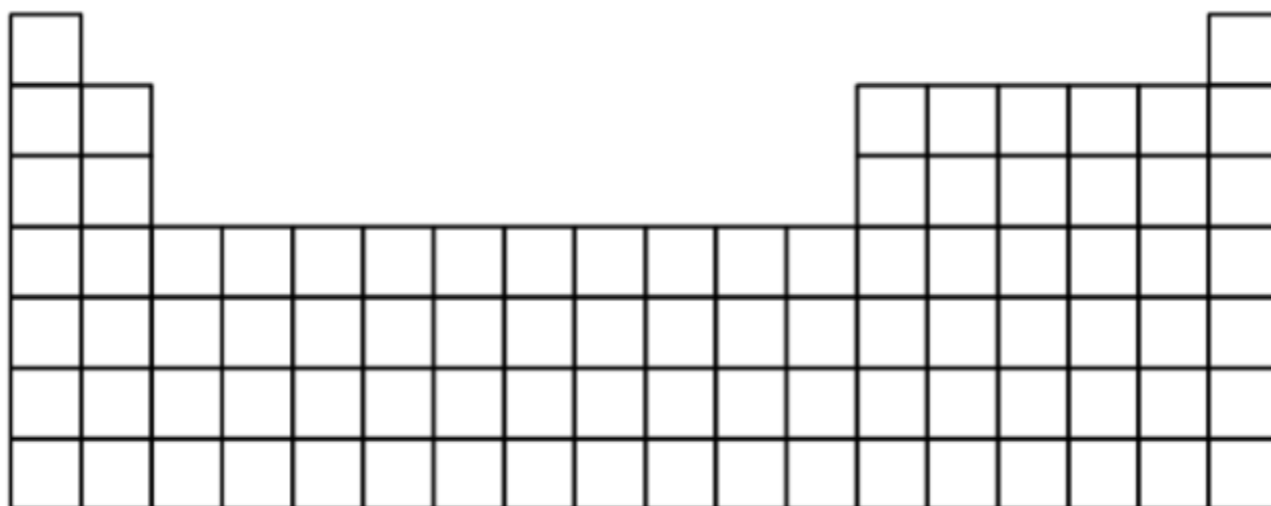
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8. Atoms gain and lose electrons in order to attempt to achieve a valence shell configuration with _____ electrons. This is called the _____ Rule.
9. Explain the difference between **mass number** and **average atomic mass**.

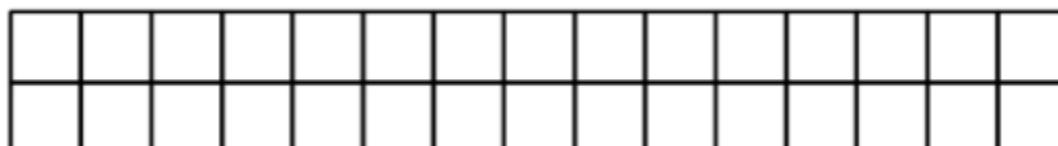
10. Predict the charge (**you will not have your colored periodic table on the test**) of each ion and complete the table below.

| Element | Symbol | # Protons | # Electrons | # Valence Electrons | Charge of Common Ion Formed | Cation/Anion? |
|------------|--------|-----------|-------------|---------------------|-----------------------------|---------------|
| Lithium | | | | | | |
| Chlorine | | | | | | |
| Phosphorus | | | | | | |
| Calcium | | | | | | |
| Aluminum | | | | | | |

11. Label the groups, periods, valence electrons, and common ion formed on the table below:



The diagram shows a blank periodic table grid with 7 rows and 18 columns. The first two columns are on the left, and the last two columns are on the right, with a gap in between representing the transition metals. The grid is intended for labeling groups, periods, valence electrons, and common ions.



A separate blank grid consisting of 2 rows and 14 columns, intended for labeling groups, periods, valence electrons, and common ions.

Name:

Date:

Pd:

12. Identify each number in the **isotope symbol** below. How many protons, neutrons, and electrons are present?



13. Calculate **average atomic mass** for each of the following:
- Rubidium is a soft, silvery-white metal that has two common isotopes, ${}^{85}\text{Rb}$ and ${}^{87}\text{Rb}$. If the abundance of ${}^{85}\text{Rb}$ is 72.2% and the abundance of ${}^{87}\text{Rb}$ is 27.8%, what is the average atomic mass of rubidium? Round to the correct number of sig figs (use the % abundance values).
 - An unknown element (X) contains 2 isotopes. The first isotopes has an abundance of 51.86% and a mass of 106.91 amu. The rest of the atoms have a mass of 108.91 amu. Determine the average atomic mass and the identity of the element. Round to the correct number of sig figs (use the % abundance and mass values)

Models of the Atom & Atomic Spectra:

15. Draw and describe each of the following **models** of the atom. Label the **subatomic particles** and **parts** of the atom. Also, identify what was incorrect about this model.
- Bohr
 - Dalton
 - Rutherford
 - J.J. Thomson (Plum Pudding)
16. Which model was the first to contain/discover each of the following:
- Energy Levels: _____
 - A Nucleus: _____
 - Electrons: _____
 - Protons/Positive Charge: _____

Name:

Date:

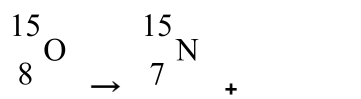
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17. Why don't elements in group 18 form ions?

29. Complete the following table on nuclear decay particles:

| Type of Decay | Decay Particle (draw symbol) | What does it do to the isotope? |
|----------------------|------------------------------|---------------------------------|
| <i>Alpha</i> | | |
| <i>Beta Negative</i> | | |
| <i>Beta Positive</i> | | |
| <i>Gamma</i> | | |

30. Complete the following nuclear decay reactions:



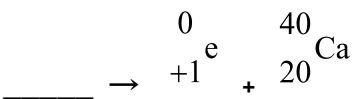
Type: _____



Type: _____



Type: _____



Type: _____

31. Write the following nuclear decay reactions:

a. Radon-222 undergoes alpha decay.

b. Polonium-210 releases a negatively charged particle with no mass during beta decay.

Name:

Date:

Pd:

c. During a gamma decay process, Francium-221 releases energy.

32. Write the following nuclear reactions. Then identify them as Fission or Fusion:

a. Uranium-235 is struck with a neutron and produces Tin-125 and Molybdenum-110

b. Hydrogen-3 and Hydrogen-2 combine to form Helium-4

33. Chromium-48 decays. After 6 half-lives, what fraction of the original nuclei would remain?

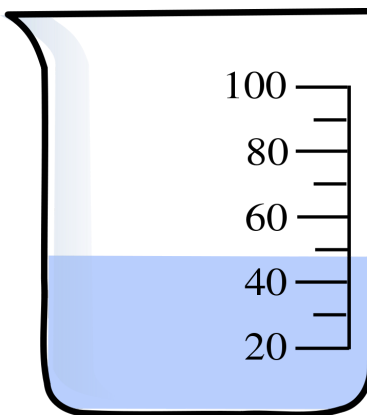
34. The half life of iodine-125 is 60 days. If you have 200 grams of I-125, how much would be left after 360 days?

35. Palladium-100 has a half-life of 3.6 days. If one had exactly 6,000,000 atoms at the start, how many atoms would be present after 22.4 days?

Throwback Questions:

1. The frequency of a microwave is 1.98×10^{-4} MHz. What is this measurement in Hz. Round to the correct number of sig figs.

2. Assuming the following beaker is measured in milliliters, record the measurement with the correct uncertainty.



3. How many days would pass if a person traveled to Mars and it took 2.3 years to arrive. Round to the correct number of sig figs.