SCIENCE 9: REVIEW OF SUBATOMIC PARTICLES AND BOHR MODELS

Atom: _____ Proton: ______ charged particle in the ______ of an atom; has a mass of _____. \triangleright Neutron: ______ particle in the \succ _____ of an atom; has a mass of _____. - Electron Electron: ______ charged particle in \geq Proton ______ surrounding the nucleus of the + Neutron atom; very _____ (mass of _____). Number of Neutrons (n) Number of Protons (p) Number of Electrons (e)

Practice:

Atom

Bohr Models of Atoms

2. In the nucleus:

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1) Why do atoms have the same number of protons and electrons?

		Ivig	
2)	Explain why you need to subtract atomic number from atomic mass to calculate the number of neutrons in an atom.	В	
		Ti	
		Ca	
		F	

1. Calculate the number of protons, neutrons, electrons.

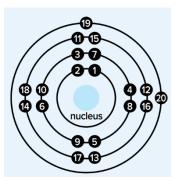
3. Draw the electrons in energy shells:

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• Max electrons per shell from inside to outside:

clockwise, singly at first then paired

• (Except in first shell), electrons are filled *starting at top*, going



Complete the following table.

neutrons

electrons

protons

3)

Al Μσ

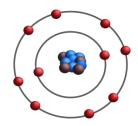
> Cl Ar Zn

Example: sodium atom	Example: oxygen atom

SCIENCE 9: VALENCE SHELLS AND IONS

Valence Shells and Valence Electrons:

- > Valence shell is the outermost shell containing electrons
- > Valence electrons are electrons in the valence shell



- 1. Atoms in the same group have the same number of ______
- 2. Atoms in the same period have the same number of ______

During a chemical reaction, atoms _______valence electrons with other atoms until they have ______.

_____ are unreactive because their valence shells are already full.

Ion: a charged 'atom' that is formed when a neutral atom _______ electrons

Cation: ______ charged ion (e.g. Ca²⁺, Na⁺), formed when atom *loses* electrons

Anion: ______ charged ion (e.g. O²⁻, P³⁻), formed when atom *gains* electrons

Bohr models of ions are very similar to Bohr models of atoms. Two key differences:

- Valence shell is full
 - (Note: the fewer electrons that have to move, the better. E.g. oxygen with 6 valence electrons will gain two electrons to form its 2- ion instead of losing six electrons.)
- Square brackets and ion charge

Examples: Draw the Bohr models of fluorine and magnesium atoms and their ions.

Fluorine	Beryllium

Practice:

1. Explain why metals tend to lose electrons and non-metals tend to gain them when forming ions.

- 2. On your periodic table, the ion charge of neon is listed as "0". Why is this the case?
- 3. On the back of this page, draw the Bohr models of: a) oxygen atom and ion; b) magnesium atom and ion; c) nitrogen atom and ion; d) chlorine atom and ion