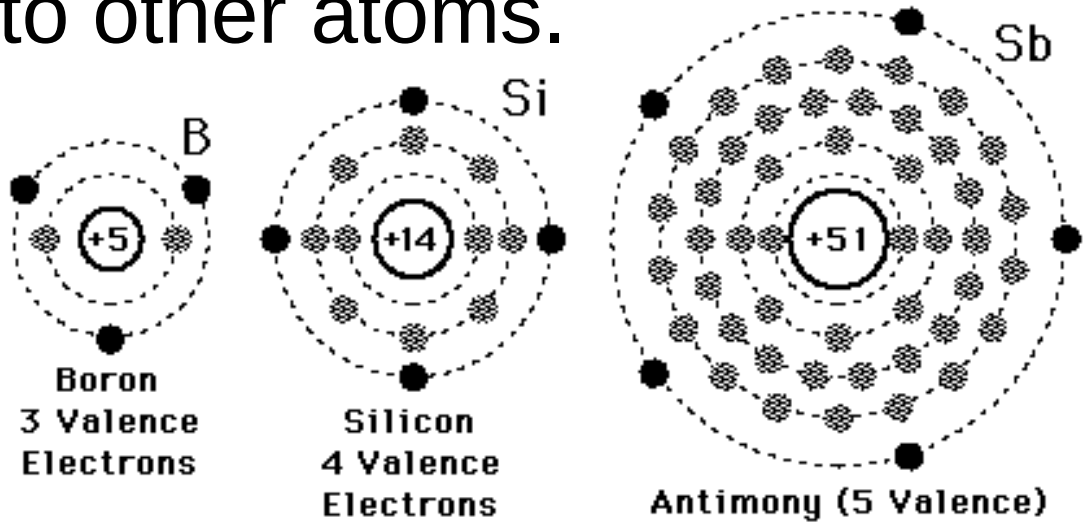
Lewis Diagrams (aka Electron Dot Diagrams)

- Lewis diagrams show ONLY the valence electrons for an element.
- Draw one dot each: on the top, right, bottom, and left of the element symbol, then start doubling up. (12, 3, 6, 9 on a clock)
- Draw the Lewis Diagrams for the first 20 Elements on your handout.

Valence Electrons

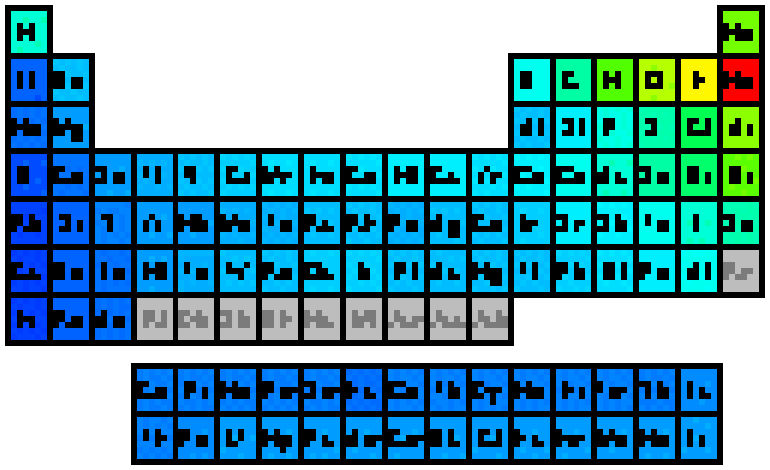
- Valence Electrons are the outermost electrons found in an atom.
- These electrons determine the type of ion an atom will form, and how an atom can bond to other atoms.



Valence Electrons for each Group

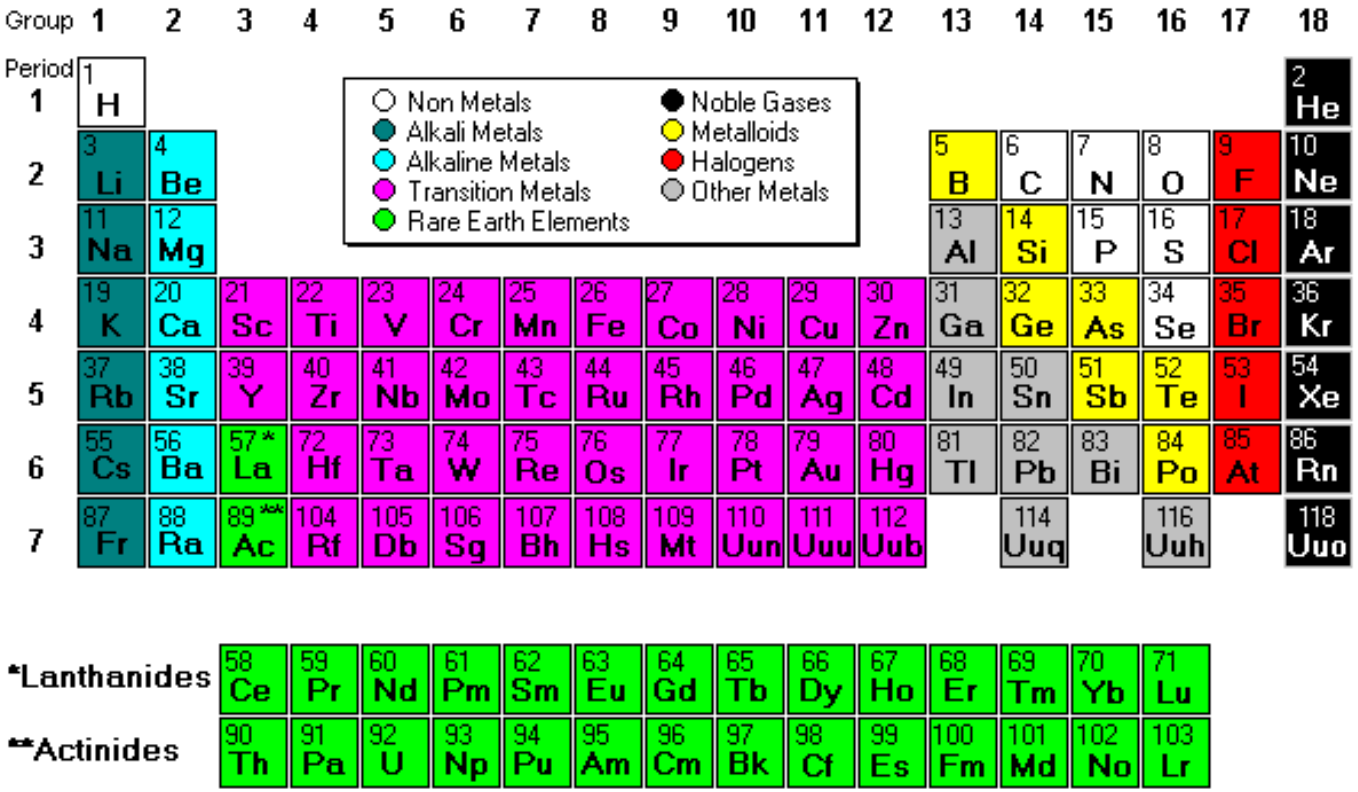
- Group 1
- Group 2
- Group 13
- Group 14
- Group 15
- Group 16
- Group 17
- Group 18

Do you notice a pattern?



Why do Elements in the same group have similar chemical properties?

- Same number of valence electrons!



And now for something completely different….

- On your electron diagrams, write the symbol for the ion formed by each of the first 20 elements
- The charge on each ion is called the valence number
- Let’s compare….

Atoms and Ions

Pg 188 - 191

Atoms & Ions

- Atoms have equal numbers of protons and electrons and are therefore electrically neutral
- Atoms are not stable unless their outer electron orbits are full
- This is achieved by either gaining, losing, or sharing electrons.

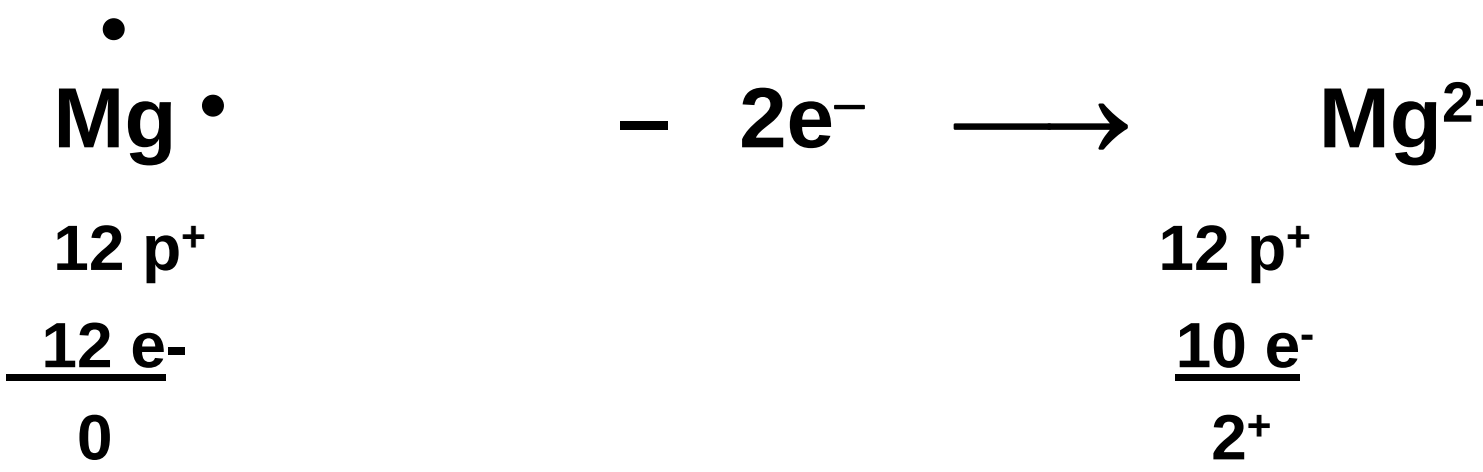
Atoms and Ions

- When an atom gains or loses one or more electrons, it becomes an ion. It is now electrically charged, but stable.
- The ionic charge is the sum of the ion's positive and negative charges.

Cations

- Cations (Positive Ions) form when an atom has more protons than electrons
- Formed by metals (elements with fewer than 4 valence electrons) losing electrons

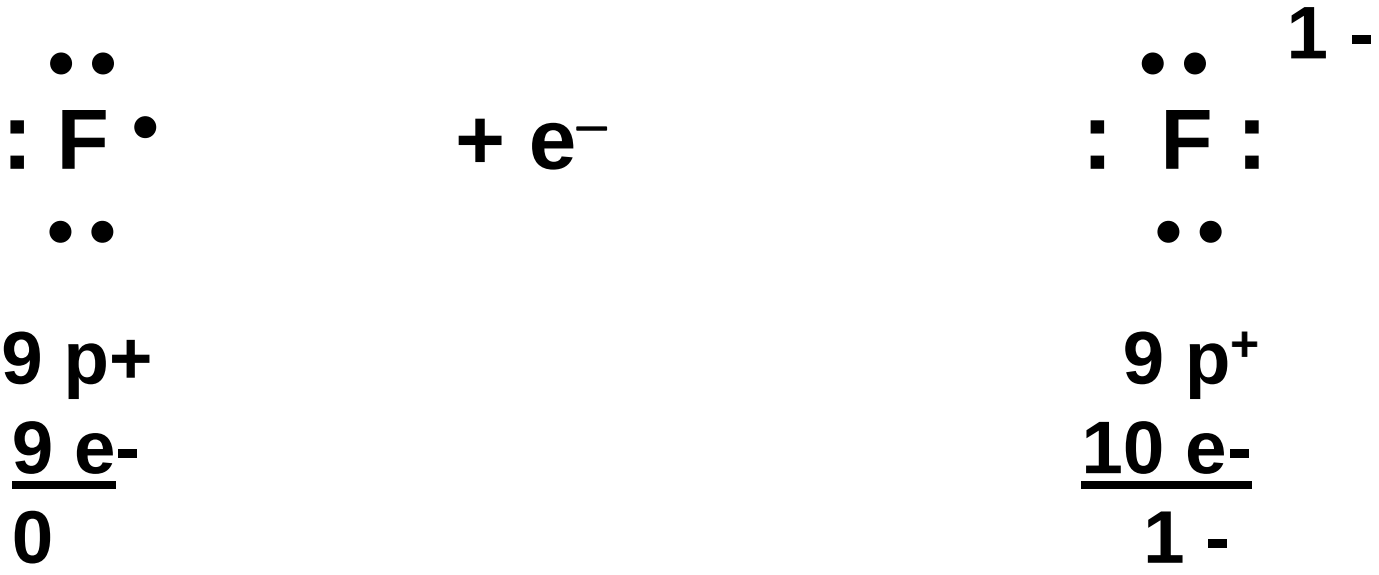
Magnesium atom **Magnesium ion**



Anions

- Anions (negative ions) form when an atom has more electrons than protons
- Formed by non-metals (more than 4 valence electrons) gaining electrons

Fluorine atom **Fluoride ion**



“Cats have Paws”

- Here’s another little trick to help you remember what anions and cations are:
  - Cations are Positive
  - Cats have Paws

Ion Joke

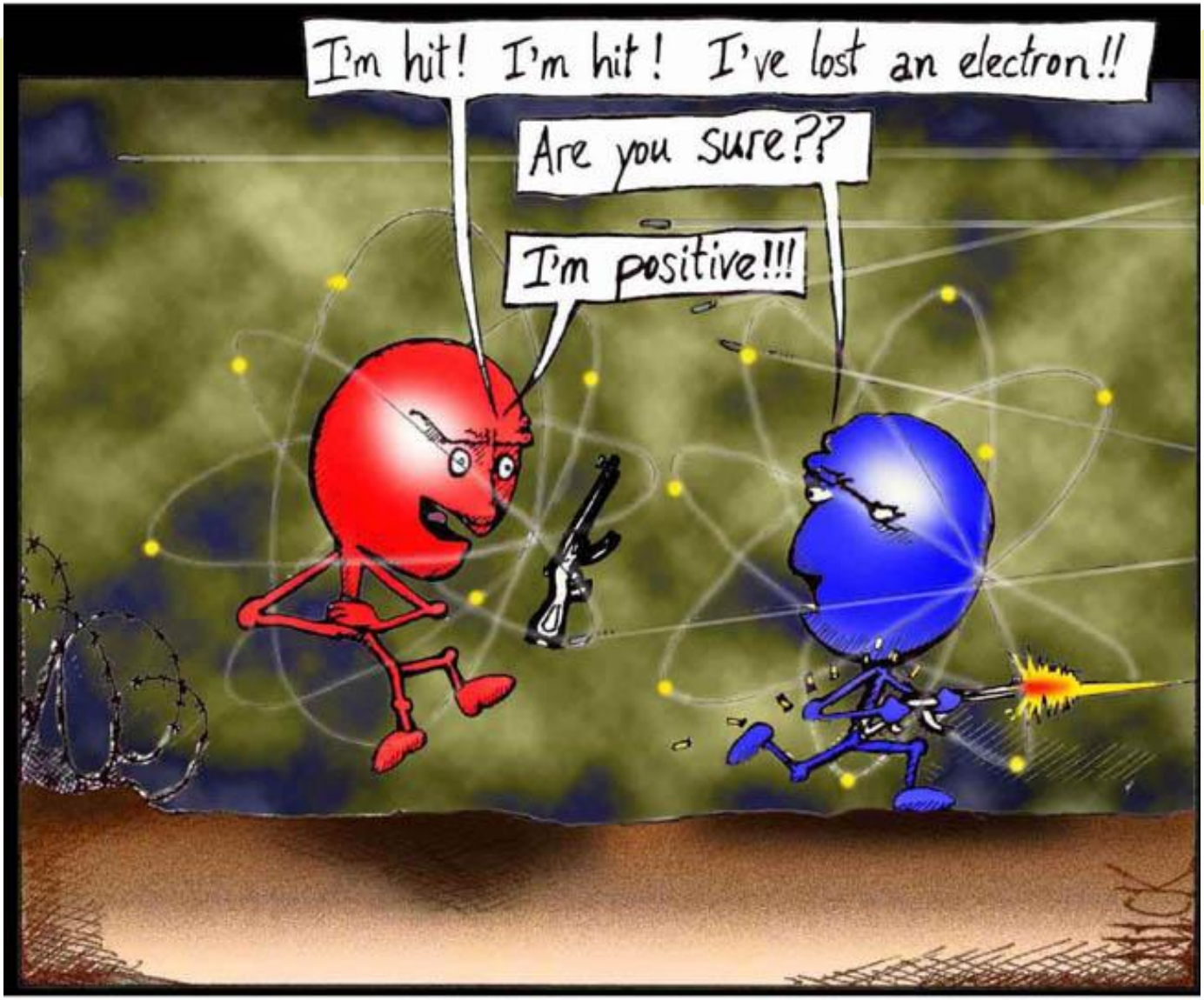
Two hydrogen atoms bumped into each other recently.

One said: "Why do you look so sad?"

The other responded: "I lost an electron."

Concerned, One asked "Are you sure?"

The other replied "I'm positive."



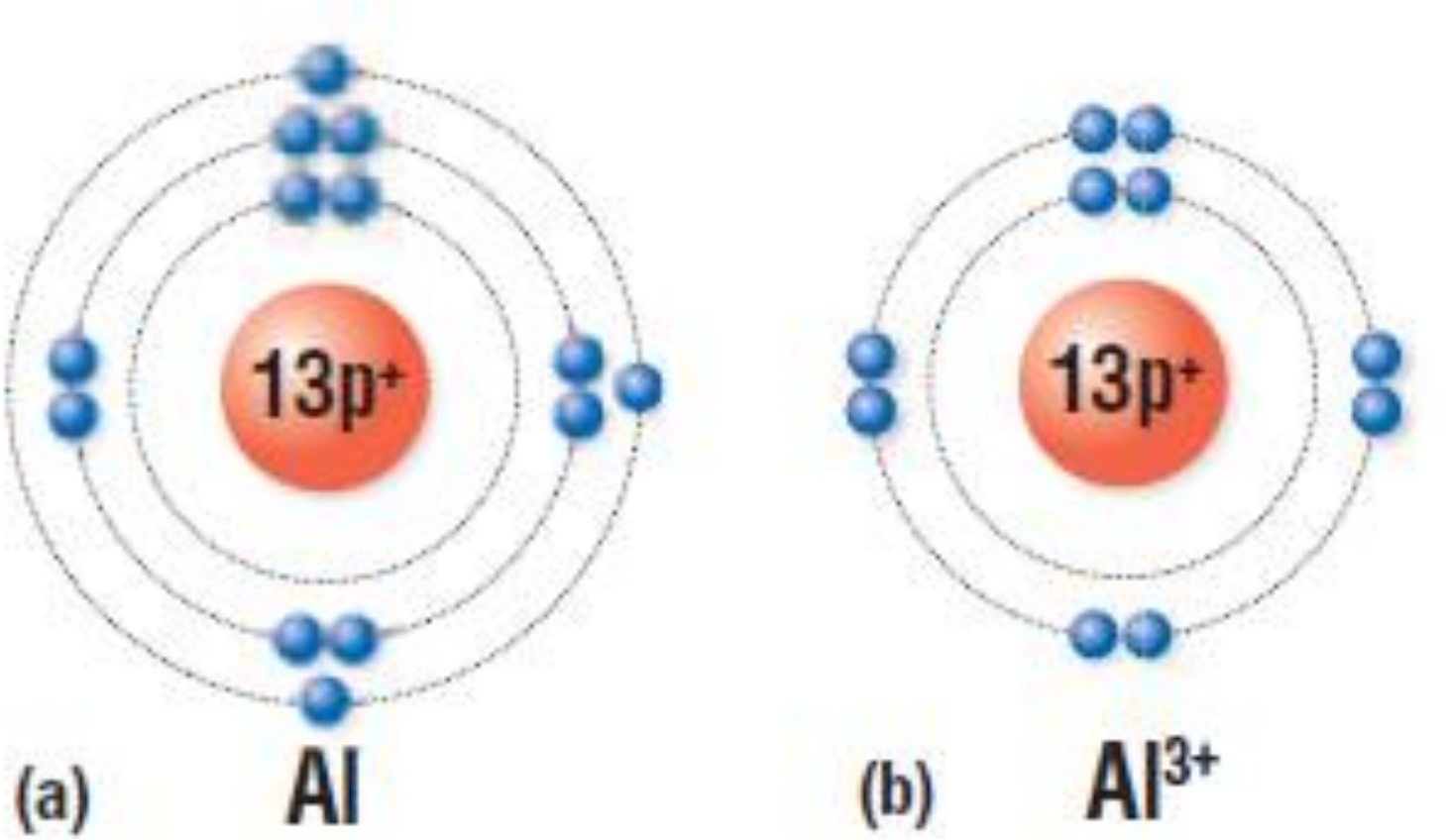
Another casualty in the War of the Atoms.

Valence electrons and Valence Number

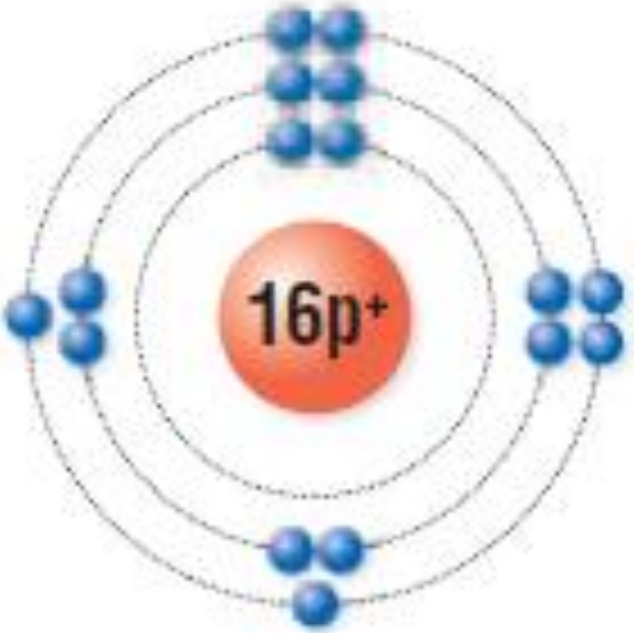
Group	Valence e-	Valence #
1 (alkali metals)	1	1
2 (alkaline earth metals)	2	2
13	3	3
14	4	4
15	5	3
16	6	2
17 (halogens)	7	1
18 (noble gases)	8	0

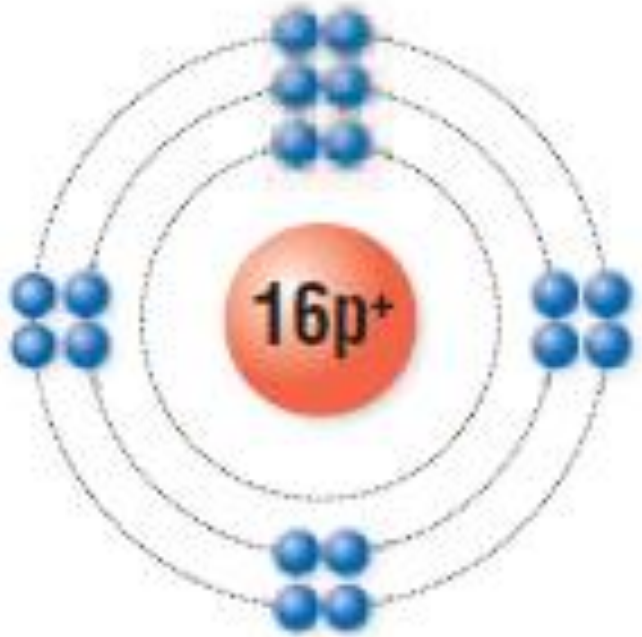
How Cool is That??!!!

Let's look at a comparison between Atoms and Ions



Let's look at a comparison between Atoms and Ions





You'll get a charge out of this….

Atoms and Ions

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Chapter 5 Quiz on Tuesday

5.4 – 5.5

Did you do the

'Mystery Gases' Lab last year?