Name:_____

The Why and How of Ions:
Featuring Bohr-Rutherford Diagrams and the Periodic Table

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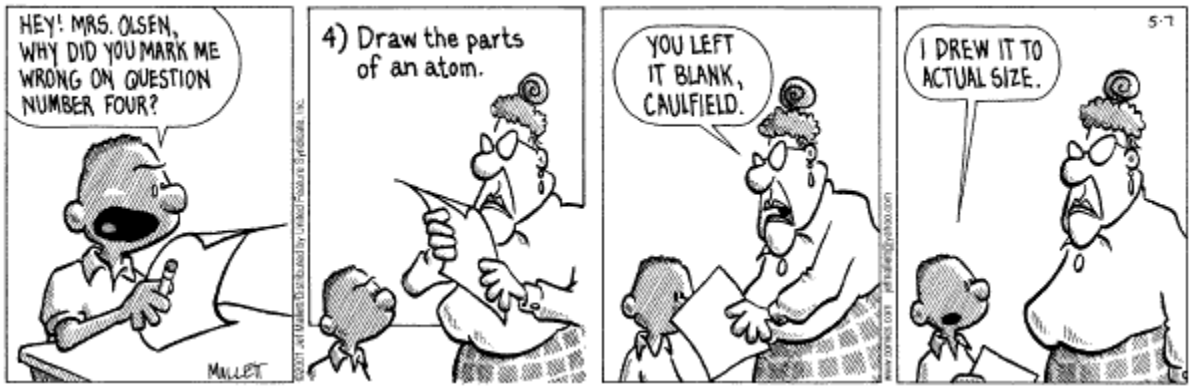
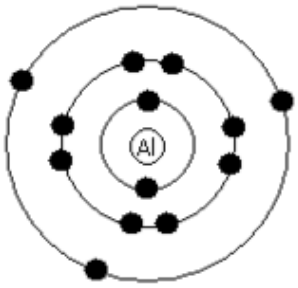


Bohr-Rutherford diagrams (or simply Bohr diagrams) are used to show the arrangement of electrons in the atom, e.g.:

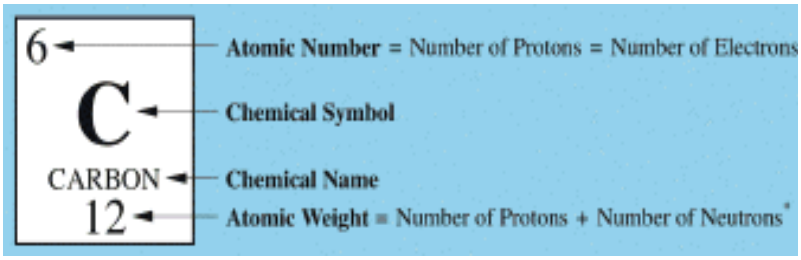


How To Draw Bohr Diagrams:

1) Find your element on the periodic table.

2) Determine the number of electrons, which for a neutral atom is equal to the number of

_____, which is equal to the _____.



3) Determine which period (_____) your element is in.

Elements in the 1st period have one _____ or _____.
Elements in the 2nd period have two, and so on.

4) Draw a nucleus with the element symbol
(and optionally, the #s of protons and neutrons)
inside in the space at right.

5) Draw the shells around the nucleus.

6) Add the electrons.

Carbon has 6 electrons.

The first shell can only hold _____ electrons.
You need to add 4 more so these go in the 2nd shell.

The 2nd shell can hold up to _____ electrons;
the 3rd shell can hold 18, but the elements in the first few periods only use 8 electrons.

7) Check your work: Count your electrons per shell and your total electrons!

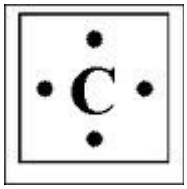
Try drawing Bohr diagram for each of the following elements on your own:

Hydrogen (H)	Helium (He)
Oxygen (O)	Aluminum (Al)

Neon (Ne)	Potassium (K)

The electrons in the outermost shell are called _____.

Lewis Dot Diagrams are abbreviated Bohr Diagrams that show just these outermost electrons, e.g.:

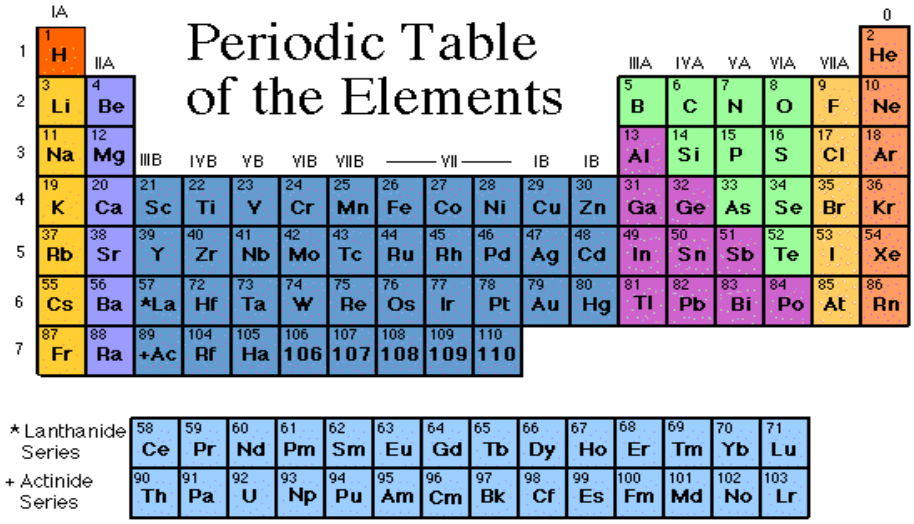


Note that both hydrogen (H) and potassium (K) have just _____ electron in their outermost shell.

Note also that these elements are both found in the _____ column of the periodic table.

All elements in the same group (column) have the _____

_____. (ref. p. 150)



It is these electrons that determine the behavior of the element, including how it _____with other elements – and how it forms _____.

Let's look at these groups, or _____ in more detail:

Column IA: _____ with _____ valence electron

- _____ and _____ metals
- _____, esp. with water

Column IIA: _____ with _____ valence electrons

- White and malleable
- Reactive, but _____

Groups in the middle: _____

Column IIIA: the _____ Family with _____ valence electrons

- Most are metals but boron is a _____.

Column IVA: the _____ Family with _____ valence electrons

- Contains metals, metalloids, and a _____**:** _____

Column VA: the _____ Family with _____ valence electrons

- Contains metals, metalloids, and non-metals

Column VIA: the _____ Family with _____ valence electrons

- Mostly **non-metals**
- Reactive

Column VIIA: the _____ with _____ valence electrons

- All are **non-metals**
- **Very reactive**

Column VIIIA: the _____ Gases with a _____

- Exist as _____
- _____ with other elements
- Do not form _____