

## Bell Ringer #17:

Socratic Room Name:  
LEVEL70WARRIOR

### Lewis Dot Structure and Valence Electrons

<http://drmoad.weebly.com/>

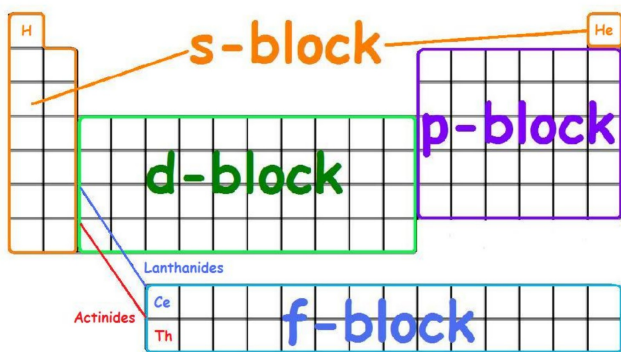
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## Agenda

Bell Ringer  
Electron Dot Diagrams  
Valence Electrons  
Dot Diagrams Homework  
Exit Ticket

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### Electron Configuration (Be able to draw this!)



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### Electron Configuration

A detailed periodic table where each element's position is labeled with its principal quantum number and subshell type. For example, Hydrogen is 1s<sup>1</sup>, Helium is 1s<sup>2</sup>, Lithium is 2s<sup>1</sup>, and Beryllium is 2s<sup>2</sup>. The d-block elements are labeled with their d-subshell (e.g., 3d<sup>1</sup> to 3d<sup>10</sup>), and the f-block elements are labeled with their f-subshell (e.g., 5f<sup>1</sup> to 5f<sup>7</sup>).

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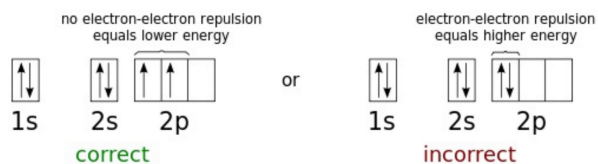
### Electron Configuration

Write out the complete electron  
configuration from 1s - 7p.

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### Reminder: Orbital Spin Diagrams

- An Arrow represents an electron.
- Hund's Rule – One electron in each suborbital before doubling up.



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Write out the long-hand electron configuration, short-hand electron configuration and orbital spin diagram for **Vanadium**.

## Valence Electrons

**Valence electrons:** are the electrons in the highest occupied energy level of an element's atoms.

- The number of valence electrons largely determines the chemical properties of an element.

## Valence Electrons

Determining the number of valence electrons

- To find the number of valence electrons in an atom of a representative element, simply look at its group number.

The image shows a periodic table with yellow arrows pointing to groups 1, 2, and 13-18. Group 1 elements have 1 valence electron, group 2 has 2, and groups 13-18 have 3, 4, 5, 6, 7, and 8 valence electrons respectively.

## Valence Electrons & Electron Configuration

Oxygen

6 valence electrons



Chlorine

7 valence electrons



## Valence Electrons → Electron Dot Structures

- Valence electrons are usually the only electrons involved in chemical bonds.
- As a general rule, only the valence electrons are shown in electron dot structures.

Electron dot structures are diagrams that show valence electrons in the atoms of an element as dots.

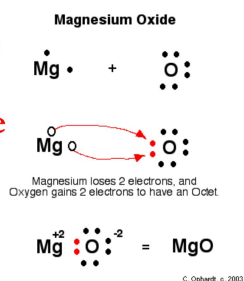
Electron Dot Structures of Some Group A Elements

Period	Group							
	1A	2A	3A	4A	5A	6A	7A	8A
1	H ·							He:
2	Li·	·Be·	·B·	·C·	·N·	·O·	·F·	·Ne:
3	Na·	·Mg·	·Al·	·Si·	·P·	·S·	·Cl·	·Ar:
4	K·	·Ca·	·Ga·	·Ge·	·As·	·Se·	·Br·	·Kr:

- Notice that all the elements within a given group (with the exception of helium) have the same number of electron dots in their structures.

## The Octet Rule

- Octet means set of eight
- The octet rule states that in forming compounds, atoms tend to achieve the electron configuration of a noble gas.
- Noble gases are stable and non-reactive in chemical reactions



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## Draw the electron dot structure for:

Bismuth

Tin

Cesium

Bromine

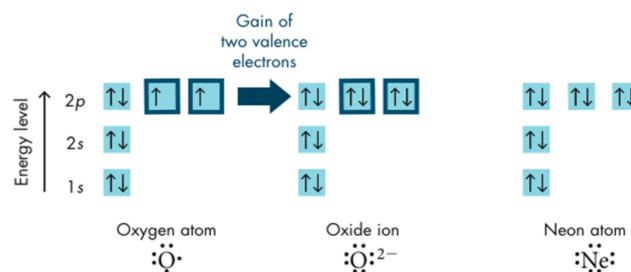
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1	2	13	14	15	16	17	18
H ·							He ··
Li ·	·Be·	·B·	·C·	·N·	·O·	·F·	·Ne·
Na·	·Mg·	·Al·	·Si·	·P·	·S·	·Cl·	·Ar·
K ·	·Ca·	·Ga·	·Ge·	·As·	·Se·	·Br·	·Kr·
Rb·	·Sr·	·In·	·Sn·	·Sb·	·Te·	·I·	·Xe·
Cs·	·Ba·	·Tl·	·Pb·	·Bi·	·Po·	·At·	·Rn·

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## Ions:



- Ions are charged particles
- Negative ions gain electrons
- Positive ions lose electrons

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## Practice Problems:

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## Lewis Dot Structure Homework

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**Exit Ticket #17:**

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## Lewis Dot Structures