Class Announcements

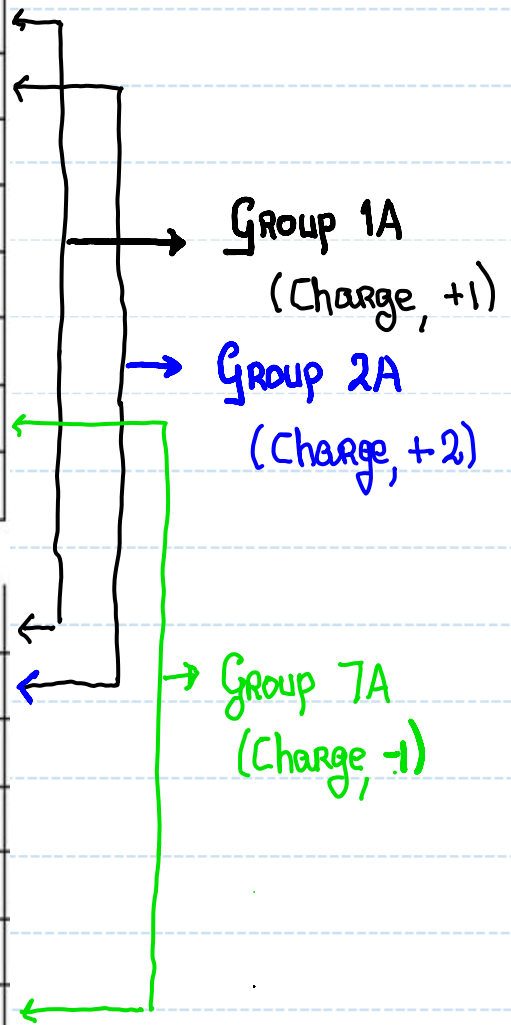
Sat Oct 1 .... Lab 2

Sun Oct 2 ... Exam 1 Review ... ISB 135 ... 3:00 - 4:45pm

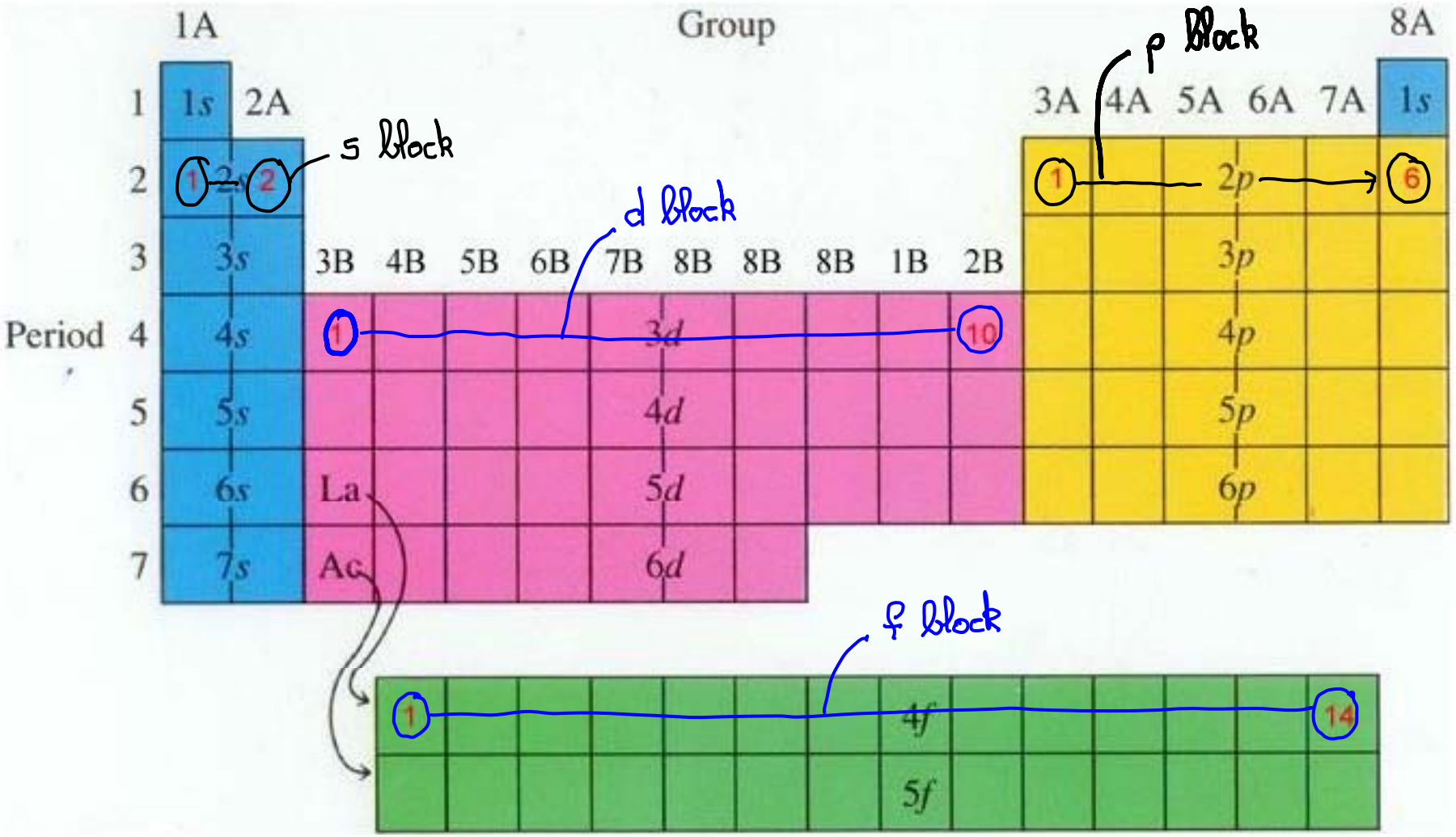
Tue Oct 4 ... Exam 1 ... in Class ...

2.7 Electronic Configuration and Position in the Periodic Table

			Electron Configuration	Noble Gas	Valence
1A	Li	3	$1s^2 2s^1$	$[He]2s^1$	1
2A	Be	4	$1s^2 2s^2$	$[He]2s^2$	2
3A	B	5	$1s^2 2s^2 2p^1$	$[He]2s^2 2p^1$	3
4A	C	6	$1s^2 2s^2 2p^2$	$[He]2s^2 2p^2$	4
5A	N	7	$1s^2 2s^2 2p^3$	$[He]2s^2 2p^3$	5
6A	O	8	$1s^2 2s^2 2p^4$	$[He]2s^2 2p^4$	6
7A	F	9	$1s^2 2s^2 2p^5$	$[He]2s^2 2p^5$	7
8A	Ne	10	$1s^2 2s^2 2p^6$	$[He]2s^2 2p^6$	8
1A	Na	11	$1s^2 2s^2 2p^6 3s^1$	$[Ne]\ 3s^1$	1
2A	Mg	12	$1s^2 2s^2 2p^6 3s^2$	$[Ne]\ 3s^2$	2
3A	Al	13	$1s^2 2s^2 2p^6 3s^2 3p^1$	$[Ne]\ 3s^2 3p^1$	3
4A	Si	14	$1s^2 2s^2 2p^6 3s^2 3p^2$	$[Ne]\ 3s^2 3p^2$	4
5A	P	15	$1s^2 2s^2 2p^6 3s^2 3p^3$	$[Ne]\ 3s^2 3p^3$	5
6A	S	16	$1s^2 2s^2 2p^6 3s^2 3p^4$	$[Ne]\ 3s^2 3p^4$	6
7A	Cl	17	$1s^2 2s^2 2p^6 3s^2 3p^5$	$[Ne]\ 3s^2 3p^5$	7
8A	Ar	18	$1s^2 2s^2 2p^6 3s^2 3p^6$	$[Ne]\ 3s^2 3p^6$	8



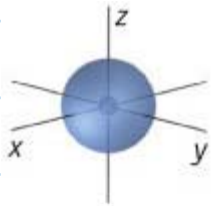
2.7 Electronic Configuration and Periodic Blocks

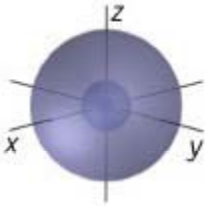


2.8 What Is a Periodic Property

A Atomic Size

See link on class web site.





2	3 Li Lithium 6.941	4 Be Beryllium 9.0122	5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.9984	10 Ne Neon 20.1797
3	11 Na Sodium 22.9898							

Decreasing size → Smallest.

Increasing size ↓ Largest

n ●← d → e⁻ ← Outermost electron

2.8 Periodic Properties

A Atomic Size

Arrange the following elements in order of increasing size, by ranking them 1 (smallest) to 5 (largest).

1 O 5 Mg 2 C 3 Si 4 Al

							2 He Helium 4.0026
3 Li Lithium 6.941	4 Be Beryllium 9.0122	5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.9984	10 Ne Neon 20.1797
11 Na Sodium 22.9898	12 Mg Magnesium 24.3050	13 Al Aluminum 26.9815	14 Si Silicon 28.0855	15 P Phosphorus 30.9738	16 S Sulfur 32.066	17 Cl Chlorine 35.4527	18 Ar Argon 39.948
19 K Potassium 39.0983	20 Ca Calcium 40.078	31 Ga Gallium 69.723	32 Ge Germanium 72.61	33 As Arsenic 74.9216	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.80
37 Rb Rubidium 85.4678	38 Sr Strontium 87.62	49 In Indium 114.82	50 Sn Tin 118.710	51 Sb Antimony 121.757	52 Te Tellurium 127.60	53 I Iodine 126.9045	54 Xe Xenon 131.29

Smallest

Mg ✓ O

Al ✓ C

Which element did you rank as 2?

a) O b) Mg c) C

d) Si e) Al

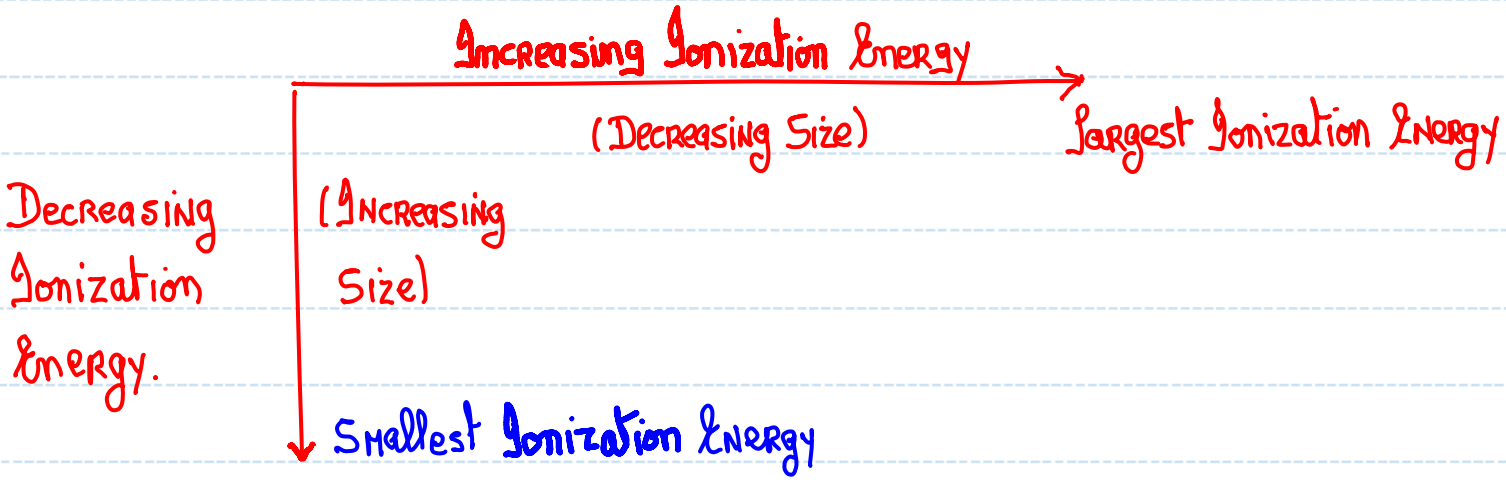
2.8 Periodic Properties

B Ionization Energy

2	3 Li Lithium 6.941	4 Be Beryllium 9.0122	5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.9984	10 Ne Neon 20.1797
3	11 Na Sodium 22.9898							

The amount of energy required to remove the outermost electron from an atom or ion.

How easy is it to remove the outermost electron? ... Depends on how strongly it is held ... How is this related to size?



2.8 Periodic Properties

B Ionization Energy

Arrange the following elements in order of increasing ionization energy, by ranking them 1 (smallest) to 4 (largest).

4 C 1 Ga 2 Al 3 Si

							2 He Helium 4.0026
3 Li Lithium 6.941	4 Be Beryllium 9.0122	5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.9984	10 Ne Neon 20.1797
11 Na Sodium 22.9898	12 Mg Magnesium 24.3050	13 Al Aluminum 26.9815	14 Si Silicon 28.0855	15 P Phosphorus 30.9738	16 S Sulfur 32.066	17 Cl Chlorine 35.4527	18 Ar Argon 39.948
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largest IE

Ga ↓ C

Al ↓ Si

Which element did you rank as 3?

a) C b) Ga

c) Al d) Si

2.8 Periodic Properties

C Electronegativity

2	3 Li Lithium 6.941	4 Be Beryllium 9.0122	5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.9984	?
3	11 Na Sodium 22.9898							

↑ No vacancy

A measure of the ability of an element to attract an electron.

Where would an electron prefer to reside? ...

How is this related to size?

2.8 Periodic Properties

C Electronegativity

a) Ca b) S
c) P d) As

Which of the above has the greatest electronegativity?

							2 He Helium 4.0026
3 Li Lithium 6.941	4 Be Beryllium 9.0122	5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.9984	10 Ne Neon 20.1797
11 Na Sodium 22.9898	12 Mg Magnesium 24.3050	13 Al Aluminum 26.9815	14 Si Silicon 28.0855	15 P Phosphorus 30.9738	16 S Sulfur 32.066	17 Cl Chlorine 35.4527	18 Ar Argon 39.948
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Ca ✓ S