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THE PERIODIC TABLE

A. Structure of the Periodic Table

The modern periodic table is a listing of elements in a grid like chart arrangement. The elements are placed in order of atomic number, and fall into certain positions in the table that reveal many of their properties and their relationships to each other.

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1.	Draw Lewis Dot	t Diagrams for the atoms that ho	ave the following atomic n	umbers:
	4:	12:	20:	38:
Wł	nat do these Lew	ris Dot Diagrams have in common:		
Wł	nat would you exp	pect about the relative propertie	es of these elements?	
Wł	nere are these a	tom located in the periodic table	?	
2.	Draw Lewis Dot	t Diagrams for the atoms that ho	ave the following atomic n	umbers:
	9:	17:	35:	53:
Wł	nat do these Lew	ris Dot Diagrams have in common:	•	
Wł	nat would you exp	pect about the relative propertie	es of these elements?	· · · · · · · · · · · · · · · · · · ·
Wł	nere are these a	tom located in the periodic table	?	
С.	Ionic Charge a	nd the Periodic Table		
1.	Draw the Lewis	Dot Diagram for the following:	<i>C</i> a²+:	
Ex	plain why the 2 ⁺	ion is the one that tends to typic	cally form.	
	J 1	ne periodic table is Ca located? _ e other elements in this group te	end to form? Why?	_
2.	Draw the Lewis	Dot Diagram for the following:		
	5:		5 ²⁻ :	
Ex	plain why the 2 ⁻ i	ion is the one that tends to typic	ally form.	
	•	ne periodic table is 5 located? _ e other elements in this group to	end to form? Why?	

B. Relating Valence Electrons to the Periodic Table

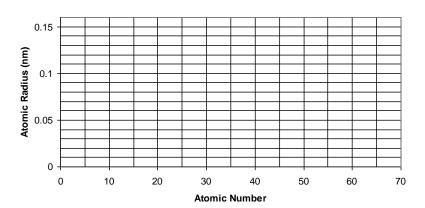
D. Atomic Radius, Ionization Energy, and the Periodic Table

The size of atoms is measured in terms of atomic radius, in units such as nanometers (1nm = 1×10^{-9} m). The ionization energy, or energy needed to remove an electron from a gaseous atom, is typically measured in kilojoules per mole of atoms. These quantities are related to position in the periodic table.

1. The radius of the first few atoms in Group 17 have been estimated to have the following values:

F (element 9): 0.064 nm Cl (17): 0.099 nm Br (35): 0.114 nm I (53): 0.133 nm

Graph these values versus atomic number in the grid.



Describe the relationship.

2. The radii of the first seven elements in Period 3 have been estimated to have the following values:

 Na (11):
 0.186 nm

 Mg (12):
 0.160 nm

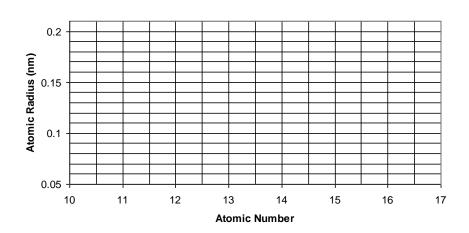
 Al (13):
 0.143 nm

 Si (14):
 0.117 nm

 P (15):
 0.110 nm

 S(16):
 0.104 nm

 Cl (17):
 0.099 nm



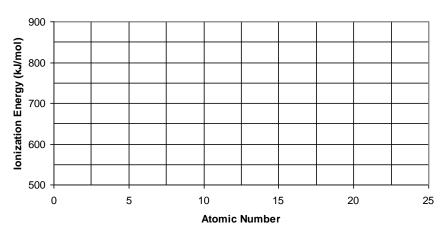
Graph these values versus atomic number in the grid.

Describe the relationship.

3. The ionization energies of the first three atoms in Group 2 are as follows:

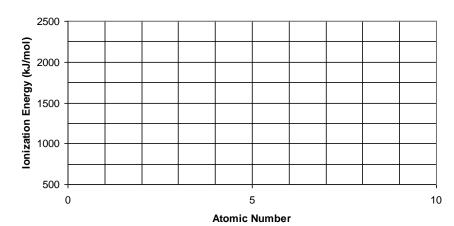
Be (4): 900 kJ/mol Mg (12): 736 kJ/mol Ca (20): 590 kJ/mol

Graph these values versus atomic number in the grid.



4. The ionization energies of the element in Period 2 are as follows:

Li (3)	519 kJ/mol
Be (4)	900 kJ/mol
B (5)	799 kJ/mol
C (6)	1088 kJ/mol
N (7)	1406 kJ/mol
O (8)	1314 kJ/mol
F (9)	1682 kJ/mol
Ne (10)	2080 kJ/mol



Graph these values versus atomic number in the grid.

Describe the relationship.

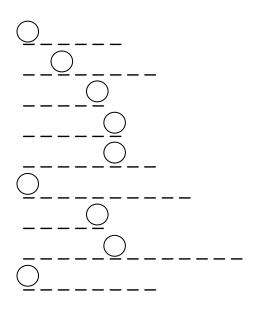
E. Periodic Table Word Scramble

Use the clues provided to help you unscramble the letters below to form words related to this package. The letters in the circles will then spell out the name of a famous scientist.

Clues

- 1. Na, Mg, Ca and Fe for example
- 2. Charged particle
- 3. An unreactive element
- 4. K to Kr, for example
- 5. Cl and I for example
- 1. SALMTE
- 2. NCLRETEO
- 3. NGORA
- 4. EPODIR
- 5. NHELOAGS
- 6. ALAENHNDTI
- 7. OLBEN
- 8. INEETLOSICCRO
- 9. NAVIMAUD

- 6. A series
- 7. Like neon
- 8. Rb⁺ and Kr, for example
- 9. A transition metal



Name: _____