

THIS COMPLETED STUDY GUIDE IS DUE 12/16/15 AS PART OF THE UNIT 3 PACKET.

ALT 3 LT3a Flame Tests and Electron Structure

What evidence is there that certain atoms are present in a compound?

Why do elements in the same group in the periodic table have similar properties?

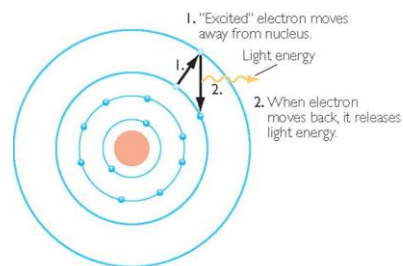
Key Vocabulary: *Know the following terms from Unit 3 Introduction handout.*

- Core electron (p. 93):
- Electron configuration (p. 118):
- Flame Test (p. 88):
- Valence electron (p. 93):
- Valence shell (p. 93):

Answer these review questions using your handouts, notes, and the text book.

___ 1. Use Data Table 1 to determine the flame color produced in a flame test for copper nitrate ($\text{Cu}(\text{NO}_3)_2$)

Compound	Flame color
$\text{Ba}(\text{NO}_3)_2$	Green
$\text{Cu}(\text{NO}_3)_2$	Blue-green
CaCl_2	Orange



- A. Blue
- B. Orange
- C. Green
- D. Blue-green

2. When you test sodium chloride in the flame of a Bunsen burner, the flame turns yellow-orange. **Explain** the process that is responsible for the flame color. Refer to Bohr Model above or p. 88.

Big Idea: The arrangement of atoms in the periodic table reflects the arrangement of electrons in the atom.

3. For the main group elements, explain how to use the periodic table to determine the number of valence electrons.

4. For a main group element, explain how to use the periodic table to determine how many electron shells to include in its shell model.

5. Apply your knowledge of electron configurations and the periodic table to fill in the following information for the elements listed.

Element Symbol	Element Name	# total electrons	# valence electrons	# core electrons	# of electron shells
Li					
Na					
Be					
Sr					
N					
P					
O					
S					
F					
Cl					

6. Drawing Shell Models of Atoms.

- Draw the nucleus and write in the correct number of protons.
- Use the period # to decide how many electron shells to draw around it _____.
- Draw in the electrons until you have the total number of core and valence electrons.
 - Shell #1 holds 2 electrons (closest to the nucleus!)
 - Shell #2 holds up to 8 electrons.
 - Shell #3 can hold up to 18 but for elements atomic number 1-18 it holds up to 8 electrons.
 - Shell #4 can hold up to 32 but for elements atomic number 19-36 it is the valence shell and holds up to 8

Draw a Shell Model of Beryllium (Be)	Draw a shell model of Fluorine
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7. Read the summary on p. 94 of the text book. Why do elements in the same group tend to have similar properties?

Retest ALT 1 LT1.c Periodic Table Patterns + New Patterns from Unit 3

Vocabulary: Know these key terms for the Periodic table.

- Group (p.46)
- Period (p. 46)
- Main group elements (p. 46)
- Transition elements (p. 46)
- Alkali Metals (p. 46)
- Alkaline Earth Metals (p. 46)
- Halogens (p. 46)
- Noble gases (p. 46)

12. Label the periodic table using the vocabulary words above.

H 1																	He 2																														
Li 3	Be 4											B 5	C 6	N 7	O 8	F 9	Ne 10																														
Na 11	Mg 12											Al 13	Si 14	P 15	S 16	Cl 17	Ar 18																														
K 19	Ca 20	Sc 21	Ti 22	V 23	Cr 24	Mn 25	Fe 26	Co 27	Ni 28	Cu 29	Zn 30	Ga 31	Ge 32	As 33	Se 34	Br 35	Kr 36																														
Rb 37	Sr 38	Y 39	Zr 40	Nb 41	Mo 42	Tc 43	Ru 44	Rh 45	Pd 46	Ag 47	Cd 48	In 49	Sn 50	Sb 51	Te 52	I 53	Xe 54																														
Cs 55	Ba 56			Hf 72	Ta 73	W 74	Re 75	Os 76	Ir 77	Pt 78	Au 79	Hg 80	Tl 81	Pb 82	Bi 83	Po 84	At 85	Rn 86																													
Fr 87	Ra 88			104	105	106	107	108	109																																						
<table border="1" style="border-collapse: collapse; text-align: center; width: 100%;"> <tr> <td>La 57</td> <td>Ce 58</td> <td>Pr 59</td> <td>Nd 60</td> <td>Pm 61</td> <td>Sm 62</td> <td>Eu 63</td> <td>Gd 64</td> <td>Tb 65</td> <td>Dy 66</td> <td>Ho 67</td> <td>Er 68</td> <td>Tm 69</td> <td>Yb 70</td> <td>Lu 71</td> </tr> <tr> <td>Ac 89</td> <td>Th 90</td> <td>Pa 91</td> <td>U 92</td> <td>Np 93</td> <td>Pu 94</td> <td>Am 95</td> <td>Cm 96</td> <td>Bk 97</td> <td>Cf 98</td> <td>Es 99</td> <td>Fm 100</td> <td>Md 101</td> <td>No 102</td> <td>Lr 103</td> </tr> </table>																		La 57	Ce 58	Pr 59	Nd 60	Pm 61	Sm 62	Eu 63	Gd 64	Tb 65	Dy 66	Ho 67	Er 68	Tm 69	Yb 70	Lu 71	Ac 89	Th 90	Pa 91	U 92	Np 93	Pu 94	Am 95	Cm 96	Bk 97	Cf 98	Es 99	Fm 100	Md 101	No 102	Lr 103
La 57	Ce 58	Pr 59	Nd 60	Pm 61	Sm 62	Eu 63	Gd 64	Tb 65	Dy 66	Ho 67	Er 68	Tm 69	Yb 70	Lu 71																																	
Ac 89	Th 90	Pa 91	U 92	Np 93	Pu 94	Am 95	Cm 96	Bk 97	Cf 98	Es 99	Fm 100	Md 101	No 102	Lr 103																																	

13. Which of the following are nonmetals? Circle all that apply.

- | | | | |
|------------|--------------|-------------|---------------|
| Boron (B) | Calcium (Ca) | Copper (Cu) | Selenium (Se) |
| Carbon (C) | Cobalt (Co) | Radon (Rn) | Thallium (Tl) |

14. What is the pattern in valence electrons across the 2nd period of the periodic table?

15. What is the pattern of valence electrons down one of the main groups (ie. Group 1A,2A,3A,4A, 5A, 6A, 7A, and 8A)?

16. Applying your new knowledge of valence electrons and Noble Gas envy explain why the Group 1A Alkali Metals and Group 7A Halogens are the most reactive elements on the periodic table. You might consider drawing a few diagrams to enhance your explanation.