

**Practice:**

1. Fill in the chart for Bohr Models

*So has same # of p<sup>+</sup> as e<sup>-</sup>*

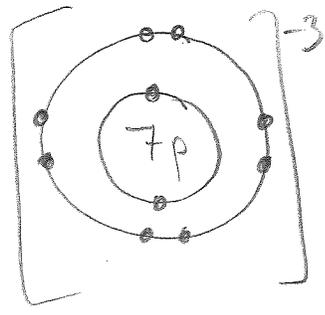
Element	Bohr Diagram of neutral atom	# electrons gained/lost	Charge on the ion	Bohr Diagram of ion
<i>do as an example</i> Na #11		1 lost	+1	
B #5		3 lost (or 5 gained)	+3 (-5)	
N #7		3 gained	-3	
S #16		2 gained	-2	

2. Draw the following ions without drawing the atom first. Use the ion charge for each element to help you.

**Note:** If the ion charge is +, the electrons have been given away; if the ion charge is -, electrons have been gained

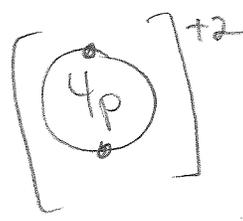
i) Nitrogen (Bohr model)  
#7

*-3  
(so has gained 3e<sup>-</sup> to fill shell)*



ii) Beryllium (Bohr model)  
#4

*+2  
(so has lost 2e<sup>-</sup> to have full shell)*



3. Ions Chart: Use the periodic table to complete the following table of ions/atoms.

Symbol	Charge	Atom or Ion ?	Number of Protons	Number of electrons
F	0	Atom	9	9
Al <sup>+3</sup>	+3	Ion	13	10
C	0	Atom	6	6
I <sup>-1</sup>	-1	Ion	53	54
Ar	0	Atom	18	18
Ca <sup>+2</sup>	+2	Ion	20	18
Si	0	Atom	14	14
N <sup>-3</sup>	-3	Ion	7	10
H	0	Atom	1	1
Ne	0	Atom	10	10
Na <sup>+1</sup>	+1	Ion	11	10
Cl <sup>-1</sup>	-1	Ion	17	18
He	0	Atom	2	2
Fe <sup>+3</sup>	+3	Ion	26	23
U <sup>+3</sup>	+3	Ion	92	89

↑  
determines  
which  
element  
you  
have!

**CHAPTER 4**

**Understanding Lewis Diagrams**

**BLM 2-9**

**Goal** • Demonstrate your understanding of Lewis diagrams.

**What to Do**

1. Complete the following table.

Name of Element	row# Period Number	column # Group Number	row # Number of Energy Levels	Number of Valence Electrons
helium	1	18	1	2 ← an exception
Aluminium	3	13	3	3
Oxygen	2	16	2	6
strontium # = 38	5	2	5	2
Silicon	3	14	3	4
barium	6	2	6	2

Handwritten notes on the left margin:  
~~72~~  
~~50~~  
~~32~~  
~~18e~~  
~~8e~~  
~~2e~~  
 ?

Same

column # (-10 if needed)

# of e<sup>-</sup> in outer shell

Higher shells allow more than 8 e<sup>-</sup>  
 - don't need to know that though

2. Draw the missing Lewis diagrams in the following table. Refer to a periodic table as necessary.

H						He:	
Li	Be	B	C	N	O	F	Ne
Na	Mg	Al	Si	P	S	Cl	Ar

no circles  
 only show electrons in outershell - short cut!

# Bohr Diagrams and Lewis Diagrams

**Goal** • Practise drawing Bohr diagrams and Lewis diagrams.

## What to Do

Complete the following table by drawing both the Bohr diagram and Lewis diagram for each element. The first row is completed as an example.

*atomic # = # of e<sup>-</sup> = # of protons*

Name of Element	Bohr Diagram	Lewis Diagram
carbon (6)		
oxygen (8)		
lithium (3)		
chlorine (17)		
magnesium (12)		
phosphorus (15)		

*only shows e<sup>-</sup> in outer shell.*

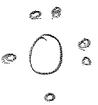
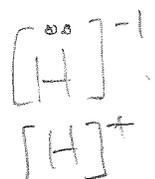
only look at  
outer shell, pretend  
inner ones don't  
exist!

1,2  
2,8 X 2,2  
2,8

Key

Practice:

1. Fill in the chart for Lewis Models

Element	# of Valence Electrons	Lewis Dot Diagram of Neutral Atom	# electrons gained/lost	Charge on Ion	Lewis Dot Diagram of <u>ion</u>
P #15 2,8,5	5		3 gained to fill shell	3-	
N #7 2,5	5		3 gained	3-	
Li #3 2,1	1		1 lost	1+	
O #8 2,6	6		2 gained	2-	
H #1 1	1		1- gained or lose 1	1- 1+	
He #2 2	2		0 gained	0	n/a
K #19 2,8,8,1	1		lose 1 e-	1+	

example:

Students do:  
↓

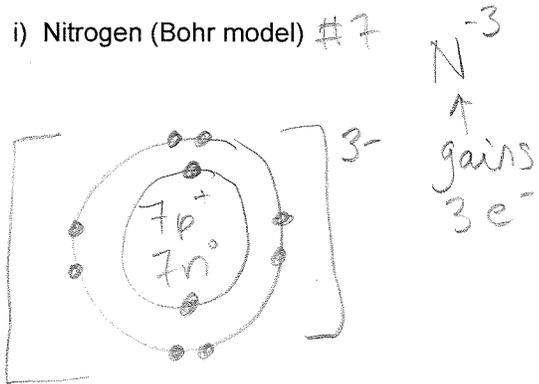
brackets for these? ion charges?

↑  
ions always have either full or empty outer shell in Lewis.

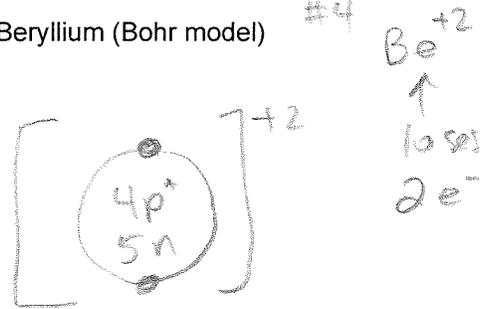
2. Draw the following ions without drawing the neutral atom first. Use the ion charge for each element to help you.

**Note:** If the ion charge is +, the electrons have been given away; if the ion charge is -, electrons have been gained

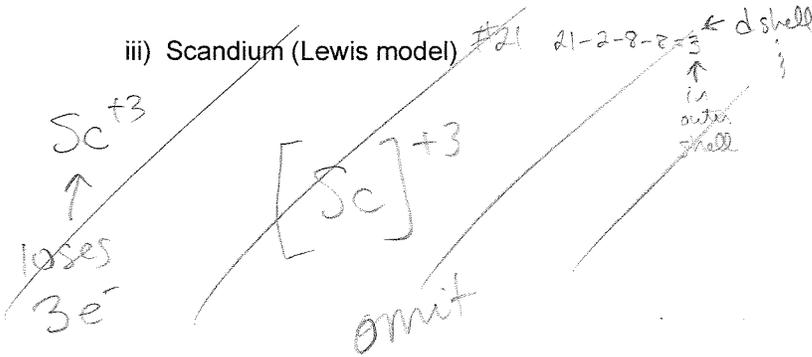
i) Nitrogen (Bohr model) #7



ii) Beryllium (Bohr model) #4



iii) Scandium (Lewis model) #21



only do up  
to #20 calcium

iv) Sulphur (Lewis model) #16

