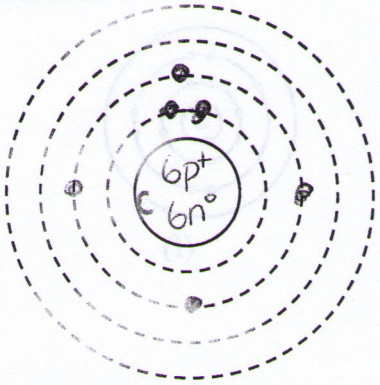
NAME Key

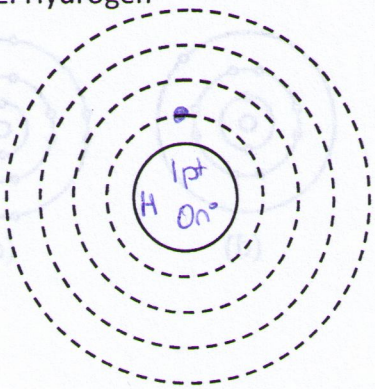
BLOCK

Bohr Model Practice

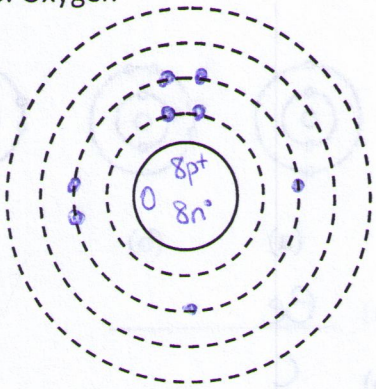
1. Carbon



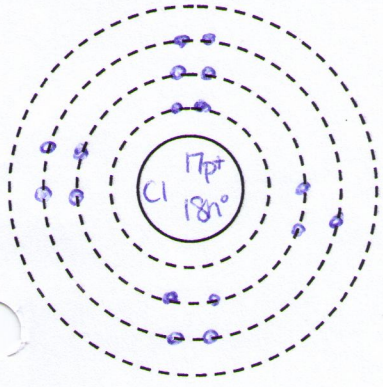
2. Hydrogen



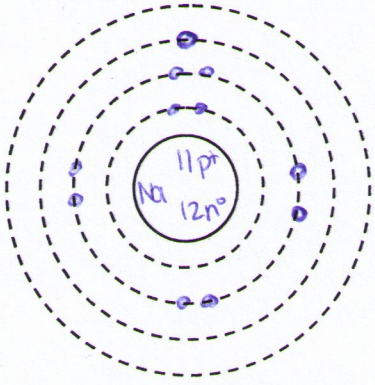
3. Oxygen



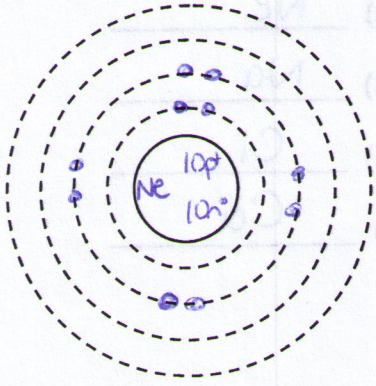
4. Chlorine



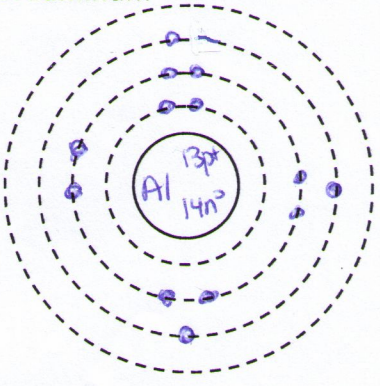
5. Sodium



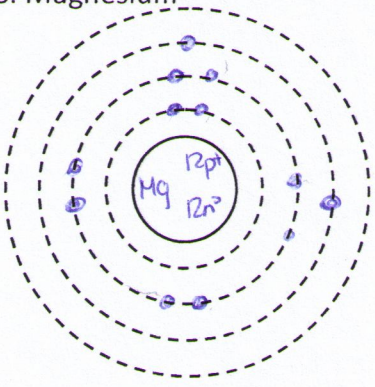
6. Neon



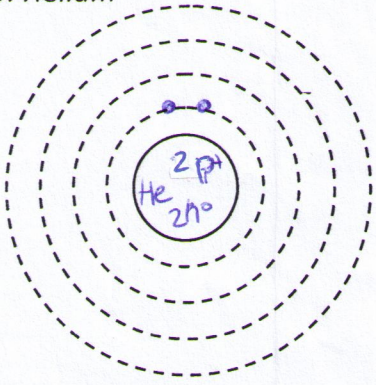
7. Aluminum



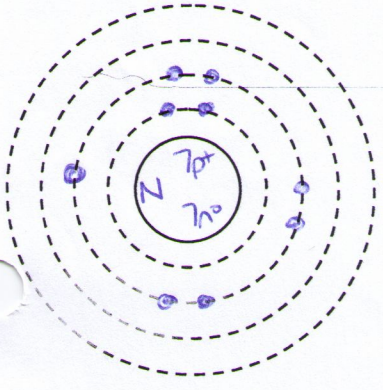
8. Magnesium



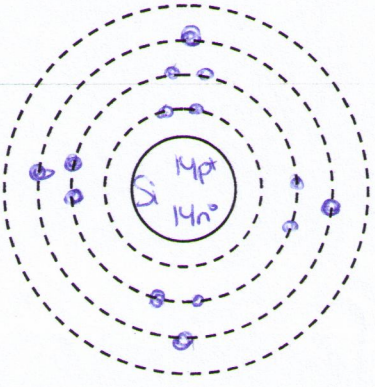
9. Helium



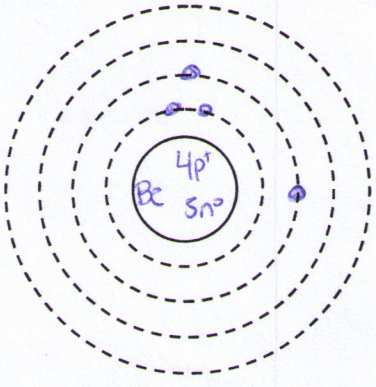
10. Nitrogen



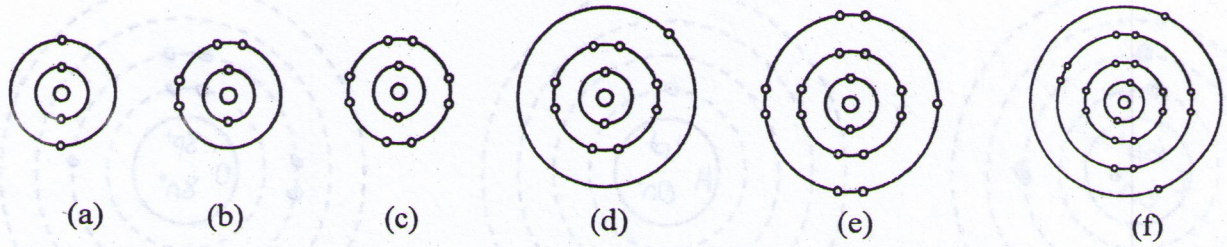
11. Silicon



12. Beryllium



Identify the elements whose Bohr model diagrams are shown below. Write the names of the elements in the spaces provided.



(a) (b) (c) (d) (e) (f)

(a) Be

(b) C

(c) Ne

(d) Na

(e) Cl

(f) Ca

Name _____ Date _____

Applying Knowledge
Section 2.3

Use with textbook pages 64–67.

The number game with atoms and ions

1. Complete the following sentences using the terms in parentheses.

   (a) The atomic ___number___ (number/mass) of an element is the same as the number of protons in the nucleus of an atom.

   (b) An ___atom___ (atom/ion) of an element has the same number of protons as electrons.

   (c) A positively charged ion has ___Lost___ (lost/gained) electrons.

   (d) A negatively charged ion has ___gained___ (lost/gained) electrons.

2. Complete the following table. Some answers are provided to help guide you. You can refer to the Bohr model chart on page 32 and the periodic table on page 202.

Element name	Atomic number	Ion charge	Atom or ion?	Number of protons	Number of electrons
beryllium	4	2+	ion	4	2
Sodium	11	0	atom	11	11
Argon	18	0	atom	18	18
chlorine	17	0	atom	17	17
Nitrogen	7	3–	ion	7	10
calcium	20	0	atom	20	20
Sulphur	16	2–	ion	16	18
Lithium	3	+	ion	3	2
Aluminum	13	3+	ion	13	10

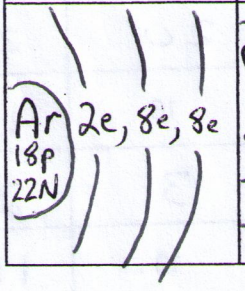
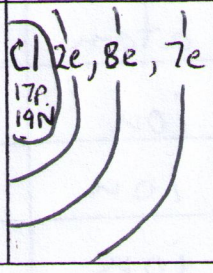
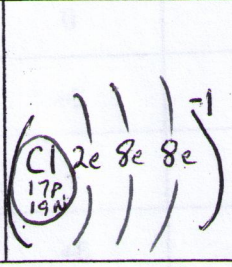
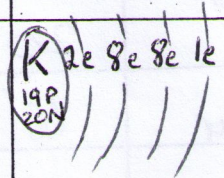
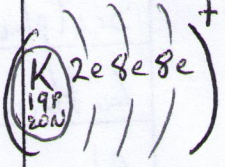
Use with textbook pages 64–67.

Drawing Bohr model diagrams

1. Refer to the Bohr model chart on page 32 to help you complete the following table. Some answers are provided for you. (Hint: Remember that the maximum number of electrons in the first three shells is 2, 8, and 8.)

Atom/ion	Atomic number	Number of protons	Number of electrons	Number of electron shells
neon atom	10	10	10	2
fluorine atom	9	9	9	2
fluorine ion	9	9	10	2
sodium atom	11	11	11	3
sodium ion	11	11	10	2
argon atom	18	18	18	3
chlorine atom	17	17	17	3
chlorine ion	17	17	18	3
potassium atom	19	19	19	4
potassium ion	19	19	18	3

2. Use the table above to draw the Bohr model diagram for the following atoms and ions.

Argon atom	Chlorine atom	Chlorine ion	Potassium atom	Potassium ion
				

3. What do you notice about the arrangement of electrons in the Bohr model of a neon atom, fluorine ion, and a magnesium ion?

All have the same electron configuration (2 complete Energy Levels

4. What would you expect to see with the arrangement of electrons in the Bohr model of an argon atom, chlorine ion, and a potassium ion?

All have the same electron configuration (3 complete Energy lev

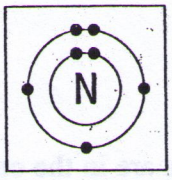
Name _____ Date _____

Interpreting Illustrations
Section 2.3

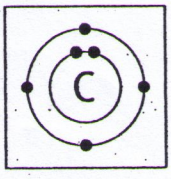
Use with textbook pages 64–67.

Analyzing Bohr model diagrams

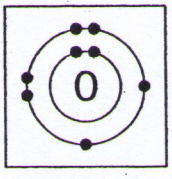
Fill in the blanks beside each Bohr model diagram. The first one has been partially completed to help guide you.

1. 

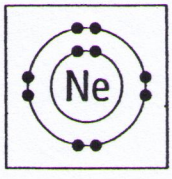
(a) number of protons 7
(b) number of shells 2
(c) number of electrons 7
(d) number of valence electrons 5
(e) Bohr model of a nitrogen atom

2. 

(a) number of protons 6
(b) number of shells 2
(c) number of electrons 6
(d) number of valence electrons 4
(e) Bohr model of a Carbon atom

3. 

(a) number of protons 8
(b) number of shells 2
(c) number of electrons 8
(d) number of valence electrons 6
(e) Bohr model of an Oxygen atom

4. 

(a) number of protons 10
(b) number of shells 2
(c) number of electrons 10
(d) number of valence electrons 8
(e) Bohr model of a Neon atom

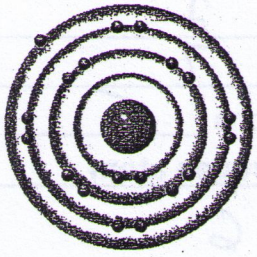
5. The four elements above are in the same period. What do you notice about the number of shells for elements belonging to the same period?

All have the same number of Energy levels.

Use with textbook pages 64–67.

The periodic table and atomic theory

Use the following Bohr model to answer questions 1 to 6.



Match the Term on the left with the corresponding Number on the right. Each Number may be used more than once. Refer to the diagram above.

Term	Number
1. E number of shells	A. 0
2. F number of protons	B. 1
3. F total number of electrons	C. 2
4. B number of valence electrons	D. 3
5. B number of electron(s) it has to lose to become stable	E. 4
6. D number of shells holding the maximum number of electrons	F. 19
	G. 20

Circle the letter of the best answer.

7. What is the maximum number of electrons that the first electron shell can hold?

A. 1

B. 2

C. 4

D. 8

Use the periodic table on page 202 to answer questions 8 to 12.

8. How many electrons are in the outermost shell of a sulphur (S) atom?

A. 1

B. 2

C. 6

D. 7

9. How many electrons are in the outermost shell of a fluorine (F) ion?

A. 1

B. 2

C. 7

D. 8

10. How many shells are there in the Bohr model of an aluminum (Al) atom?

A. 1

B. 2

C. 3

D. 4

11. Which of the following represents the Bohr model electron arrangement of a chlorine (Cl) atom?

A. 2, 15

B. 2, 2, 13

C. 2, 8, 7

D. 2, 8, 8

12. What do a beryllium (Be) ion and a neon (Ne) atom have in common?

A. They have full outer shells.

B. They have the same number of electrons.

C. They have the same number of electron shells.

D. None of the above

Key

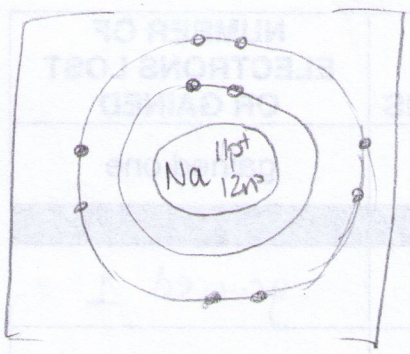
Science 9: Chemistry

Name:_____

Bohr Models of Ions: Practice

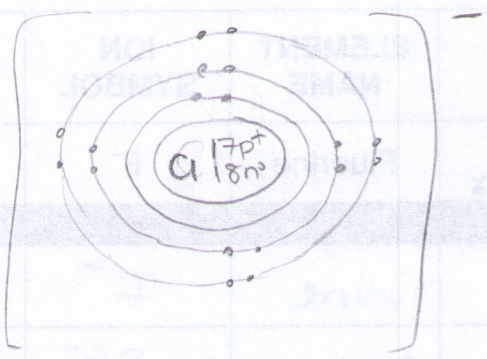
Draw Bohr models of the following **ions**. Include: symbol, protons, neutrons, electrons and ion charge using brackets. You will need to use your periodic table!

Na^+

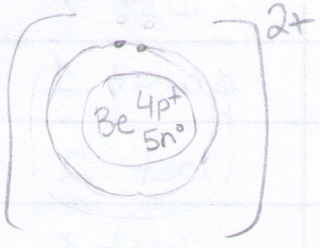


Cl^-

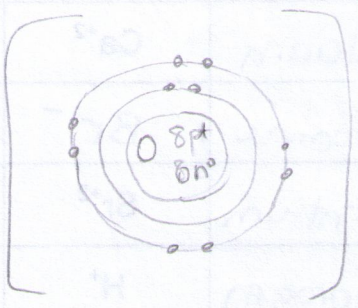
#e⁻ = #p⁺ + 1
= 18e⁻



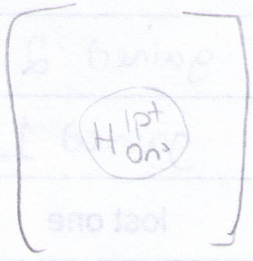
Be^{2+}



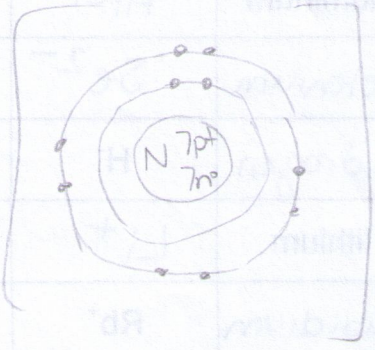
O^{2-}



H^+



N^{3-}



NAME: Key

Reminders:
1. In a neutral atom the number of protons equals the number of electrons.
2. An atom can NEVER gain or lose protons
3. The number of protons equals the atomic number

Ion Practice Set

1. What is an ion?

2. What does the number next to the ions signify?

Complete the following table, using the periodic table in the back of your book.

	ELEMENT NAME	ION SYMBOL	NUMBER OF PROTONS	NUMBER OF ELECTRONS	NUMBER OF ELECTRONS LOST OR GAINED
ex	Fluorine	F^-	9	10	gained one
1	Iodine	I^-	53	54	gained 1
2	Sulphur	S^{2-}	16	18	gained two
3	potassium	K^+	19	18	lost one
4	Calcium	Ca^{+2}	20	18	lost 2
5	Bromine	Br^-	35	36	gained 1
6	Strontium	Sr^{+2}	38	36	lost 2
7	Hydrogen	H^+	1	0	lost 1
8	Oxygen	O^{2-}	8	10	gained two
9	Magnesium	Mg^{2+}	12	10	lost two
10	aluminum	Al^{3+}	13	10	lost 3
11	Selenium	Se^{2-}	34	36	gained 2
12	Hydrogen	H^-	1	2	gained 1
13	lithium	Li^+	3	2	lost one
14	Rubidium	Rb^+	37	36	lost 1
15	Chlorine	Cl^-	17	18	gained 1