

Interactive Classroom

Glencoe Science

CHEMISTRY

MATTER AND CHANGE

Chapter 6

The Periodic Table and
Periodic Law

**Mc
Graw
Hill** **Glencoe**

Click the mouse button or press the Space Bar to continue.

Section 6.2 Classification of the Elements

Objectives

- **Explain** why elements in the same group have similar properties.
- **Identify** the four blocks of the periodic table based on their electron configuration.

MAIN Idea

Elements are organized into different blocks in the periodic table according to their electron configurations.

Review Vocabulary

valence electron:

electron in an atom's outermost orbitals; determines the chemical properties of an atom



Organizing the Elements

- Recall electrons in the highest principal energy level are called valence electrons.
- All group 1 elements have one valence electron.

Table 6.3		Electron Configuration for the Group 1 Elements	
Period 1	hydrogen	$1s^1$	$1s^1$
Period 2	lithium	$1s^2 2s^1$	$[\text{He}]2s^1$
Period 3	sodium	$1s^2 2s^2 2p^6 3s^1$	$[\text{Ne}]3s^1$
Period 4	potassium	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$	$[\text{Ar}]4s^1$



Organizing the Elements by Electron Configuration (cont.)

- The energy level of an element's valence electrons indicates the period on the periodic table in which it is found.
- The number of valence electrons for elements in groups 13-18 is ten less than their group number.



Organizing the Elements by Electron Configuration (cont.)

	1								18
1	H·								He:
2	Li·	Be·		·B·	·C·	·N·	·O·	·F·	·Ne:
3	Na·	Mg·		·Al·	·Si·	·P·	·S·	·Cl·	·Ar:
4	K·	Ca·		·Ga·	·Ge·	·As·	·Se·	·Br·	·Kr:
5	Rb·	Sr·		·In·	·Sn·	·Sb·	·Te·	·I·	·Xe:
6	Cs·	Ba·		·Tl·	·Pb·	·Bi·	·Po·		·Rn:



- Valance Electrons = electrons in the outer energy shell.
- Increasing number that matches the family number of the element (minus the teen value)

Symbol	Li	Be	B	C	N	O	F	Ne
Family	1 (1A)	2 (2A)	13 (3A)	14 (4A)	15 (5A)	16 (6 A)	17 (7A)	18 (8A)
Valence E's	1	2	3	4	5	6	7	8



- Valence Number = Number of electrons lost, shared or gained in chem. rxns
- Number increases to the center of the table, then decreases to the right of the table.

Symbol	Li	Be	B	C	N	O	F	Ne
Valence E's	1	2	3	4	5	6	7	8
Valence Number	1	2	3	4	3	2	1	0

+ = lose e's

- = gains e's

0=no reaction



The Modern Periodic Table (cont.)

PERIODIC TABLE OF THE ELEMENTS

1

Hydrogen

1

H

1.008

2

Beryllium

4

Be

9.012

3

Lithium

3

Li

6.941

4

Sodium

11

Na

22.990

5

Potassium

19

K

39.098

6

Rubidium

37

Rb

85.468

7

Cesium

55

Cs

132.905

8

Francium

87

Fr

(223)

9

Magnesium

12

Mg

24.305

10

Calcium

20

Ca

40.078

11

Strontium

38

Sr

87.62

12

Barium

56

Ba

137.327

13

Radium

88

Ra

(226)

14

Scandium

21

Sc

44.956

15

Yttrium

39

Y

88.906

16

Lanthanum

57

La

138.905

17

Actinium

89

Ac

(227)

18

Titanium

22

Ti

47.867

19

Zirconium

40

Zr

91.224

20

Hafnium

72

Hf

178.49

21

Rutherfordium

104

Rf

(261)

22

Vanadium

23

V

50.942

23

Niobium

41

Nb

92.906

24

Tantalum

73

Ta

180.948

25

Dubnium

105

Db

(262)

26

Chromium

24

Cr

51.996

27

Molybdenum

42

Mo

95.94

28

Seaborgium

106

Sg

(266)

29

Manganese

25

Mn

54.938

30

Technetium

43

Tc

(98)

31

Rhenium

75

Re

186.207

32

Iron

26

Fe

55.847

33

Ruthenium

44

Ru

101.07

34

Rhodium

45

Rh

102.906

35

Rosmium

107

Bh

(264)

36

Cobalt

27

Co

58.933

37

Ruthenium

44

Ru

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Rhodium

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Cu

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Germanium

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Ge

72.61

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Arsenic

33

As

74.922

46

Selenium

34

Se

78.96

47

Bromine

35

Br

79.904

48

Krypton

36

Kr

83.80

49

Palladium

46

Pd

106.42

50

Silver

47

Ag

107.868

51

Cadmium

48

Cd

112.411

52

Indium

49

In

114.82

53

Tin

50

Sn

118.710

54

Antimony

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Sb

121.757

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Platinum

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Pt

195.08

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Gold

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Mercury

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Hg

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204.383

62

Lead

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207.2

63

Bismuth

83

Bi

208.980

64

Polonium

84

Po

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65

Astatine

85

At

209.987

66

Radon

86

Rn

222.018

67

Darmstadtium

110

Ds

(281)

68

Roentgenium

111

Rg

(272)

69

Ununbium

112

Uub

(285)

70

Ununtrium

113

Uut

(284)

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Ununquadium

114

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(289)

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Section 6.1 Assessment



What is a row of elements on the periodic table called?

- A. octave
- B. period**
- C. group
- D. transition

