Arranging the Elements

Objectives

- **Describe** how Mendeleev arranged elements in the first periodic table.
- **Explain** how elements are arranged in the modern periodic table.
- **Compare** metals, nonmetals, and metalloids based on their properties and on their location in the periodic table.
- **Describe** the difference between a period and a group.

I. Discovering a Pattern

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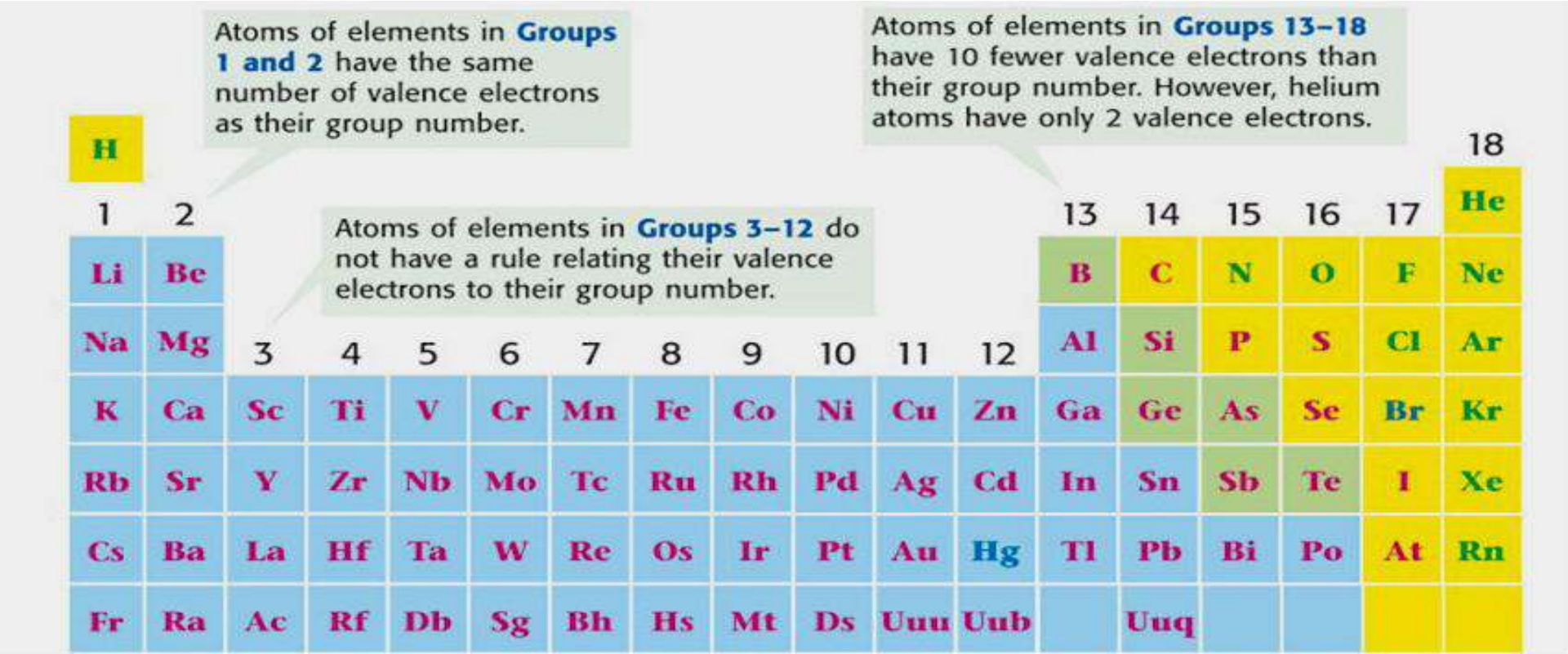
A. Periodic Properties of the Elements Mendeleev saw that when the elements were arranged in order of increasing atomic mass, those that had similar properties occurred in a repeating pattern.

B. **Predicting Properties of Missing Elements** When Mendeleev was forming the periodic table, all of the elements had been discovered yet. He used the periodic table to accurately predict the properties of the missing elements.

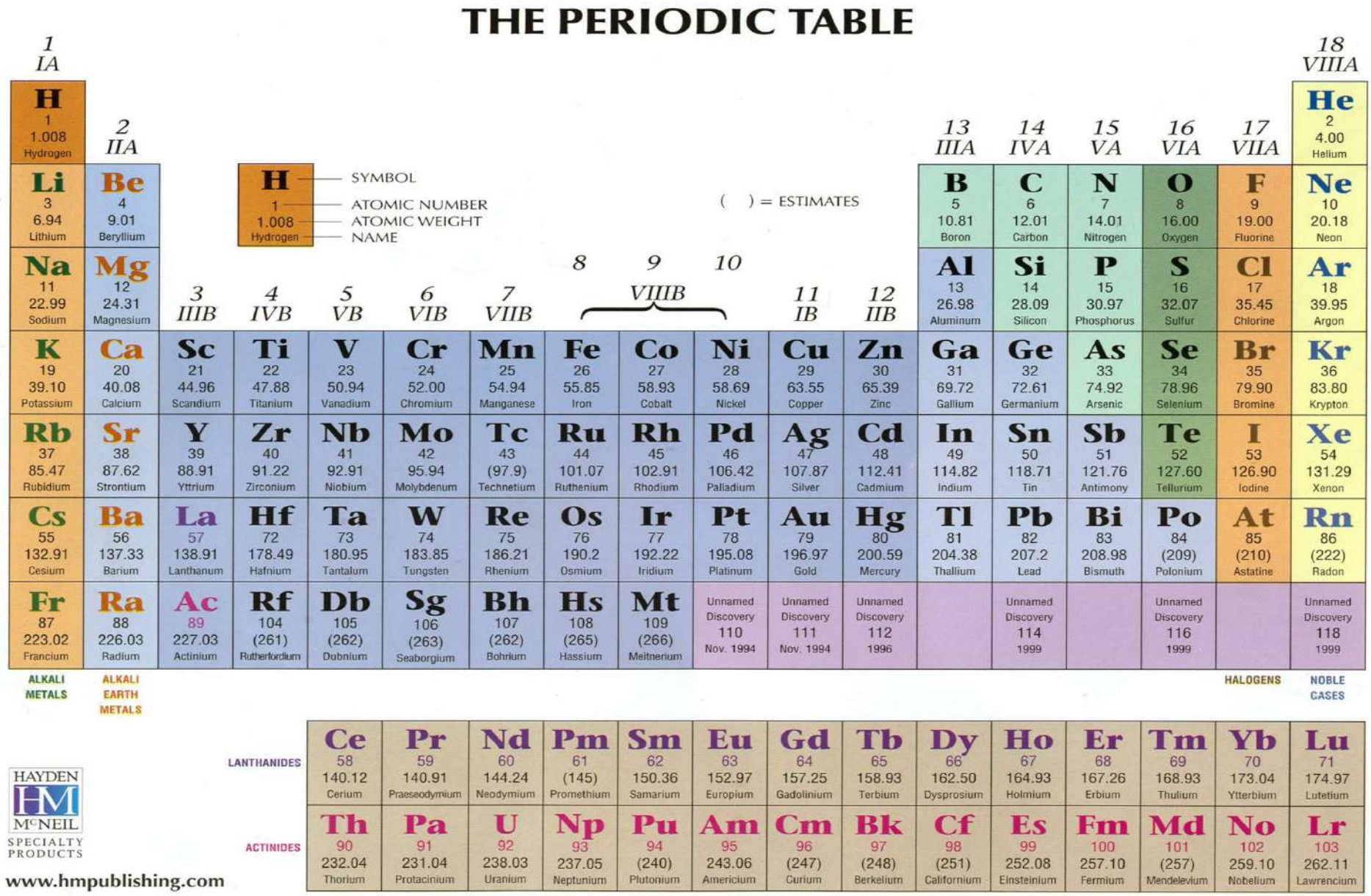
I	II	III	IV	V	VI	VII	VIII		
H 1.01									
Li 6.94	Be 9.01	B 10.8	C 12.0	N 14.0	O 16.0	F 19.0			
Na 23.0	Mg 24.3	Al 27.0	Si 28.1	P 31.0	S 32.1	Cl 35.5			
K 39.1	Ca 40.1		Ti 47.9	V 50.9	Cr 52.0	Mn 54.9	Fe 55.9	Co 58.9	Ni 58.7
Cu 63.5	Zn 65.4			As 74.9	Se 79.0	Br 79.9			
Rb 85.5	Sr 87.6	Y 88.9	Zr 91.2	Nb 92.9	Mo 95.9		Ru 101	Rh 103	Pd 106
Ag 108	Cd 112	In 115	Sn 119	Sb 122	Te 128	I 127			
Ce 133	Ba 137	La 139		Ta 181	W 184		Os 194	Ir 192	Pt 195
Au 197	Hg 201	Ti 204	Pb 207	Bi 209					
			Th 232		U 238				

II. Changing the Arrangement

A. Adding Elements All of the more than 30 elements discovered since 1914 follow the periodic law. The periodic law states that the repeating chemical and physical properties of elements change periodically with the elements' atomic numbers.



- [Periodic Table]



III. The Periodic Table and Classes of Elements

A. Metals Most elements are metals. Metals are found to the left of the zigzag line on the periodic table.

B. **Nonmetals** Nonmetals are found to the right of the zigzag line on the periodic table.

C. **Metalloids** Metalloids, also called semiconductors, are the elements that border the zigzag line on the periodic table.

IV. Decoding the Periodic Table

A. Each Element Is Identified by a Chemical Symbol Each square on the periodic table includes an element's name, chemical symbol, atomic number, and atomic mass.

B. **Rows Are Called *Periods*** Each horizontal row of elements (from left to right) on the periodic table is called a period.

C. **Columns Are Called *Groups*** Each vertical column of elements (from top to bottom) on the periodic table is called a group.