

LESSON | What is the periodic 14 | table of elements?

By the mid-1800s, 60 elements were known. Scientists had quite a bit of information about these elements. But, the information was not organized, so it was not very useful. In 1869, a Russian scientist named Dmitri Mendeleev [duh-MEE-tree men-duh-LAY-uf] made a chart of the known elements. Since that time, more elements have been discovered and added to the chart. The chart is called the **periodic table of the elements**. Every country uses the same periodic table.

In the periodic table, elements are arranged in order of their atomic numbers. With a couple of exceptions, atomic numbers are in the same order as atomic masses. That is, the lightest element has the lowest atomic number; the heaviest element has the highest atomic number.

Look at the periodic table on page 81. Hydrogen has an atomic number of 1. It is the lightest element. Aluminum (Al) has an atomic number of 13. Only 12 elements are lighter than aluminum.

Each row across the periodic table is called a **period**. All the elements listed in a row belong to the same period. There are seven periods.

Each column in the periodic table is called a **group**, or family, of elements. All of the elements in a group have many similar properties. Each group is identified by a number. For example, the column of elements at the left side of the table is Group 1.

Elements can be divided into two types—**metals** and **nonmetals**. There are more metals than nonmetals. In the periodic table, metals are on the left, nonmetals are on the right. A heavy, step-like line separates the metals from the nonmetals. Hydrogen is in two places in the periodic table because it can act as a metal or a nonmetal.

PERIODIC TABLE OF ELEMENTS

GROUP 1 2 13 14 15 16 17 18

PERIOD 1 2 3 4 5 6 7

1 H Hydrogen 1.008	2 He Helium 4.003											13 B Boron 10.81	14 C Carbon 12.01	15 N Nitrogen 14.01	16 O Oxygen 16.00	17 F Fluorine 18.99	18 Ne Neon 20.18	
3 Li Lithium 6.94	4 Be Beryllium 9.01											13 Al Aluminum 26.98	14 Si Silicon 28.09	15 P Phosphorus 30.97	16 S Sulfur 32.06	17 Cl Chlorine 35.45	18 Ar Argon 39.95	
11 Na Sodium 22.99	12 Mg Magnesium 24.31	21 Sc Scandium 44.96	22 Ti Titanium 47.88	23 V Vanadium 50.94	24 Cr Chromium 51.99	25 Mn Manganese 54.94	26 Fe Iron 55.85	27 Co Cobalt 58.93	28 Ni Nickel 58.71	29 Cu Copper 63.54	30 Zn Zinc 65.39	31 Ga Gallium 69.72	32 Ge Germanium 72.64	33 As Arsenic 74.92	34 Se Selenium 78.96	35 Br Bromine 79.90	36 Kr Krypton 83.80	
37 Rb Rubidium 85.47	38 Sr Strontium 87.62	39 Y Yttrium 88.91	40 Zr Zirconium 91.22	41 Nb Niobium 92.91	42 Mo Molybdenum 95.94	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.91	46 Pd Palladium 106.42	47 Ag Silver 107.87	48 Cd Cadmium 112.41	49 In Indium 114.82	50 Sn Tin 118.71	51 Sb Antimony 121.76	52 Te Tellurium 127.60	53 I Iodine 126.91	54 Xe Xenon 131.30	
55 Cs Cesium 132.91	56 Ba Barium 137.34	57-70 La Series Lanthanum 138.91	71 Lu Lutetium 174.97	72 Hf Hafnium 178.49	73 Ta Tantalum 180.95	74 W Tungsten 183.85	75 Re Rhenium 186.21	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.97	80 Hg Mercury 200.59	81 Tl Thallium 204.38	82 Pb Lead 207.19	83 Bi Bismuth 208.98	84 Po Polonium 209	85 At Astatine 210	86 Rn Radon 222
87 Fr Francium 223	88 Ra Radium 226	89-102 Ac Series Actinium 227	103 Lr Lawrencium 260	104 Rf Rutherfordium 261	105 Ha Hassium 262	106 * * * * * * *	107 * * * * * * *	108 * * * * * * *	109 * * * * * * *									
Lanthanide Series																		
57 La Lanthanum 138.91	58 Ce Cerium 140.12	59 Pr Praseodymium 140.91	60 Nd Neodymium 144.24	61 Pm Promethium 145	62 Sm Samarium 150.36	63 Eu Europium 151.96	64 Gd Gadolinium 157.25	65 Tb Terbium 158.93	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93	68 Er Erbium 167.26	69 Tm Thulium 168.93	70 Yb Ytterbium 173.05					
Actinide Series																		
89 Ac Actinium 227	90 Th Thorium 232.04	91 Pa Protactinium 231.04	92 U Uranium 238.03	93 Np Neptunium 237	94 Pu Plutonium 244	95 Am Americium 243	96 Cm Curium 247	97 Bk Berkelium 247	98 Cf Californium 251	99 Es Einsteinium 252	100 Fm Fermium 257	101 Md Mendelevium 288	102 No Nobelium 289					

* Names for these elements have not been agreed upon.

METALS NONMETALS

Figure A

USING THE PERIODIC TABLE

Answer the questions about the periodic table. The complete periodic table at the end of the book will tell you the names of the elements.

- List the periods. _____
- List the groups. _____
- List the name, symbol, and atomic number of each element in Period 3.

Name	Symbol	Atomic Number

4. List the name, symbol, and atomic number of each element in Group 13.

Name	Symbol	Atomic Number
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

FINDING THE ELEMENT

The periods and families of five elements are listed below. Find each element in the Periodic Table. Then fill in the missing information.

	Period	Group	Elements	Symbol	Atomic Number
1.	2	16			
2.	3	1			
3.	4	8			
4.	1	18			
5.	6	12			

After you have completed the chart, answer the following questions about the elements on the chart.

- a) Which one of these elements is the lightest? _____
- b) You know it is the lightest because it has the _____
atomic number. highest, lowest

FINDING THE PERIODS AND GROUPS

The names of five elements are listed below. Find each element in the Periodic Table. Then fill in the missing information.

Period	Group	Element	Symbol	Atomic Number
		chlorine		
		potassium		
		neon		
		tin		
		krypton		

After you have completed the chart, answer the following questions about the elements on the chart.

1. Which of these elements are metals? _____
2. Which of these elements are nonmetals? _____
3. Two of these elements have many properties that are alike.
 - a) Name these elements. _____
 - b) We know they are alike because they are in the same _____
period, group
4. Name the metals that have properties like tin. _____

5. Name four elements that have properties similar to chlorine. _____

FILL IN THE BLANK

Complete each statement using a term or terms from the list below. Write your answers in the spaces provided. Some answers may be used more than once.

1869 group period sixty higher
Mendeleev Russia mass the same atomic number

1. The Periodic Table was put together by a man named _____ in the year _____.
2. The man who put together the Periodic Table came from _____.
3. The number of known elements in 1869 was _____.
4. The elements are listed according to _____.
5. Each element is given a number called its _____.
6. An atomic mass has to do with the _____ of an element.
7. A heavy element usually has a _____ atomic number than a light element does.
8. Elements in the same row across belong to the same _____.
9. Elements in the same up-and-down column belong to the same _____.
10. Elements of the same group have many properties that are _____.

COMPLETING SENTENCES

Choose the correct word or term for each statement. Write your choice in the spaces provided.

1. Elements in the same row across belong to the same _____
period, group
2. Elements in the same column down are members of the same _____
period, group
3. Elements that have many similar properties belong to the same _____
period, group
4. On the Periodic Table, metals are listed on the _____
right, left
5. On the Periodic Table, nonmetals are listed on the _____
right, left
6. There are more _____ than _____
metals, nonmetals metals, nonmetals
7. On the Periodic Table, elements are listed according to _____
alphabet, atomic number