

# AIM | How do scientists organize

## 11 | the elements on a chart?

People often need to put important information on a chart—like box scores for baseball. On a chart, you can see many facts in a short time.

Scientists needed a good chart to help them organize what they knew about chemical elements. In 1869, a Russian named Dmitri Mendeleev (men duh LAY uf) made a chart of the elements. At that time only 60 elements were known. Since then more elements have been discovered and added to Mendeleev's chart. We call this chart the *Periodic Table*. Just like the chemical symbols, the Periodic Table is the same in every country.

The Periodic Table shows the elements in the order of their weight. The lighter elements are first. The heavier elements follow. Each element has an *atomic number*. The atomic number tells where an element ranks in weight. The lowest number is for the lightest element. The highest number is for the heaviest element.

Look at the Periodic Table on page 63. Hydrogen has an atomic number of 1. It is the lightest element. Aluminum has an atomic number of 13. Only 12 elements are lighter than aluminum.

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

Each column down is a *group* or *family*. Elements in each column down belong to the same group. They have many properties that are the same. One group—Group VIII—has three columns.

Metal elements are on the left side of the Periodic Table. Nonmetals are on the right. There are more metals than nonmetals. Hydrogen is in two places because hydrogen can act as a metal or a nonmetal.

METALS																		NONMETALS																	
																		VII A	O																
																		1	2																
																		H	He																
																		III A	IV A	V A	VI A														
																		5	6	7	8	9	10												
																		B	C	N	O	F	Ne												
																		13	14	15	16	17	18												
																		Al	Si	P	S	Cl	Ar												
																		19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
																		K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
																		37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
																		Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
																		55	56	57-71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
																		Cs	Ba	Special series	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
																		87	88	89-103	104	105	106												
																		Fr	Ra	Special series	Rf	Ha	Not yet named												

↓ PERIODS

↓ GROUPS

Key: 1 Atomic Number, H Symbol

## USING THE PERIODIC TABLE

Check with the Periodic Table for the answers to each exercise. The complete chart on pages 184 and 185 will tell you names of the elements.

1. Listing the Periods and Groups

1. List the periods. \_\_\_\_\_

2. List the groups. \_\_\_\_\_

3. 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 IIIA.

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

5. Which group has more than one column? \_\_\_\_\_

## II. 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. One element, oxygen, has already been done for you. One has more than one answer.

Period	Family or Group	Elements	Symbol	Atomic Number
2	VIA	oxygen	O	8
3	IA			
4	VIII			
1	O			
6	IIB			

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

### III. 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

### IV. Naming Elements That Are Alike

1. Name the elements that have properties like zinc.  
\_\_\_\_\_
2. Name three elements that have properties similar to chlorine.  
\_\_\_\_\_

**COMPLETING SENTENCES**

Complete the sentences with the choices below. One of these may be used twice.

1869  
higher  
weight

group or family  
Mendeleev  
the same

period  
Russia  
atomic number

sixty

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 number has to do with the \_\_\_\_\_ of an element.
7. A heavy element 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 \_\_\_\_\_.

**CHOOSE ONE**

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

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