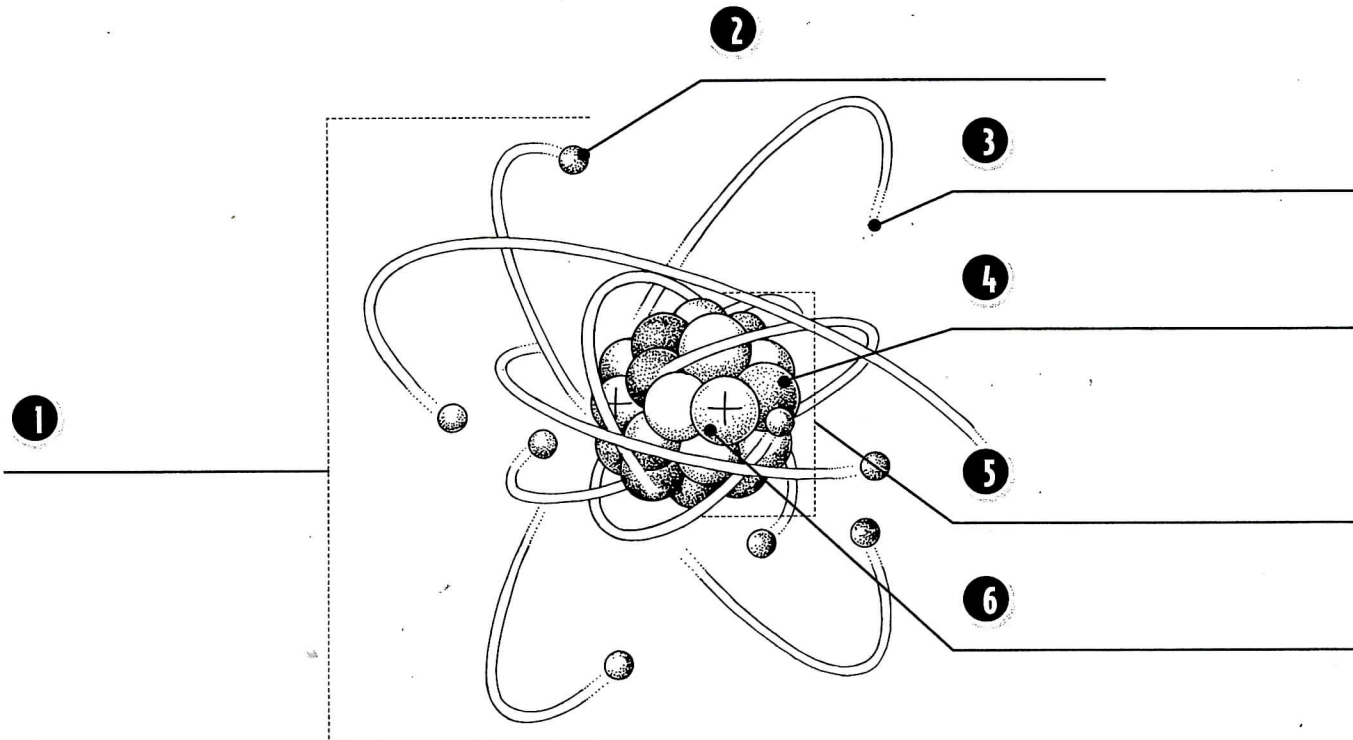


# The Atom

**Atoms** are the tiny building blocks of matter. All the matter on Earth is made up of various combinations of atoms. Atoms are the smallest particles of an element that still exhibit all the characteristics of that element. Use the terms in the word box to label the diagram of an atom. Then match each term to its definition. Most terms are used twice.

electron	electron orbit	neutron
nucleus	proton	atom



- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_
- 5 \_\_\_\_\_
- 6 \_\_\_\_\_
- 7 \_\_\_\_\_ This small particle of an atom carries a negative charge.
- 8 \_\_\_\_\_ Made up of the protons and neutrons, this part of the atom contains nearly all the mass of the atom.
- 9 \_\_\_\_\_ This small particle of an atom carries a neutral charge.
- 10 \_\_\_\_\_ This is the area where electrons travel around the nucleus.
- 11 \_\_\_\_\_ This is the basic building block of all matter.
- 12 \_\_\_\_\_ This small particle of an atom carries a positive charge.

# Setting the Table

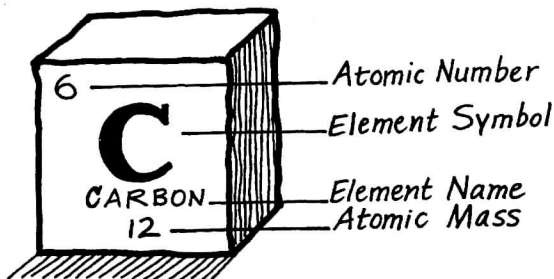
The periodic table is a chart of the chemical elements arranged to show patterns of chemical or physical properties. The elements are arranged on the table based on properties they have in common. Match each term to its definition. You can use the periodic table on page 20 as a reference.

alkali metals atomic number families rare earth metals	transition alkaline earth metals noble	metals naturally periods
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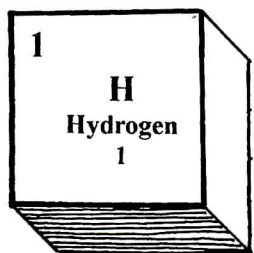
- 1 \_\_\_\_\_ Elements in the middle of the periodic table are known as these kinds of metals.
- 2 \_\_\_\_\_ These gases are considered inactive. They do not react with other elements.
- 3 \_\_\_\_\_ Most of the elements are considered to be these.
- 4 \_\_\_\_\_ These refer to Group I metals.
- 5 \_\_\_\_\_ Horizontal rows are called this.
- 6 \_\_\_\_\_ The elements are arranged by this.
- 7 \_\_\_\_\_ Vertical columns are called groups or this.
- 8 \_\_\_\_\_ These refer to Group II metals.
- 9 \_\_\_\_\_ For convenience, these are placed at the bottom so the periodic table does not become too wide to be represented in chart form.
- 10 \_\_\_\_\_ There are 92 elements, from hydrogen to uranium that occur in this manner.

# A WORLD-FAMOUS TABLE

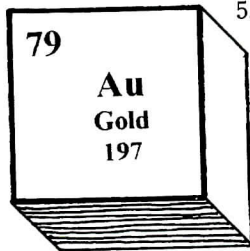
There is a table (not one for dinner) that's probably the most famous table of science. (You can find it in your physical science book or on page 52 of this book.) If you learn how to read it, you'll have quick access to important stuff about elements. It's called the Periodic Table (because it's written in rows, called periods). Build your skill at reading the Periodic Table by finding the missing information in the samples below. You can get more practice with the Periodic Table on pages 11, 13, 14, and 15 of this book.



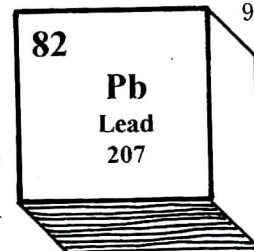
**REMEMBER:**  
 atomic mass = protons + neutrons  
 atomic number = # protons  
 # protons = # electrons



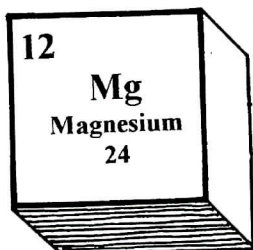
1. a. atomic number \_\_\_\_\_  
 b. atomic mass \_\_\_\_\_



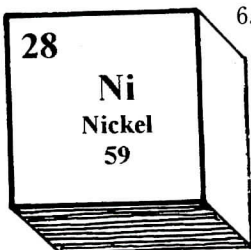
5. a. # electrons \_\_\_\_\_  
 b. # protons \_\_\_\_\_  
 c. atomic number \_\_\_\_\_  
 d. name of element \_\_\_\_\_



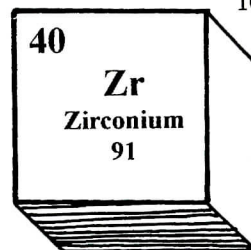
9. a. element name \_\_\_\_\_  
 b. # protons \_\_\_\_\_



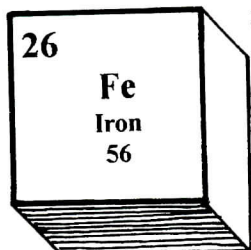
2. a. element name \_\_\_\_\_  
 b. atomic number \_\_\_\_\_



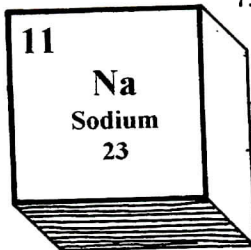
6. a. atomic mass \_\_\_\_\_  
 b. element symbol \_\_\_\_\_



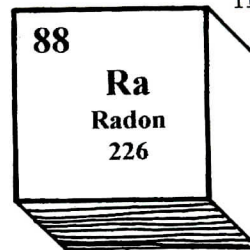
10. a. # electrons \_\_\_\_\_  
 b. atomic mass \_\_\_\_\_



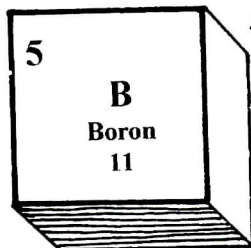
3. a. # protons \_\_\_\_\_  
 b. element symbol \_\_\_\_\_



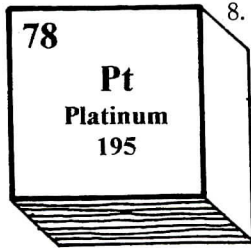
7. a. element symbol \_\_\_\_\_  
 b. # neutrons \_\_\_\_\_  
 c. element name \_\_\_\_\_



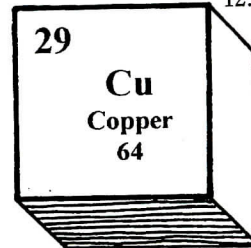
11. a. atomic number \_\_\_\_\_  
 b. # neutrons \_\_\_\_\_



4. a. atomic number \_\_\_\_\_  
 b. element name \_\_\_\_\_



8. a. atomic number \_\_\_\_\_  
 b. # neutrons \_\_\_\_\_



12. a. atomic mass \_\_\_\_\_  
 b. # neutrons \_\_\_\_\_

Name \_\_\_\_\_

# WHO AM I?

These mystery elements are waiting to be identified. The trick is—you'll need the Periodic Table to unmask their identities. Unless you have it memorized, you'll need a copy of the table from your science book or from page 52 of this book. Read the clues about each mystery element, figure out what it is, and then write the name and symbol of the element.

**REMEMBER:**  
*The Atomic number equals the number of protons. Atomic mass equals the number of protons plus neutrons. The number of electrons equals the number of protons.*

1. Nonmetal halogen family atomic mass 35  
 2. 25 electrons transition element  
 3. gas 48 neutrons  
 4. period 2 atomic mass 11  
 5. nonmetallic period 3 atomic mass 32  
 6. 26 protons period 4 transition element  
 7. 12 neutrons metallic 11 electrons  
 8. 29 electrons period 4  
 9. atomic mass 20 gas  
 10. period 5 transition element 51 neutrons  
 11. 80 electrons transition element  
 12. period 4 lowest mass in period  
 13. metallic period 4 20 electrons  
 14. period 6 gas 86 protons  
 15. 4 neutrons metallic  
 16. period 4 metallic 27 electrons  
 17. metallic period 6 56 protons  
 18. gas atomic mass 16 8 neutrons  
 19. mass less than 30 not neon noble gas  
 20. period 5 metallic 38 electrons

- |           |           |
|-----------|-----------|
| 1. _____  | 11. _____ |
| 2. _____  | 12. _____ |
| 3. _____  | 13. _____ |
| 4. _____  | 14. _____ |
| 5. _____  | 15. _____ |
| 6. _____  | 16. _____ |
| 7. _____  | 17. _____ |
| 8. _____  | 18. _____ |
| 9. _____  | 19. _____ |
| 10. _____ | 20. _____ |

Name \_\_\_\_\_

# Properties of Metals and Nonmetals

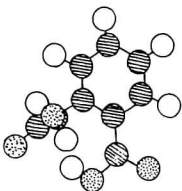
The elements on the periodic table are grouped by metals and nonmetals. Each group has distinct physical and chemical properties. Classify the phrases in the word box to complete the chart.

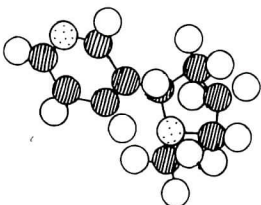
malleable	lustrous	thallium
gaseous at room temperature	ductile	brittle
forms negative ions	conductor	nonconductor
only forms positive ions	helium	titanium
receives electrons in chemical reactions	covalent bonding	metallic bonding
phosphorus	zinc	boron
selenium	nickel	gold
gives away electrons in chemical reactions	argon	

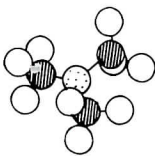
Properties of Metal Elements	Properties of Nonmetal Elements
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
Examples	Examples
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

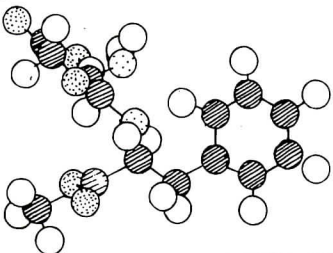
# Writing in Code

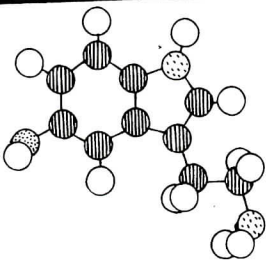
Chemists use a type of shorthand when they write chemical names. These "codes" use the symbols from the periodic table followed by a subscript number to the right of the symbol that tells how many atoms of the element are present in a molecule. If no number is present, there is only one atom. Use the example to figure out how many atoms are present in each molecule.

<b>Example</b>	<b>Aspirin: a pain-killing molecule</b>
	$C_9H_8O_4$ C = carbon, H = hydrogen, O = oxygen  <u>9</u> carbon atoms <u>8</u> hydrogen atoms <u>4</u> oxygen atoms

<b>1</b>	<b>Nicotine: a poisonous molecule</b>
	$C_{10}H_{14}N_2$  ___ carbon atoms    ___ hydrogen atoms ___ nitrogen atoms

<b>2</b>	<b>Trimethylamine: a rotten smell molecule</b>
	$C_3H_9N$  ___ carbon atoms    ___ hydrogen atoms ___ nitrogen atoms

<b>3</b>	<b>Aspartame: an artificial sweetener</b>
	$C_{14}H_{18}O_5N_2$  ___ carbon atoms    ___ hydrogen atoms ___ oxygen atoms    ___ nitrogen atoms

<b>4</b>	<b>Serotonin: a brain chemical</b>
	$C_{10}H_{12}ON_2$  ___ carbon atoms    ___ hydrogen atoms ___ oxygen atoms    ___ nitrogen atoms