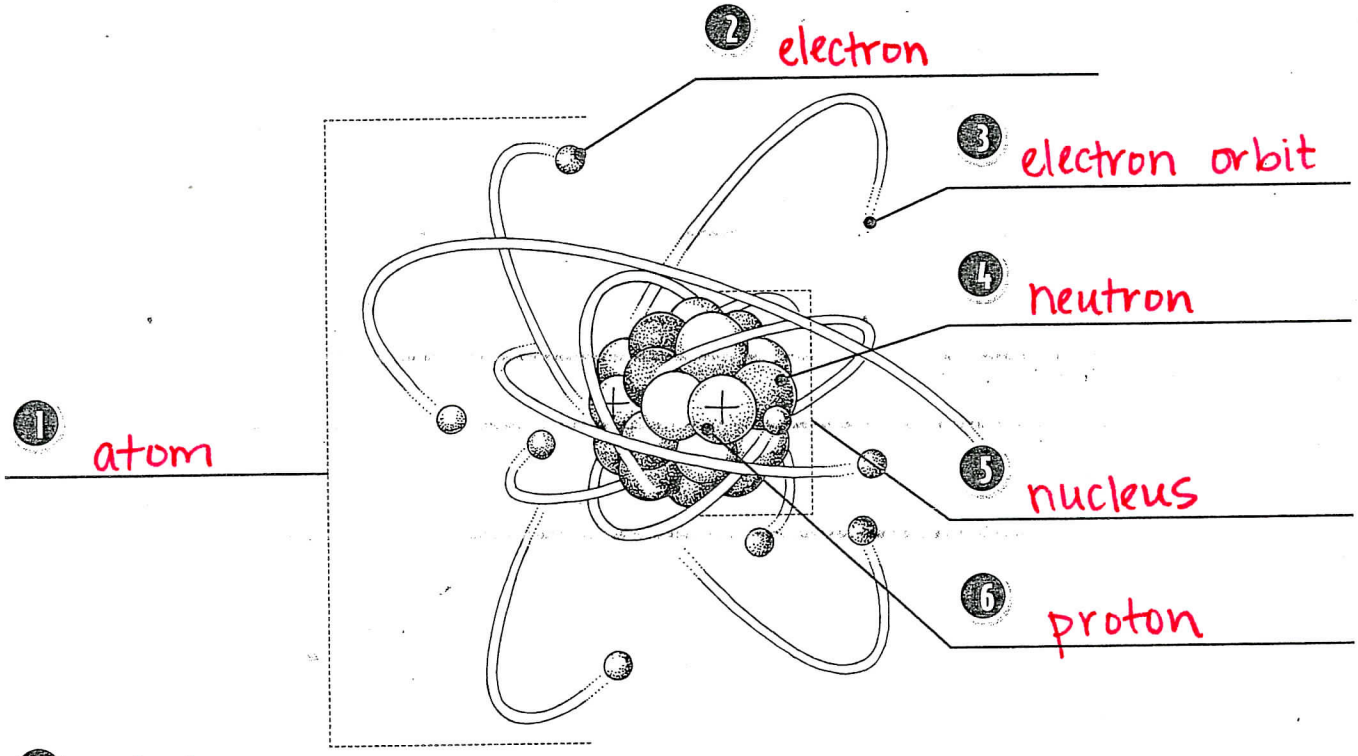
Name _____ Date _____

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



7 electron — This small particle of an atom carries a negative charge.

8 nucleus — Made up of the protons and neutrons, this part of the atom contains nearly all the mass of the atom.

9 neutron — This small particle of an atom carries a neutral charge.

10 electron orbit — This is the area where electrons travel around the nucleus.

11 atom — This is the basic building block of all matter.

12 proton — This small particle of an atom carries a positive charge.

Name _____ Date _____

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	transition	metals
atomic number	alkaline earth metals	naturally
families	noble	periods
rare earth metals		

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

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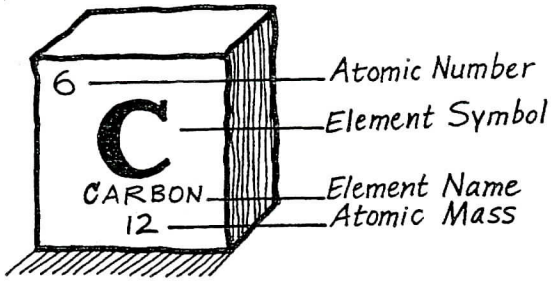
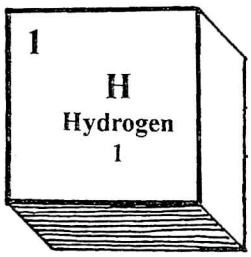
A WORLD-FAMOUS TABLE

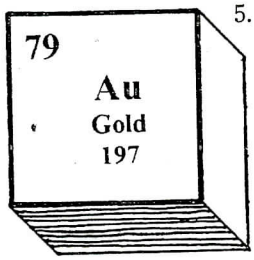
There is a table (not one for dinner) that's probably the most famous table of science. (You can find it in your physical science book or on page 52 of this book.) If you learn how to read it, you'll have quick access to important stuff about elements. It's called the Periodic Table (because it's written 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.



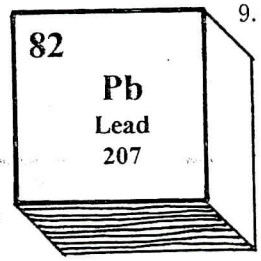
REMEMBER:
atomic mass = protons + neutrons
atomic number = # protons
protons = # electrons



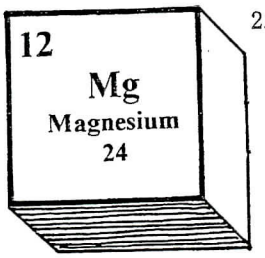
1. a. atomic number 1
   b. atomic mass 1



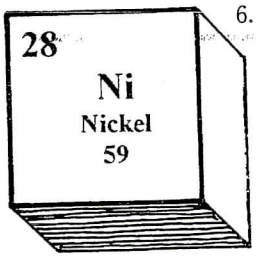
5. a. # electrons 79
   b. # protons 79
   c. atomic number 79
   d. name of element gold



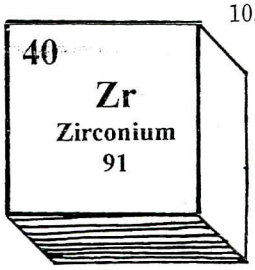
9. a. element name Lead
   b. # protons 82



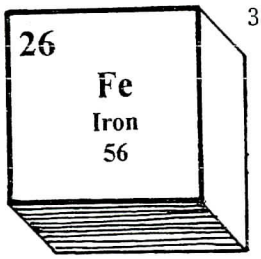
2. a. element name Magnesium
   b. atomic number 12



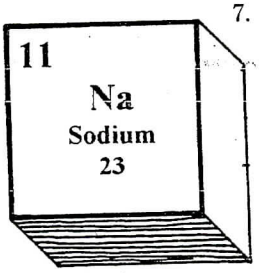
6. a. atomic mass 59
   b. element symbol Ni



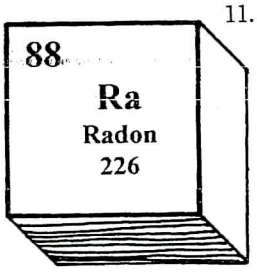
10. a. # electrons 40
    b. atomic mass 91



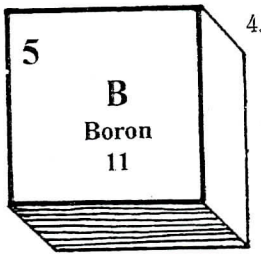
3. a. # protons 26
   b. element symbol Fe



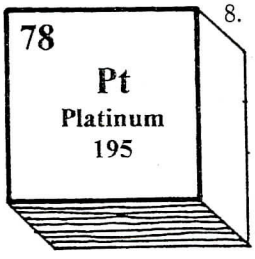
7. a. element symbol Na
   b. # neutrons 12
   c. element name Sodium



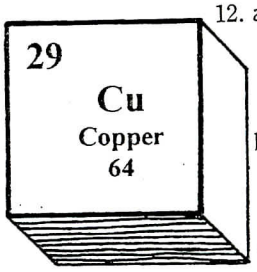
11. a. atomic numbe 88
    b. # neutrons 138



4. a. atomic number 5
   b. element name Boron



8. a. atomic number 78
   b. # neutrons 117

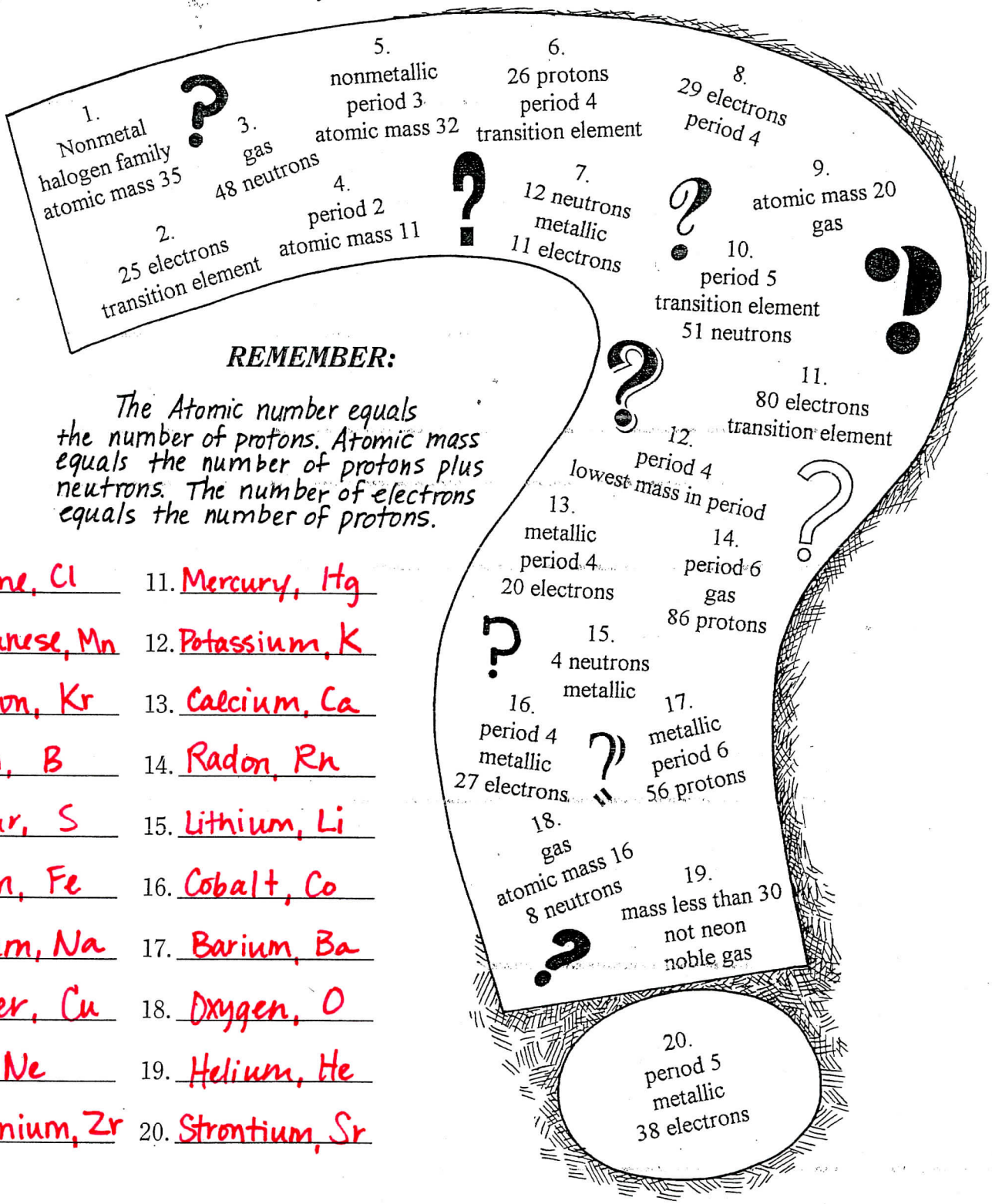


12. a. atomic mass 64
    b. # neutrons 35

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. Chlorine, Cl
2. Manganese, Mn
3. Krypton, Kr
4. Boron, B
5. Sulfur, S
6. Iron, Fe
7. Sodium, Na
8. Copper, Cu
9. Neon, Ne
10. Zirconium, Zr
11. Mercury, Hg
12. Potassium, K
13. Calcium, Ca
14. Radon, Rn
15. Lithium, Li
16. Cobalt, Co
17. Barium, Ba
18. Oxygen, O
19. Helium, He
20. Strontium, Sr

Name

Name _____ Date _____

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	

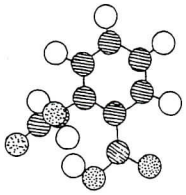
Properties of Metal Elements	Properties of Nonmetal Elements
malleable	covalent bonding
lustrous	forms negative ions
ductile	brittle
conductor	nonconductor
metallic bonding	gaseous at room temperature
gives away electrons in chemical bonding	receives electrons in chemical reactions
Examples	**Examples**
zinc	selenium
nickel	boron
gold	argon
titanium	helium
Thallium	phosphorus

Name _____ Date _____

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.

Example



Aspirin: a pain-killing molecule

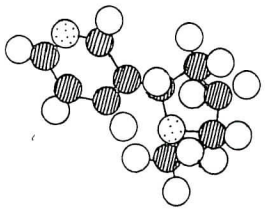
$C_9H_8O_4$

C = carbon, H = hydrogen, O = oxygen

9 carbon atoms 8 hydrogen atoms

4 oxygen atoms

1



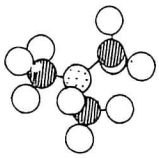
Nicotine: a poisonous molecule

$C_{10}H_{14}N_2$

10 carbon atoms 14 hydrogen atoms

2 nitrogen atoms

2



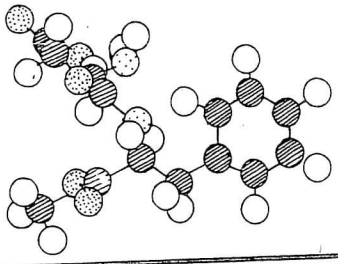
Trimethylamine: a rotten smell molecule

C_3H_9N

3 carbon atoms 9 hydrogen atoms

1 nitrogen atoms

3



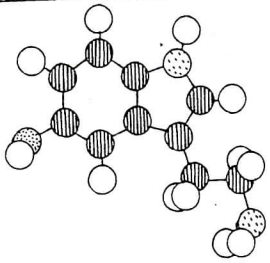
Aspartame: an artificial sweetener

$C_{14}H_8O_5N_2$

14 carbon atoms 8 hydrogen atoms

5 oxygen atoms 2 nitrogen atoms

4



Serotonin: a brain chemical

$C_{10}H_{12}ON_2$

10 carbon atoms 12 hydrogen atoms

1 oxygen atoms 2 nitrogen atoms