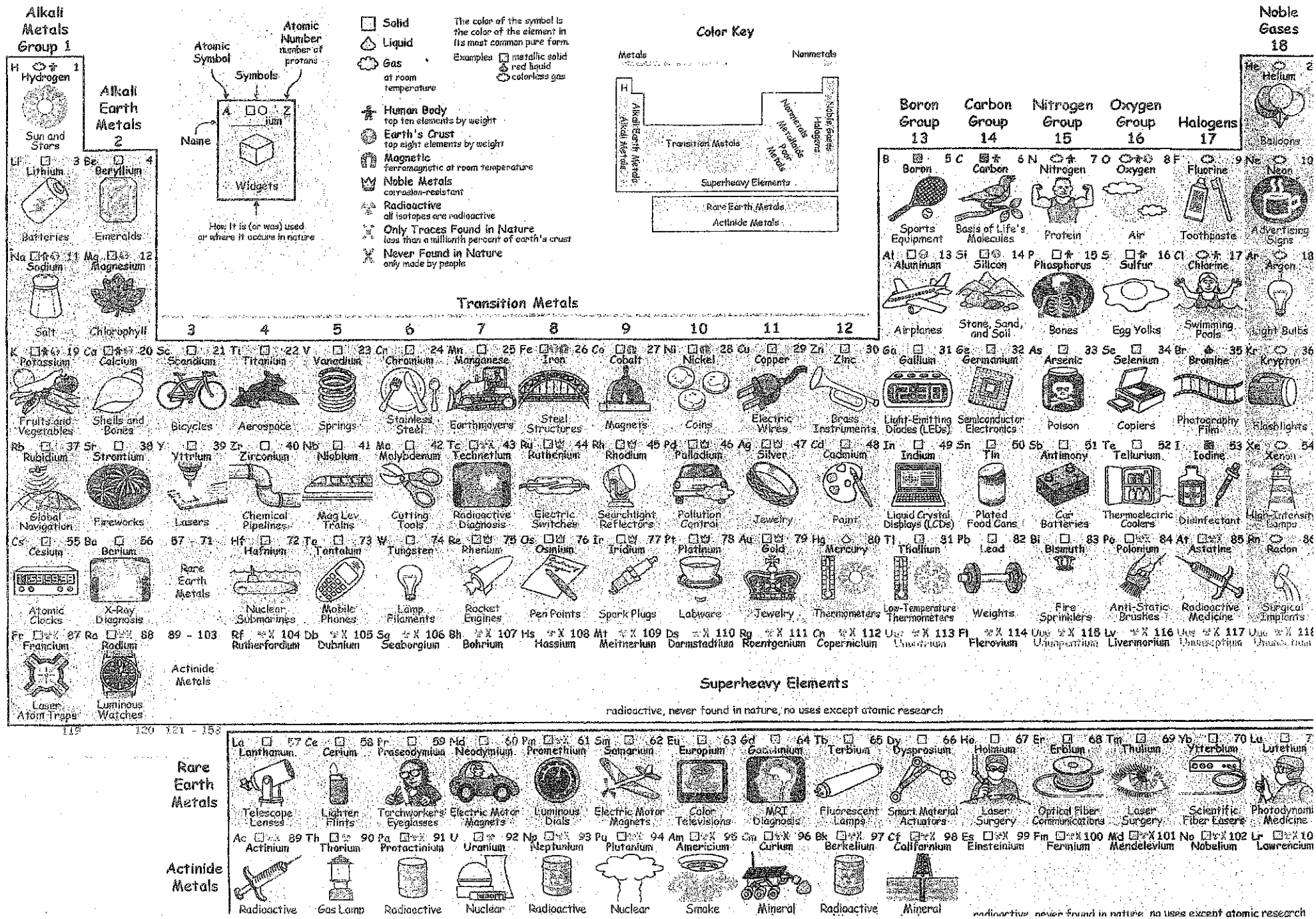
The Periodic Table of the Elements, in Pictures



Periodic Table of the Elements

1																	18
1 H Hydrogen 1.01	2											13	14	15	16	17	2 He Helium 4.00
3 Li Lithium 6.94	4 Be Beryllium 9.01											5 B Boron 10.81	6 C Carbon 12.01	7 N Nitrogen 14.01	8 O Oxygen 16.00	9 F Fluorine 19.00	10 Ne Neon 20.18
11 Na Sodium 22.99	12 Mg Magnesium 24.31	3	4	5	6	7	8	9	10	11	12	13 Al Aluminum 26.98	14 Si Silicon 28.09	15 P Phosphorus 30.97	16 S Sulfur 32.07	17 Cl Chlorine 35.45	18 Ar Argon 39.95
19 K Potassium 39.10	20 Ca Calcium 40.08	21 Sc Scandium 44.96	22 Ti Titanium 47.87	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 58.69	29 Cu Copper 63.55	30 Zn Zinc 65.38	31 Ga Gallium 69.72	32 Ge Germanium 72.63	33 As Arsenic 74.92	34 Se Selenium 78.97	35 Br Bromine 79.90	36 Kr Krypton 84.80
37 Rb Rubidium 84.47	38 Sr Strontium 87.62	39 Y Yttrium 88.91	40 Zr Zirconium 91.22	41 Nb Niobium 92.91	42 Mo Molibdenum 95.95	43 Tc Technetium 98.91	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 127.6	53 I Iodine 126.90	54 Xe Xenon 131.25
55 Cs Cesium 132.91	56 Ba Barium 137.33	57-71 Lanthanides	72 Hf Hafnium 178.49	73 Ta Tantalum 180.95	74 W Tungsten 183.84	75 Re Rhenium 186.21	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.09	79 Au Gold 196.97	80 Hg Mercury 200.59	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.98	84 Po Polonium [208.98]	85 At Astatine 209.99	86 Rn Radon 222.02
87 Fr Francium 223.02	88 Ra Radium 226.03	89-103 Actinides	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Uut Ununtrium unknown	114 Fl Flerovium [289]	115 Uup Ununpentium unknown	116 Lv Livermorium [298]	117 Uus Ununseptium unknown	118 Uuo Ununoctium unknown

57 La Lanthanum 138.91	58 Ce Cerium 140.12	59 Pr Praseodymium 140.91	60 Nd Neodymium 144.24	61 Pm Promethium 144.91	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 173.06	71 Lu Lutetium 174.97
89 Ac Actinium 227.03	90 Th Thorium 232.04	91 Pa Protactinium 231.04	92 U Uranium 238.03	93 Np Neptunium 237.05	94 Pu Plutonium 244.06	95 Am Americium 243.06	96 Cm Curium 247.07	97 Bk Berkelium 247.07	98 Cf Californium 251.08	99 Es Einsteinium [254]	100 Fm Fermium 257.10	101 Md Mendelevium 258.1	102 No Nobelium 259.10	103 Lr Lawrencium [262]

Anatomy of an atom

The basic model

What are atoms made of?

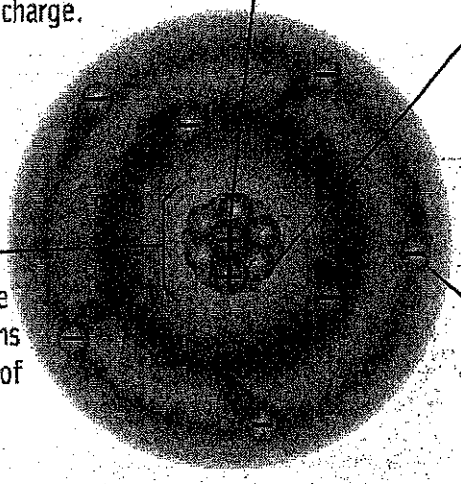
Scientists have discovered that even atoms are composed of smaller parts called subatomic particles. Atoms with an equal number of protons and electrons are stable and have no charge.

Protons
Protons are postively charged particles found in the nucleus. Atoms are identified by the number of protons they have.

Neutrons
Neutrons are particles found in the nucleus that have no charge. Atoms of the same element with different number of neutrons are called isotopes.

Nucleus
The nucleus is a dense core at the center of an atom made of protons and neutrons. It contains 99.9% of the atom's mass.

Electrons
Electrons are negatively charged particles that orbit the nucleus in a "cloud" at nearly the speed of light.

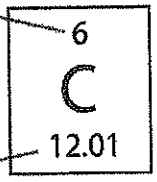


This illustration is not to scale.
If an atom's nucleus were the size shown here, the closest electrons would be over 100 meters away.

Chemical Elements -- Different kinds of Atoms

Atoms with different numbers of protons have different properties. Scientists currently have isolated 117 different kinds of atoms called **chemical elements**.

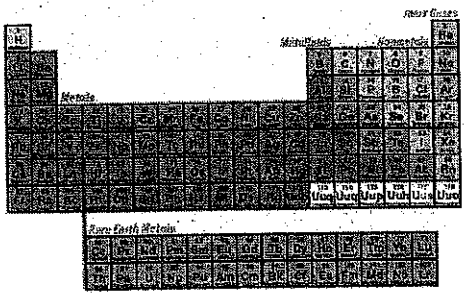
The Periodic Table of Elements organizes all of the known elements in the universe into a chart according to their number of protons, termed their **atomic number.**



The **(atomic) mass number** is the total number of protons and neutrons expressed in atomic mass units (amu).

Atoms with the same number of protons, but different numbers of neutrons are isotopes, many of which are radioactive. The mass number is different for each isotope of an element.

The Periodic Table of Elements



How many different elements can you name?

Name
Date

Class Notes : Atoms

Directions: *Define the vocabulary terms and fill in the blanks as we go through the PowerPoint together.*

Vocabulary:

*Atom -

*Nucleus -

*Electron -

*Proton -

*Neutron -

Parts of the Atom:

At the center of each atom is a small, dense _____. The _____ is made of _____ and _____.

_____ have a charge of +1. _____ have no charge (or zero).

_____ are found moving around the nucleus. They have a charge of _____.

Name _____

Atoms

Read each statement and decide whether it is true or false. If the statement is true, write "true" on the line next to it. If the statement is false, write "false" on the line and then rewrite the statement to make it true.

1. _____ Atoms are too small to be seen with the eye or ordinary tools.

2. _____ Electrons are the positively charged particles in an atom.

3. _____ The nucleus of an atom is made of protons and neutrons.

4. _____ Neutrons are the negatively charged particles inside an atom.

5. _____ An ion is an electrically charged atom where the number of protons equals the number of electrons.

Using the information below provided about each atom, draw a Bohr model of the atom. Label the protons with a + and the electrons with a –. Note that an atom's innermost electron shell can hold no more than two electrons.

6. Helium: 2 protons, 2 neutrons, 2 electrons

7. Carbon: 6 protons, 6 neutrons, 6 electrons

8. Write a short paragraph comparing and contrasting the two atoms you drew above.

Name _____

Elements

Read each element, characteristic, or description. Decide which category that description best fits into and write its number in the appropriate section of the box below.

1. Shiny
2. Poor thermal and electrical conductors
3. Ductile
4. Brittle
5. Could be shiny or dull
6. Iron
7. Good thermal and electrical conductors
8. Could be malleable or unmalleable
9. Oxygen
10. Sometimes called semiconductors

Metals	Nonmetals	Metalloids

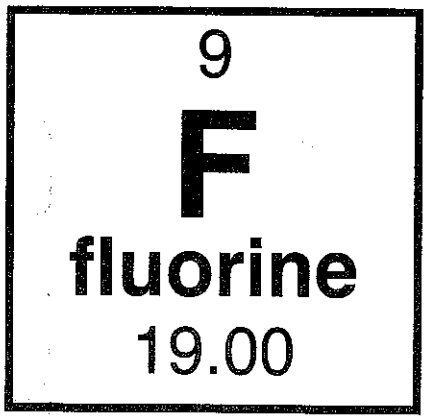
Use the words from the box below to complete the following paragraph about the periodic table.

group	protons	weight	atomic number
location	period	element	

Each square on the periodic table includes lots of information about an _____ (11).
The one-letter or two-letter chemical symbol represents the element. The number above the symbol is the _____ (12). This number identifies the number of _____ (13) in an atom of the element. The number below the element name is the standard atomic _____ (14).
Each row on the periodic table is called a _____ (15), and each column is called a _____ (16). The _____ (17) of the element on the table tells what type of element it is based on its properties.

Look at the information in the box below, and then fill in the blanks.

18. Element: _____
19. Chemical Symbol: _____
20. Atomic Number: _____
21. Standard Atomic Weight: _____
22. Number of Protons: _____



EXPLORE, Part 4
Handout

Element Cube

Glue Under

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Glue Under

Basic Information

Name:_____

Symbol:_____

Atomic #:_____

Mass #:_____

Glue Under

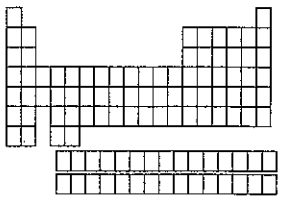
Glue Under

Periodic Information

Family:_____

Group#:____ Period#:____

Location (shaded)



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Uses of the Element

1._____
2._____
3._____
4._____
5._____

Atomic Model

Atomic Structure Information

#Protons:_____

#Neutrons:_____

#Electrons:_____

Glue Under

Glue Under

Physical Properties

Phase(at STP):_____

Boiling Pt (°C): _____

Melting Pt (°C):_____

Density (g/mL):_____

Appearance: _____