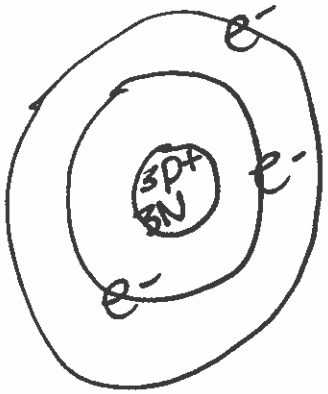
ATOM

MOLECULE

ELEMENT

COMPOUND

Illustration:



ATOM

Description:
smallest part of matter made from protons, neutrons, + electrons

Example:
The smallest amount of Lithium
1 lithium Atom

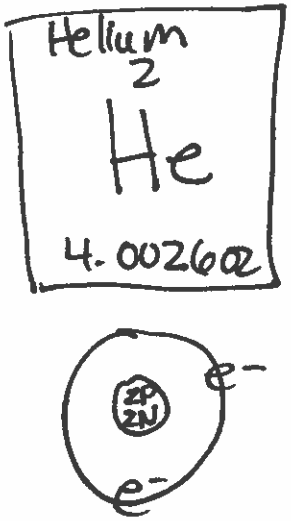
Illustration:

MOLECULE

Description:
formed when two or more atoms combine chemically.

Example:
Hydrogen found as H_2
Oxygen found as O_2
Nitrogen found as N_2

Illustration:

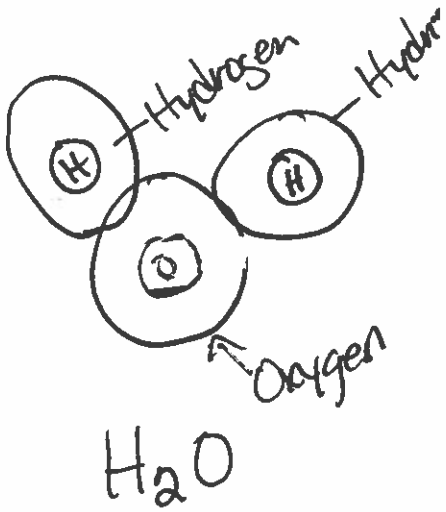


ELEMENT

Description:
substance made from only one type of atom.

Example:
Many atoms of Gold chemically combined + nothing else.

Illustration:



COMPOUND

Description:
Substance made from two or more different elements.

Example: Water - H_2O
Sand - SiO_2
Salt = NaCl

NAME _____ PERIOD _____

Molecules and Compounds Worksheet

Atoms - Building Blocks Color Chart

Hydrogen (H)	Blue
Carbon (C)	Yellow
Oxygen (O)	Red
Nitrogen (N)	Black
Sodium (Na)	White
Chlorine (Cl)	Green

Chemical Formula of Common Compounds

Sand	SiO_2	Aspirin	$C_9H_8O_4$
Sugar	$C_6H_{12}O_6$	Advil	$C_{13}H_{18}O_2$
Rust	FeO_3	Baking Soda	$NaHCO_3$
Gasoline	C_8H_{18}	Ruby	Al_2O_3
Salt	$NaCl$	Emerald	$Be_3Al_2SiO_6$
Water	H_2O	Caffeine	$C_8H_{10}N_4O_2$
Vitamin C	$C_6H_8O_6$	Peppermint	$C_{10}H_7O$

*** Teacher Assign ***

My compound is _____, and the chemical formula is _____.

Count the atoms in one molecule

H atoms	C atoms	O atoms	N atoms	Na atoms

How many atoms are in one molecule of your compound? _____

Now to determine the identity of a mystery compound, we must count the number and types of atoms in a molecule.

Count the atoms in one molecule or compound that you created with Legos

H atoms	C atoms	O atoms	N atoms	Na atoms

How many atoms are in one molecule of your compound? _____

The chemical formula of the mystery compound is _____,

which indicates it could only be _____.

If you take away any atom from one of the molecules, will it still be the same compound? Yes / No

ANSWER KEY----------ANSWER KEY----------ANSWER KEY ----------ANSWER KEY

Molecules and Compounds Worksheet

Atoms - Building Blocks Color Chart

Hydrogen (H)	Blue
Carbon (C)	Yellow
Oxygen (O)	Red
Nitrogen (N)	Black
Sodium (Na)	White
Chlorine (Cl)	Green

Chemical Formula of Common Compounds

Sand	SiO_2	Aspirin	$C_9H_8O_4$
Sugar	$C_6H_{12}O_6$	Advil	$C_{13}H_{18}O_2$
Rust	FeO_3	Baking Soda	$NaHCO_3$
Gasoline	C_8H_{18}	Ruby	Al_2O_3
Salt	$NaCl$	Emerald	$Be_3Al_2SiO_6$
Water	H_2O	Caffeine	$C_8H_{10}N_4O_2$
Vitamin C	$C_6H_8O_6$	Peppermint	$C_{10}H_7O$

My compound is Baking Soda, and the chemical formula is $NaHCO_3$.

Count the atoms in one molecule

H atoms	C atoms	O atoms	N atoms	Na atoms
1	1	3	0	1

How many atoms are in one molecule of your compound? 6

Now to determine the identity of a mystery compound, we must count the number and types of atoms in a molecule.

Count the atoms in one molecule

EXAMPLE

H atoms	C atoms	O atoms	N atoms	Na atoms
7	10	1	0	0

How many atoms are in one molecule of your compound? 18

The chemical formula of the mystery compound is $C_{10}H_70$,

[illegible] Peppermint.

If you take away any atom from one of the molecules, will it still be the same compound?

Yes / No

Periodic Table of the Elements

Metals
Non-Metals
Noble Gases

Key:

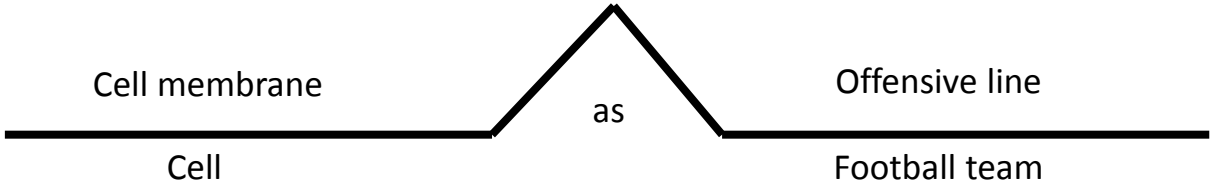
element name **atomic number** **symbol** atomic weight

hydrogen 1 **H** 1.00794																	helium 2 **He** 4.002602
lithium 3 **Li** 6.941	beryllium 4 **Be** 9.012182											boron 5 **B** 10.811	carbon 6 **C** 12.0107	nitrogen 7 **N** 14.00674	oxygen 8 **O** 15.9994	fluorine 9 **F** 18.9984	neon 10 **Ne** 20.1797
sodium 11 **Na** 22.98977	magnesium 12 **Mg** 24.3050											aluminum 13 **Al** 26.981538	silicon 14 **Si** 28.0855	phosphorus 15 **P** 30.97376	sulfur 16 **S** 32.065	chlorine 17 **Cl** 35.453	argon 18 **Ar** 39.984
potassium 19 **K** 39.0983	calcium 20 **Ca** 40.078	scandium 21 **Sc** 44.95591	titanium 22 **Ti** 47.867	vanadium 23 **V** 50.9415	chromium 24 **Cr** 51.9961	manganese 25 **Mn** 54.93805	iron 26 **Fe** 55.845	cobalt 27 **Co** 58.9332	nickel 28 **Ni** 58.6934	copper 29 **Cu** 63.546	zinc 30 **Zn** 65.409	gallium 31 **Ga** 69.723	germanium 32 **Ge** 72.64	arsenic 33 **As** 74.9216	selenium 34 **Se** 78.96	bromine 35 **Br** 79.904	krypton 36 **Kr** 83.798
rubidium 37 **Rb** 85.4678	strontium 38 **Sr** 87.62	yttrium 39 **Y** 88.90585	zirconium 40 **Zr** 91.225	niobium 41 **Nb** 92.90638	molybdenum 42 **Mo** 95.94	technetium 43 **Tc** [98]	ruthenium 44 **Ru** 101.07	rhodium 45 **Rh** 102.9055	palladium 46 **Pd** 106.42	silver 47 **Ag** 107.8682	cadmium 48 **Cd** 112.411	indium 49 **In** 114.818	tin 50 **Sn** 118.710	antimony 51 **Sb** 121.760	tellurium 52 **Te** 127.60	iodine 53 **I** 126.9045	xenon 54 **Xe** 131.293
caesium 55 **Cs** 132.90545	barium 56 **Ba** 137.327	lutetium 71 **Lu** 174.967	hafnium 72 **Hf** 1.00794	tantalum 73 **Ta** 180.9479	tungsten 74 **W** 183.84	rhenium 75 **Re** 186.207	osmium 76 **Os** 190.23	iridium 77 **Ir** 192.217	platinum 78 **Pt** 195.078	gold 79 **Au** 196.96655	mercury 80 **Hg** 200.59	thallium 81 **Tl** 204.3833	lead 82 **Pb** 207.2	bismuth 83 **Bi** 208.980	polonium 84 **Po** [209]	astatine 85 **At** [210]	radon 86 **Rn** [222]
francium 87 **Fr** [223]	radium 88 **Ra** [226]	lawrencium 103 **Lr** [262]	rutherfordium 104 **Rf** [261]	dubnium 105 **Db** [262]	seaborgium 106 **Sg** [266]	bohrium 107 **Bh** [264]	hassium 108 **Hs** [269]	meitnerium 109 **Mt** [268]	darmstadtium 110 **Ds** [271]	roentgenium 111 **Rg** [272]	ununbium 112 **Uub** [285]		ununquadium 114 **Uuq** [289]				

lanthanum 57 **La** 138.9055	cerium 58 **Ce** 140.116	praseodymium 59 **Pr** 140.90765	neodymium 60 **Nd** 144.24	promethium 61 **Pm** [145]	samarium 62 **Sm** 150.36	europium 63 **Eu** 151.964	gadolinium 64 **Gd** 157.25	terbium 65 **Tb** 158.9253	dysprosium 66 **Dy** 162.50	holmium 67 **Ho** 164.930	erbium 68 **Er** 167.259	thulium 69 **Tm** 168.934	ytterbium 70 **Yb** 173.04
actinium 89 **Ac** [227]	thorium 90 **Th** 232.038	protactinium 91 **Pa** 231.0359	uranium 92 **U** 238.0289	neptunium 93 **Np** [237]	plutonium 94 **Pu** [244]	americium 95 **Am** [243]	curium 96 **Cm** [247]	berkelium 97 **Bk** [247]	californium 98 **Cf** [251]	einsteinium 99 **Es** [252]	fermium 100 **Fm** [257]	mendelevium 101 **Md** [258]	nobelium 102 **No** [259]

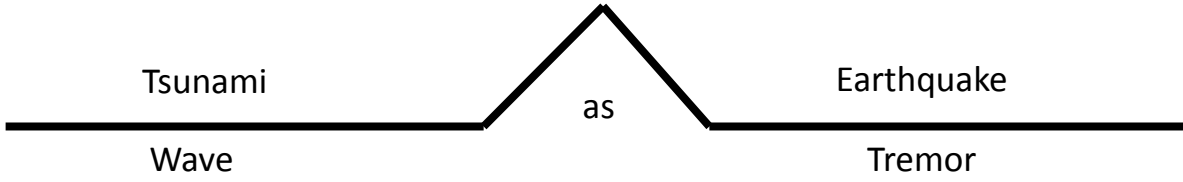
Notes: Elements with atomic weights in square brackets have no stable isotopes. Different sources list different atomic weights for elements. The difference arises from the differing atomic weights of various isotopes. We have tried to list the most stable isotope. For example, some sources list the atomic weight of seaborgium as 263 and others 266. The most stable isotope appears have an atomic weight of 266 so we list that weight here. Roentgenium is still the unofficial name of element 111 but it is the one recommended by the IUPAC so we list it here instead of the generic 'unununium'. Aluminum, cesium, and sulfur are the American spellings for aluminium, caesium, and sulphur.
This table was downloaded from http://www.science-teachers.com/printable_periodic_tables.htm.

Solving Analogy Problems- Examples



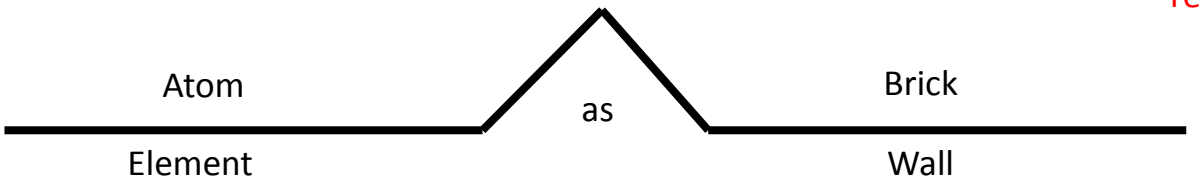
…won't let bad things in

relating factor



…is an extreme example of

relating factor

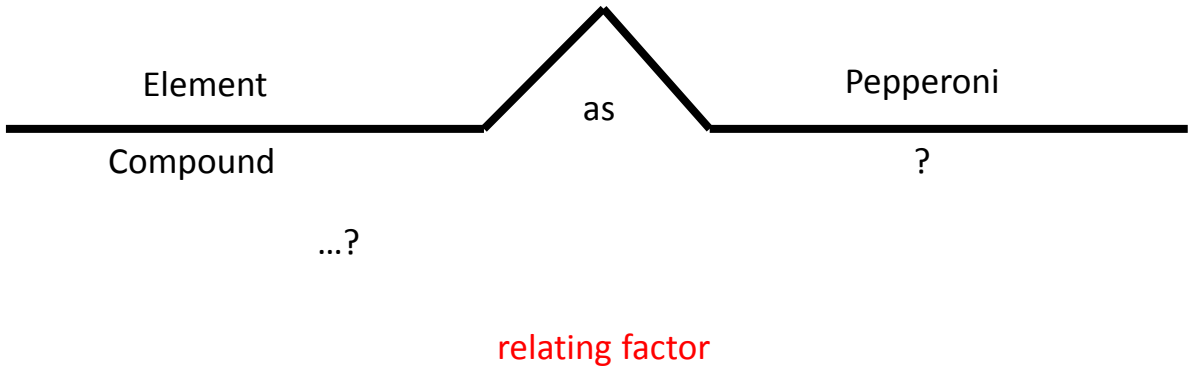


…are building blocks

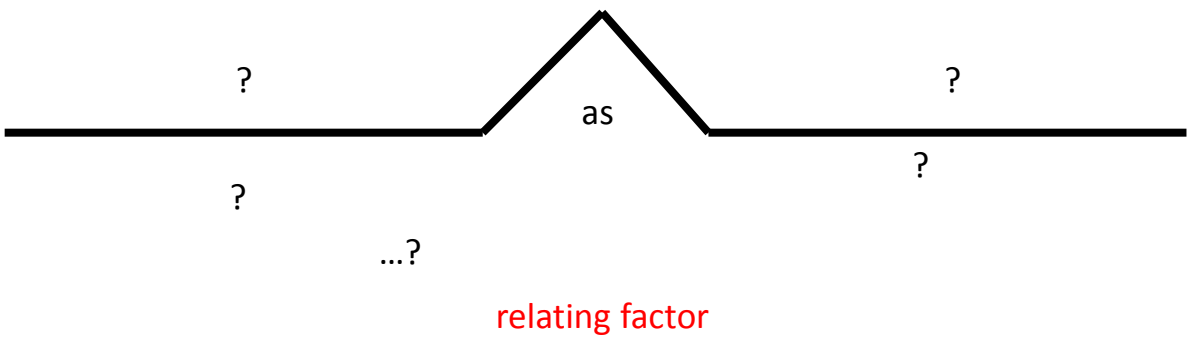
relating factor

Analogy template and first two examples are found in and adapted From *Building Academic Vocabulary* (Marzano & Pickering, 2005)

Solving Analogy Problems- Let's do one together!



Solving Analogy Problems- Do one by yourself!



Using some combination of the terms provided: Atom, Element, Compound, Molecule, Create your own analogy. Be sure to write the relating factor.