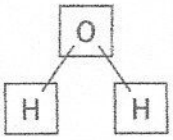
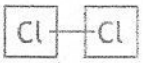
Atoms & Molecule Worksheet

Marshmallow Color	Chemical Symbol	Element	Number of Bonds
White	H	Hydrogen	1
Pink	O	Oxygen	2
Orange	C	Carbon	4
Green	Cl	Chloride	1
Yellow	Na	Sodium	1

Molecule Shape
Linear: straight bond
Angular: bonds with angle
Tetrahedron: bonds with branches
Pyramid: bonds in 3-D





Water _____

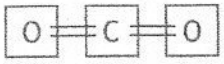
Molecule shape _____

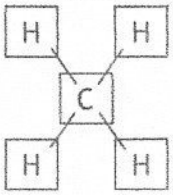
Found where? _____

Chlorine _____

Molecule shape _____

Found where? _____





Carbon Dioxide _____

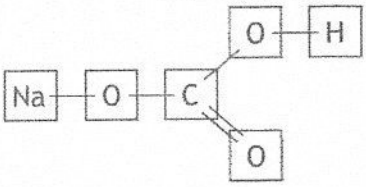
Molecule shape _____

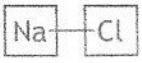
Found where? _____

Methane _____

Molecule shape _____

Found where? _____





Sodium Bicarbonate _____

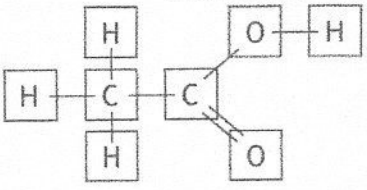
Molecule shape _____

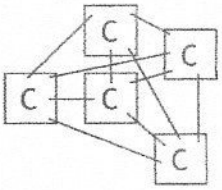
Found where? _____

Sodium Chloride _____

Molecule shape _____

Found where? _____





Acetic Acid _____

Molecule shape _____

Found where? _____

Diamond _____

Molecule shape _____

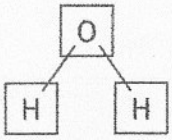
Found where? _____

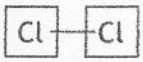
Atoms & Molecule Worksheet

Answer Sheet

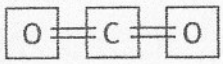
Marshmallow Color	Chemical Symbol	Element	Number of Bonds
White	H	Hydrogen	1
Pink	O	Oxygen	2
Orange	C	Carbon	4
Green	Cl	Chloride	1
Yellow	Na	Sodium	1

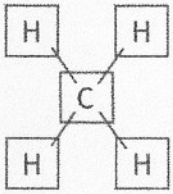
Molecule Shape
Linear: straight bond
Angular: bonds with angle
Tetrahedron: bonds with branches
Pyramid: bonds in 3-D



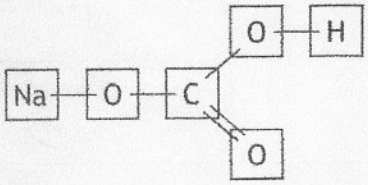


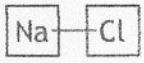
Water	H_2O	Chlorine	Cl_2
Molecule shape	Angular	Molecule shape	linear
Found where?	Lakes, rivers, oceans	Found where?	Bleach, swimming pool



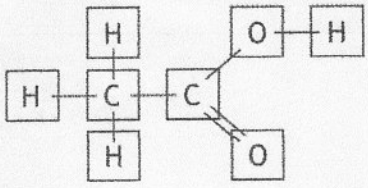


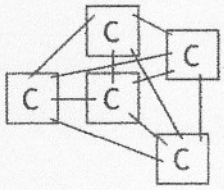
Carbon Dioxide	CO_2	**Methane**	CH_4
Molecule shape	linear	Molecule shape	tetrahedron
Found where?	Air, exhaled breath	Found where?	Natural gas





Sodium Bicarbonate	$NaHCO_3$	**Sodium Chloride**	NaCl
Molecule shape	tetrahedron	Molecule shape	linear
Found where?	Baking soda	Found where?	Table salt





Acetic Acid	CH_3COOH or $C_2H_4O_2$	**Diamond**	C_5
Molecule shape	tetrahedron	Molecule shape	pyramid
Found where?	Vinegar	Found where?	Stones

Atoms & Molecule Evaluation

1. How many atoms make up each molecule?

Water =	_____	Sodium Bicarbonate =	_____
Chlorine =	_____	Sodium Chloride =	_____
Carbon Dioxide =	_____	Acetic Acid =	_____
Methane =	_____	Diamond =	_____

2. How many bonds does each molecule need?

Water =	_____	Sodium Bicarbonate =	_____
Chlorine =	_____	Sodium Chloride =	_____
Carbon Dioxide =	_____	Acetic Acid =	_____
Methane =	_____	Diamond =	_____

3. How does the number of atoms bonded to the central atom affect the molecule?

_____

4. What is the difference between an atom and an element?

_____

_____

5. What is the difference between a molecule and a compound?

_____

_____

6. Why does CO_2 need two toothpicks between each oxygen atom and the carbon atom?

_____

_____

Atoms & Molecules Evaluation
Answer Sheet

1. How many atoms make up each molecule?

Water =	3	Sodium Bicarbonate =	6
Chlorine =	2	Sodium Chloride =	2
Carbon Dioxide =	3	Acetic Acid =	8
Methane =	5	Diamond =	5

2. How many bonds does each molecule need?

Water =	2	Sodium Bicarbonate =	6
Chlorine =	1	Sodium Chloride =	1
Carbon Dioxide =	4	Acetic Acid =	8
Methane =	4	Diamond =	10

3. How does the number of atoms bonded to the central atom affect the molecule? *It creates the shape of the molecule*

4. What is the difference between an atom and an element? *Atoms may be different from each other, but an element is a substance in which all the atoms are the same kind.*

5. What is the difference between a molecule and a compound?
   Molecule = atoms of elements held together by chemical bonds.
   Compound = substance in which molecular elements combine with each other.

6. Why does CO_2 need two toothpicks between each oxygen atom and the carbon atom?
   To satisfy the bonding rule, a double bond is needed between each oxygen and the carbon.

Challenge Work

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 _____, 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

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 means it can only be _____.

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

Answer Sheet

Molecules and Compounds Worksheet

Atoms - Building Blocks Color Chart

Hydrogen (H)	Blue
Carbon (C)	Yellow
Oxygen (O)	Red
Nitrogen (N)	Black
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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

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 $C_{10}H_70$,

which means it can only be Peppermint.

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

Yes / (No)