



Atoms, Elements, & the Periodic Table

Earth Science Intro Unit



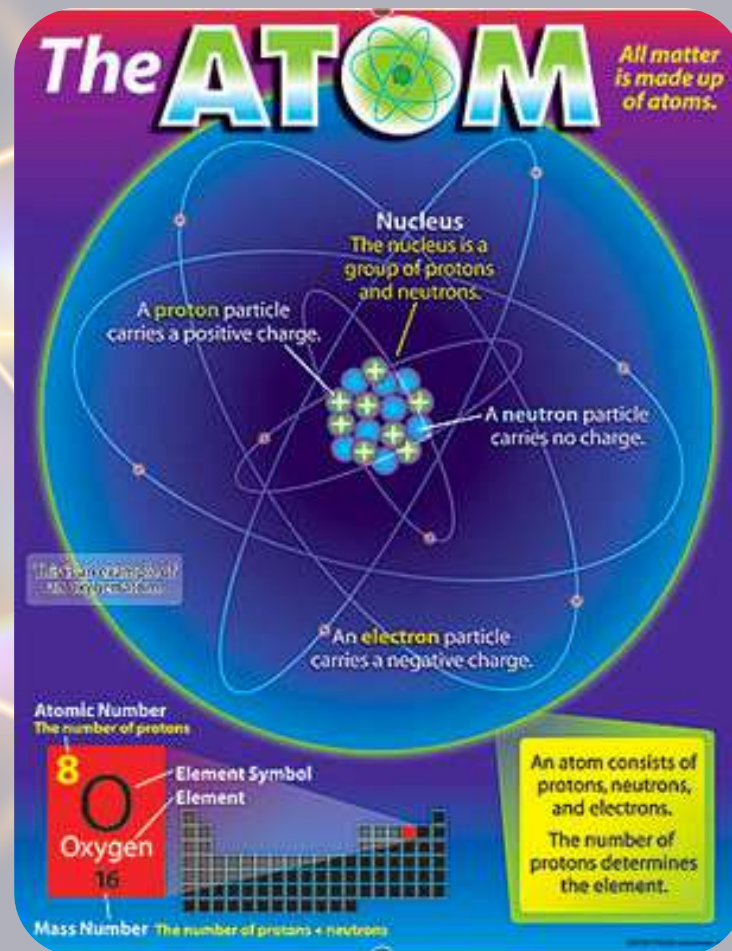
I will be able to describe and identify the parts that make up an atom.

What is an Atom?

- **Atom**

- Smallest particle into which an element can be divided and still be the same element

- Building blocks of matter.
- Make up everything around you.
- Individual atoms are too small to be seen.
- 1 penny is made up of 2×10^{22} atoms.
 - 20,000,000,000,000,000,000,000 atoms



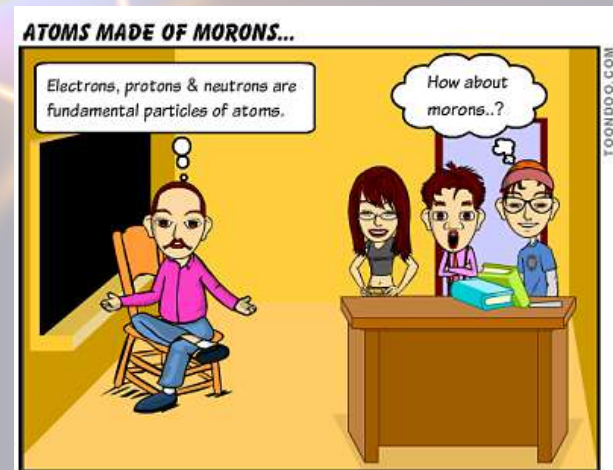
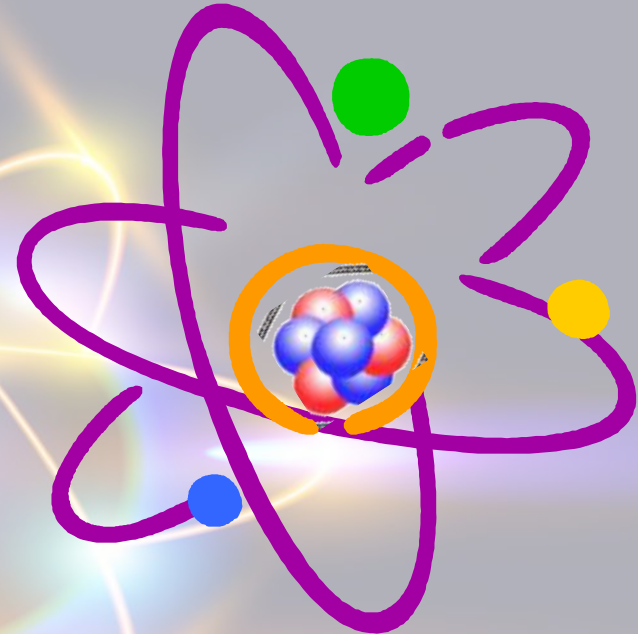


I will be able to describe and identify the parts that make up an atom.

What makes up an Atom?

• Parts of the Atom

- Subatomic particles
 - **Nucleus** – small dense center of the atom.
 - Contains
 - **Protons** = + Charge
 - **Neutrons**
 - » Neutral Charge
 - **Electron Cloud**- surrounds the nucleus
 - **Electrons** = - charge





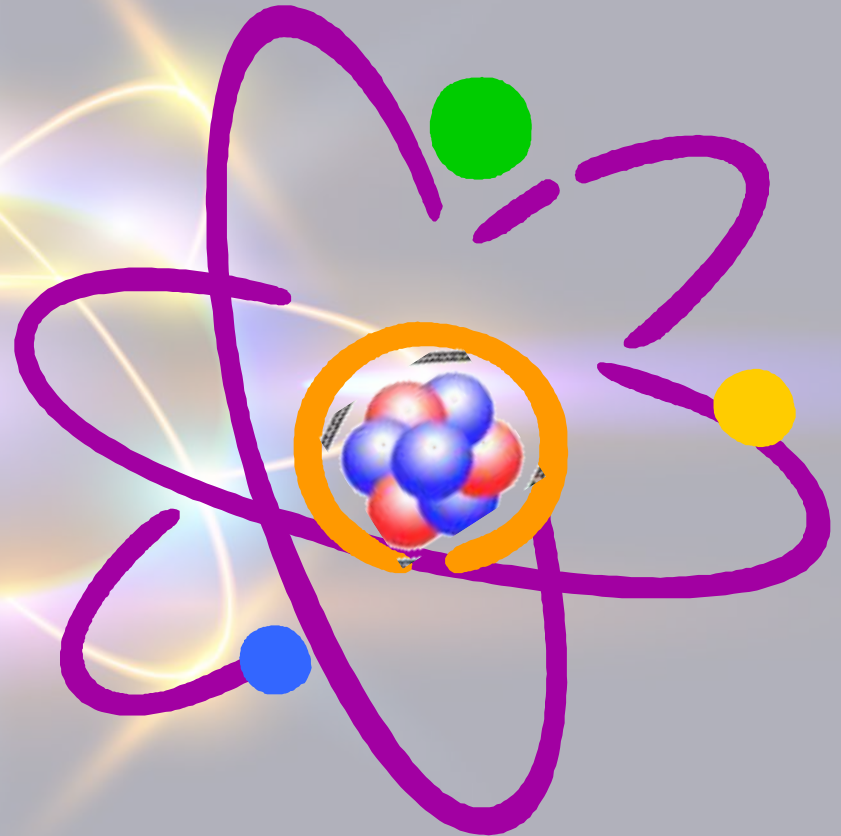
I will be able to describe and identify the parts that make up an atom.

What makes up an Atom?

- **Parts of the Atom**

- **Proton-**

- Subatomic particle found in the nucleus of an atom.
 - Positive charge.





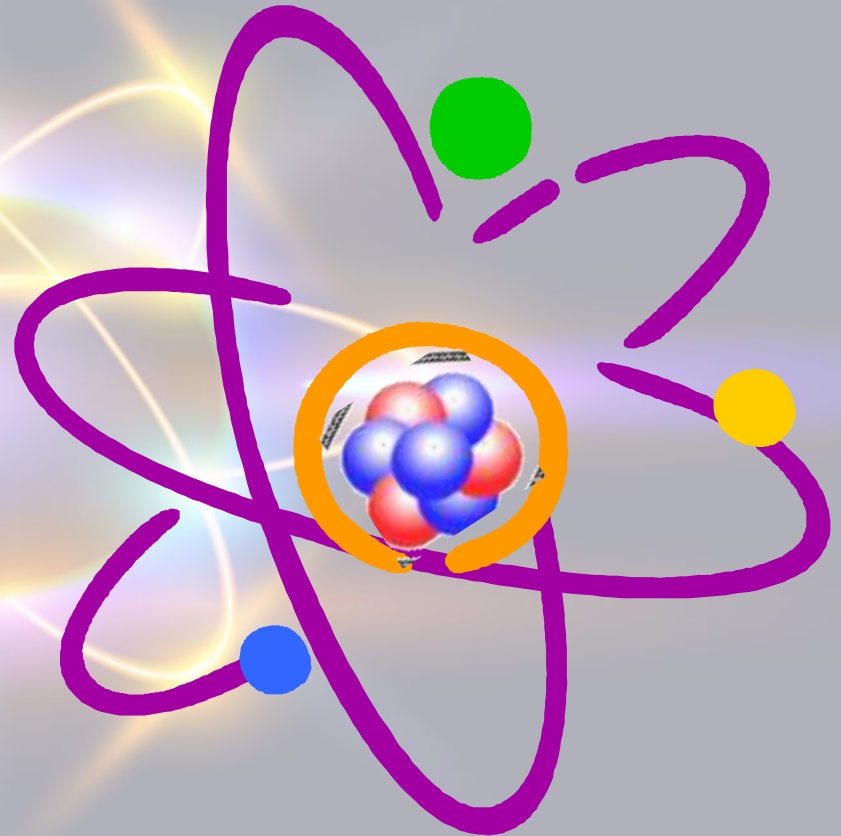
I will be able to describe and identify the parts that make up an atom.

What makes up an Atom?

- **Parts of the Atom**

- **Neutron-**

- Subatomic particle found in the nucleus of an atom.
 - Neutral charge.





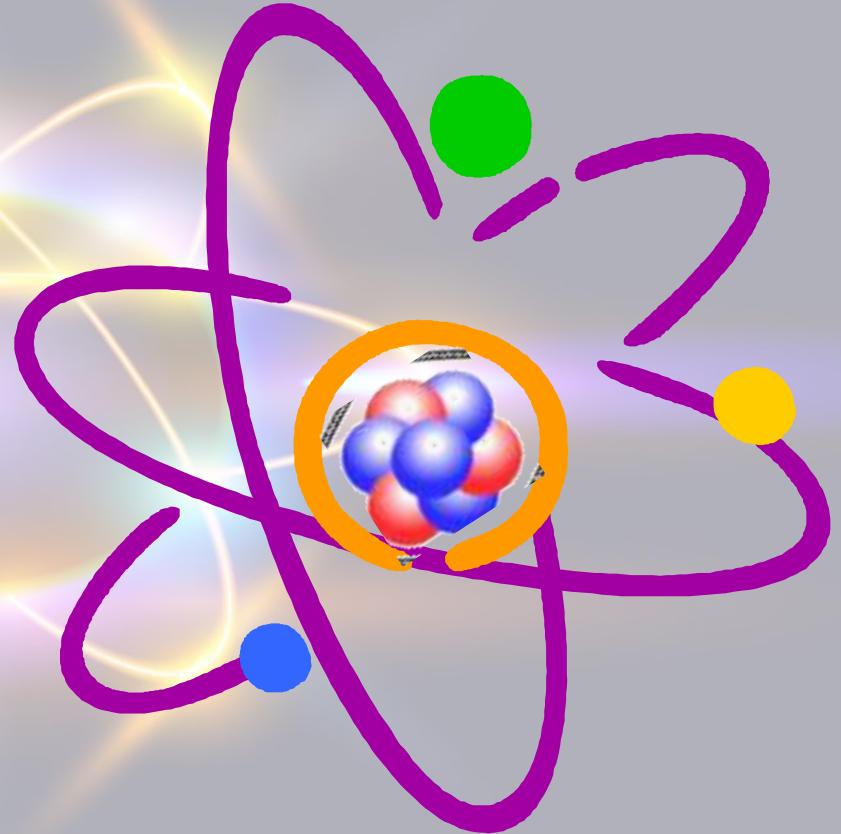
I will be able to describe and identify the parts that make up an atom.

What makes up an Atom?

• Parts of the Atom

– Electron-

- Smallest Subatomic particle
- Negative charge
- Found orbiting in the electron cloud outside the nucleus.





I will be able to describe what an Element is and how to use the Periodic Table.

What makes up an Element?

- **Element**

- A substance composed of a single kind of atom.



		H Hydrogen		He Helium	
C Carbon	N Nitrogen	O Oxygen	Ne Neon	Na Sodium	Mg Magnesium
Al Aluminum	Si Silicon	Ar Argon	Ca Calcium	Fe Iron	Au Gold





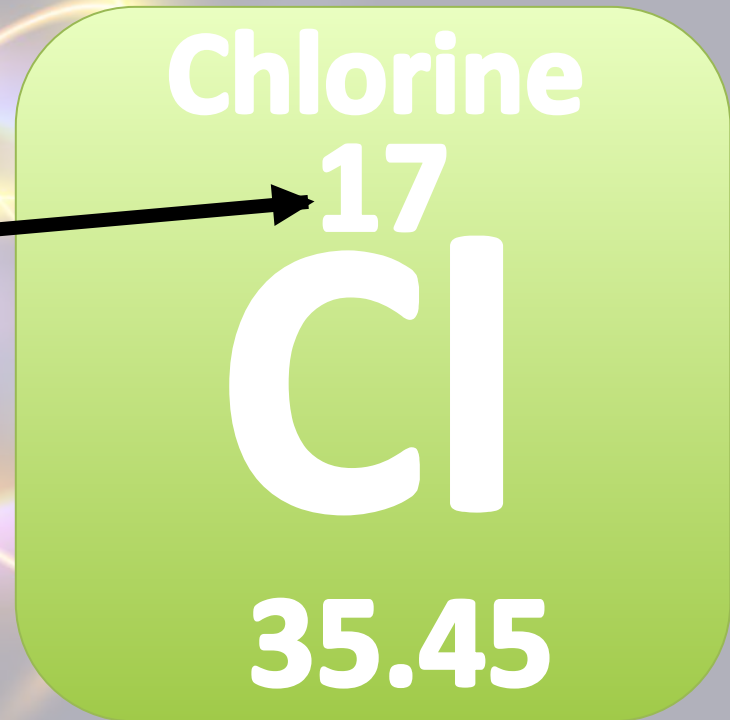
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What makes up an Element?

- **Elements**

- Each element is identified by its **atomic number**.

- Equal to the number of protons
- Chlorine has 17 Protons
- Also equal to the number of electrons





I will be able to describe what an Element is and how to use the Periodic Table.

What is the Periodic Table?

- Periodic Table

Atomic #

•Indicates the number of Protons.

Atomic Mass

•The weighted Average of the masses of the naturally occurring isotopes.

Chlorine

17

Cl

35.45

Element Name

Chemical Symbol

- 1-2 letter abbreviation
- 1st letter capitalized
- 2nd always lowercase





I will be able to describe what an Element is and how to use the Periodic Table.

What is the Periodic Table?

• Periodic Table

– A table created by Mendeleev

- Arranged the elements according to their atomic numbers
- Revealed patterns among the element's properties.

– Elements in each column share similar properties.

hydrogen 1 H 1.0079																	helium 2 He 4.0026						
lithium 3 Li 6.941	beryllium 4 Be 9.0122																	boron 5 B 10.811	carbon 6 C 12.011	nitrogen 7 N 14.007	oxygen 8 O 15.999	fluorine 9 F 18.998	neon 10 Ne 20.180
sodium 11 Na 22.990	magnesium 12 Mg 24.305																	aluminium 13 Al 26.982	silicon 14 Si 28.086	phosphorus 15 P 30.974	sulfur 16 S 32.065	chlorine 17 Cl 35.453	argon 18 Ar 39.948
potassium 19 K 39.098	calcium 20 Ca 40.078	scandium 21 Sc 44.956	titanium 22 Ti 47.867	vanadium 23 V 50.942	chromium 24 Cr 51.996	manganese 25 Mn 54.938	iron 26 Fe 55.845	cobalt 27 Co 58.933	nickel 28 Ni 58.693	copper 29 Cu 63.546	zinc 30 Zn 65.39	gallium 31 Ga 69.723	germanium 32 Ge 72.61	arsenic 33 As 74.922	selenium 34 Se 78.96	bromine 35 Br 79.904	krypton 36 Kr 83.80						
rubidium 37 Rb 85.468	strontium 38 Sr 87.62	yttrium 39 Y 88.906	zirconium 40 Zr 91.224	niobium 41 Nb 92.906	molybdenum 42 Mo 95.94	technetium 43 Tc [98]	ruthenium 44 Ru 101.07	rhodium 45 Rh 102.91	palladium 46 Pd 106.42	silver 47 Ag 107.87	cadmium 48 Cd 112.41	indium 49 In 114.82	tin 50 Sn 118.71	antimony 51 Sb 121.76	tellurium 52 Te 127.60	iodine 53 I 126.90	xenon 54 Xe 131.29						
caesium 55 Cs 132.91	barium 56 Ba 137.33	57-70 *	lutetium 71 Lu 174.97	hafnium 72 Hf 178.49	tantalum 73 Ta 180.95	tungsten 74 W 183.84	rhenium 75 Re 186.21	osmium 76 Os 190.23	iridium 77 Ir 192.22	platinum 78 Pt 195.08	gold 79 Au 196.97	mercury 80 Hg 200.59	thallium 81 Tl 204.38	lead 82 Pb 207.2	bismuth 83 Bi 208.98	polonium 84 Po [209]	astatine 85 At [210]	radon 86 Rn [222]					
francium 87 Fr [223]	radium 88 Ra [226]	89-102 **	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]	ununillium 110 Uun [271]	unununium 111 Uuu [272]	ununbium 112 Uub [277]	ununquadium 114 Uuq [289]										

Key:

element name
atomic number
symbol
atomic weight (mean relative mass)





I will be able to use the info displayed on the periodic table to determine characteristics of the elements.

What is The Periodic Table?

- Periodic Table

Atomic #

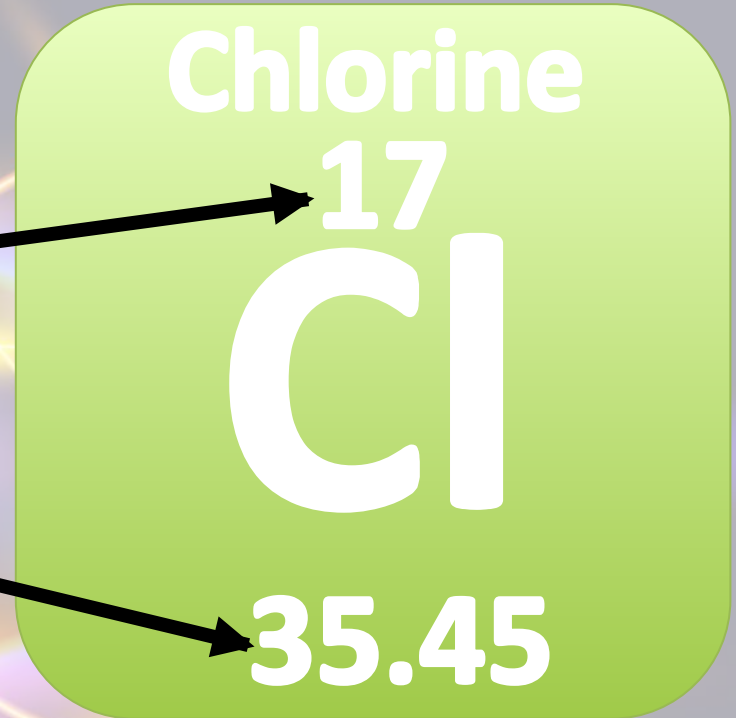
Atomic Mass

(round this number)

Protons = **Atomic Number**

Neutrons = **Atomic Mass - Atomic Number**

Electrons = **Atomic Number**

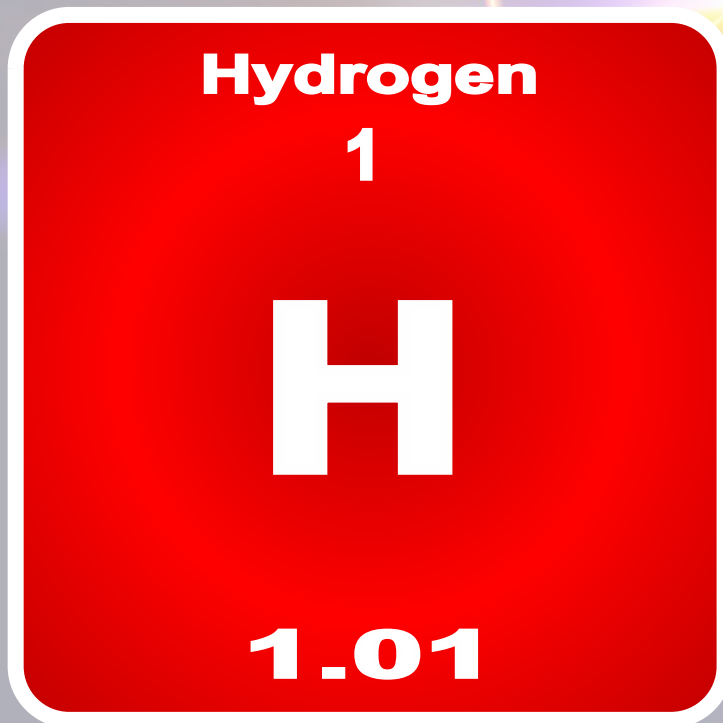




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What is The Periodic Table?

- Periodic Table



P =

N =

E =





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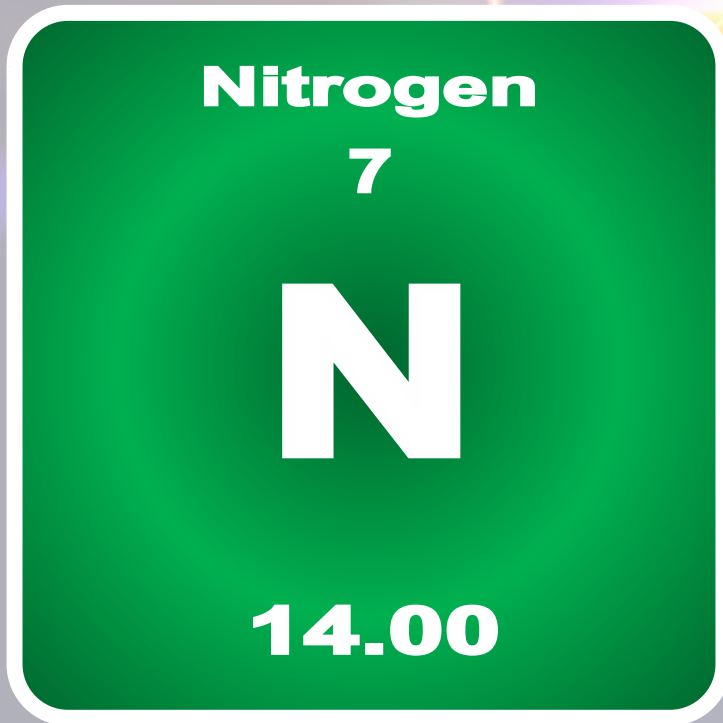




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Compounds, Mixtures and Solutions

Earth Science Intro Unit

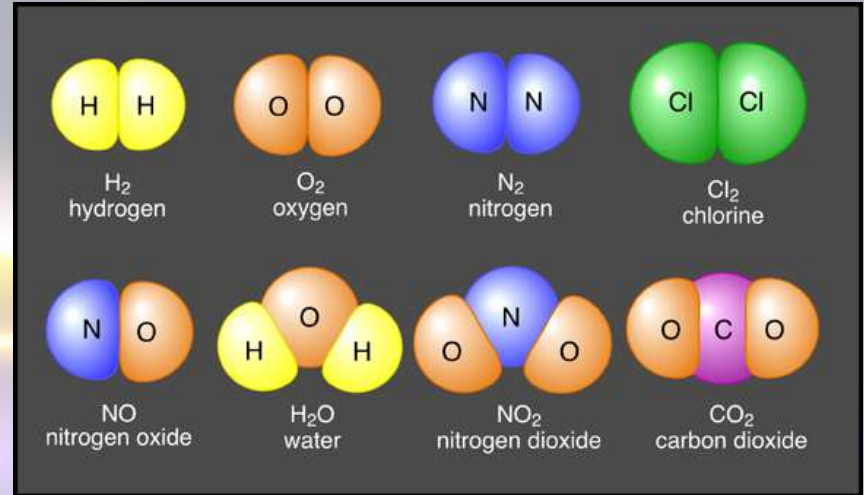


I will be able to define and describe the differences between compounds and mixtures.

What is a Compound?

• Compounds

- a substance made up of different kinds of atoms chemically combined.
- Has different properties from the elements that make them up
 - Ex. NaCl – salt (table salt)
 - Na= sodium ; a solid that explodes when it comes in contact with any form of water
 - Cl= a poisonous gas





I will be able to count atoms in various examples of compounds.

How to Count Atoms

- **Counting Atoms**

- Hydrogen (H_2)

- Hydrogen =

- Water (H_2O)

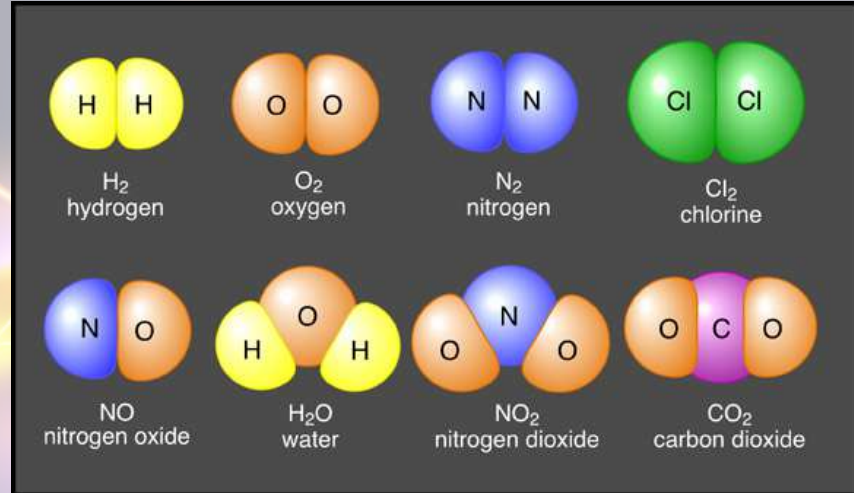
- Hydrogen =

- Oxygen =

- Nitrogen Oxide (NO)

- Nitrogen =

- Oxygen =



- Sugar ($C_6H_{12}O_6$)

- Carbon =

- Hydrogen =

- Oxygen =





I will be able to define and describe the differences between compounds and mixtures.

What is a Mixture?

- **Mixtures**

- two or more substances that are combined physically not chemically
- Made of many different kinds of particles that can usually be separated.





I will be able to define and describe the differences between compounds and mixtures.

What is a Mixture?

• Examples of Mixtures

- Homogeneous – substances in the mixture are evenly spread out.
- Uniform composition
 - Air
 - Corn Oil
 - Vinegar
 - Solutions- (salt water)





I will be able to define and describe the differences between compounds and mixtures.

What is a Mixture?

- **Examples of Mixtures**
 - Heterogeneous – a mixture that lacks a uniform composition
 - Rocks- made up of minerals in different proportions.
 - Sand at the beach.
 - Vinegar and Oil





I will be able to define and describe what a solution is.

What is a Solution?

- **Solutions**

- Different kind of mixture, homogeneous mixture
- One substance is dissolved in another substance
 - Ex. Salt dissolved in water,
 - Coffee
 - Tea

