



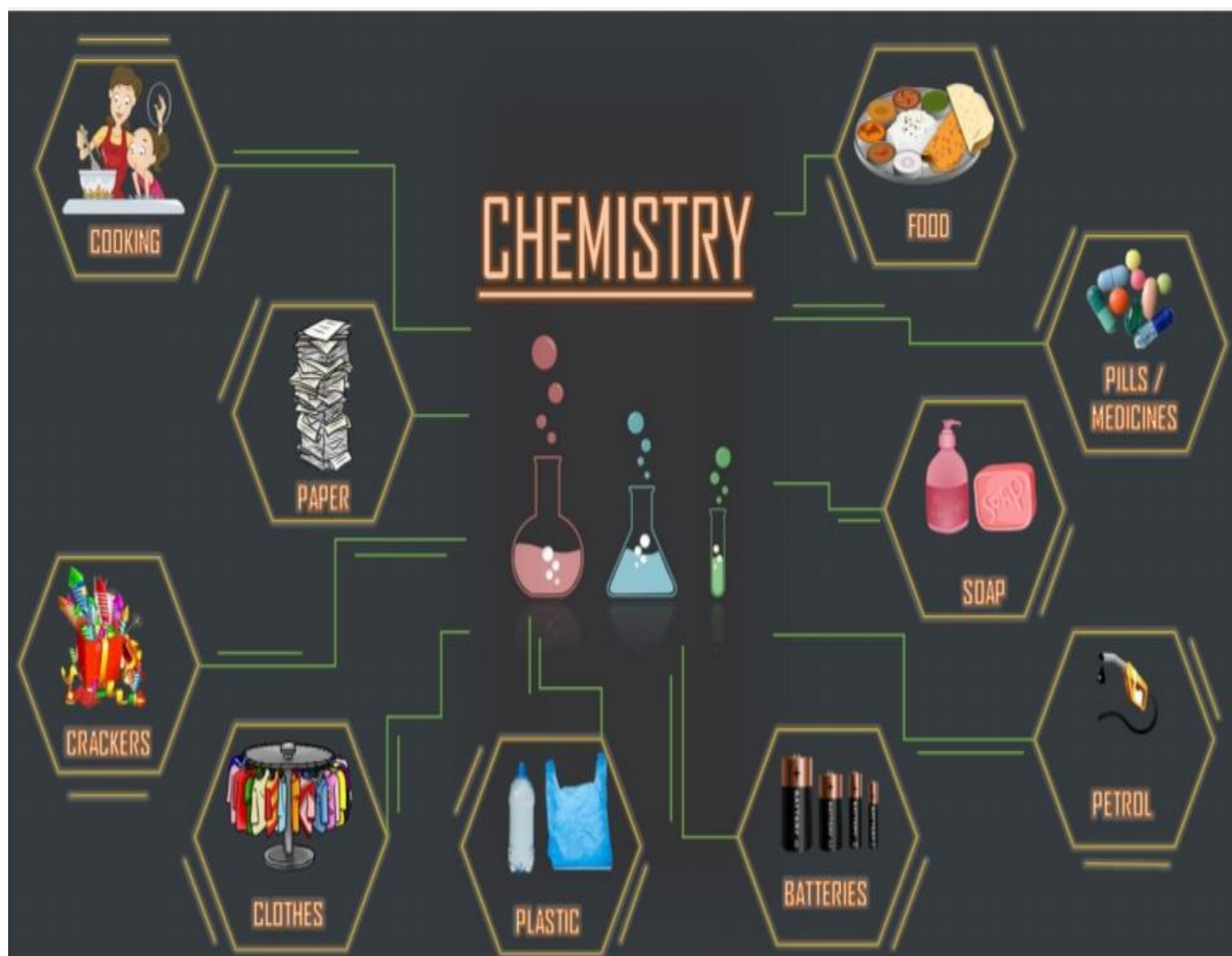
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Do
you
know
where
it
all
started?

LIGHTS CHEM-ERA

REACTIONS

Chemistry is the study of matter and the chemical reactions between substances. Chemistry is also the study of matter's composition, structure, and properties. Matter is essentially anything

in the world that takes up space and has mass.

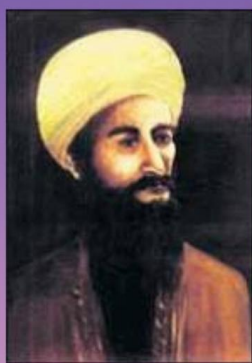
Chemistry is sometimes called "the central science," because it bridges physics with other natural sciences, such as geology and biology.

In Hindi, Chemistry is also known as "**Rasaayan vigyan**".

The word "**Chemistry**" is derived from the word "**Alchemy**" and "**Alchemy**" is borrowed from the Arabic word "**Al-kimia**" which means "**the art of transformation**".



Jabir Ibn Hayyan has also done many pioneering works in the field of Chemistry, (the student of Imam Jafar as-Sadiq(a.s)-The Founder of Chemistry). He is referred as Geber/Jeber in the west. Popularly known as the father of chemistry, Jabir's works contain the oldest known systematic classification of chemical substances, and the oldest known instructions for deriving an inorganic compound (sal ammoniac or ammonium chloride) from organic substances (such as plants, blood, and hair) by chemical means.



Jabir Ibn Hayyan

Antoine-Laurent de Lavoisier
He is widely considered in popular literature as the "father of modern chemistry"
Lavoisier is most noted for his discovery of the role oxygen plays in combustion. He recognized and named oxygen (1778) and hydrogen (1783), and opposed the phlogiston theory. Lavoisier helped construct the metric system, wrote the first extensive list of elements, and helped to reform chemical nomenclature.

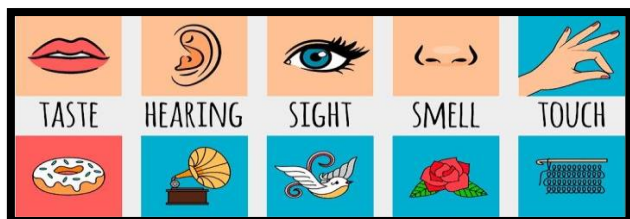


Antoine-Laurent de Lavoisier

But what makes Chemistry so interesting and increases the curiosity to learn more is everything you use involves chemistry and chemical reactions, for eg., when you play, eat, breathe, study or even just sit still reading a book. Your body too is made up of atoms – say 99 percent. It is purely a play of chemicals. It is all around you! Chemistry is everywhere, it is about how the world works!

A Chemical Point of View

Everything you hear, see, smell, taste, and touch involves chemistry and chemicals (matter). And hearing, seeing, tasting, and touching all involve intricate series of chemical reactions and



interactions in your body

Everyone has their own view of the world.

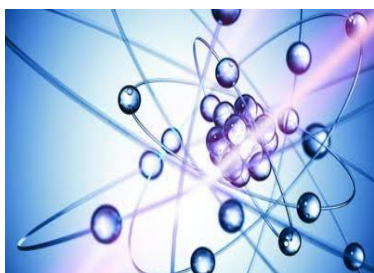


Imagine a human body. Most people look at its outer appearance and that's it.

Doctors look into it as flesh and blood, bones and marrow.

And then there are chemists who look at the human body like as one that is composed of elements.

Chemists sometimes refer to matter as 'stuff', and indeed so it is. Matter is anything that has mass and occupies space. Which is to say, anything you can touch or hold. Common usage might have us believe that



'chemicals' are just those substances in laboratories or something that is not a natural substance. Far from it, chemists believe that everything is made of chemicals.

We are all surrounded by chemicals. Using those chemicals makes us innate chemists somewhere or the other. Many people use nail polish remover and that's it but do you know in the chemical labs this same chemical called acetone is used as drying agent in experiments. Strange how everything has chemistry



Vinegar

linked to it!

Acetic Acid



Chemists do look at things differently. They get into the details, into the making of things, their chemical makeup. So many people just look at something and that's it but chemists pay attention to how it is made, what chemicals have gone into the making of a certain thing. That's how they are different.



Miracles that happened with flaws!!!

Ninth-century Chinese alchemists made an explosive discovery in their quest to find an elixir for eternal life. They found out the hard way that mixing salt pepper, sulfur, and charcoal is not a recipe for immortality; it makes **gunpowder**.



In 1859, 22-year-old chemist Robert Chesebrough was investigating an oil well in Pennsylvania when he caught wind of a strange rumour among the oil rig workers: a jelly-like substance known as "rod wax" that constantly got into the machines and caused them to malfunction. But the substance had a good side, too. Chesebrough noticed that the workers used rod wax to soothe cuts and burns on their skin, and he took some home to experiment with. The product of his experimentation was what we know today as petroleum jelly, or Vaseline.

While trying to find a cure for headaches and hangovers, chemist John Pemberton 'from atlanta, concocted a syrup cordial made from wine and coca extract, which he called 'Pemberton's French Wine Coca'. In 1885, Atlanta banned the sale of alcohol, forcing Pemberton to produce a purely coca-based version of the syrup that needed to be diluted. The story goes that one day a careless barman at a soda fountain nearby accidentally spritzed it with ice-cold soda water from the fountain instead of tap water. He organised runners to take small samples to Willis Venables' soda fountain so that taste tests could be undertaken. Either way, customers gave it the thumbs up, and the ever-popular beverage was born.



In the mid 1800s, natural rubber was used for many things such as waterproof boots, but the material was not immune to extremely hot or cold weather. Manufacturers began to give up on rubber but one man saw the potential in the material. Charles Goodyear began experimenting different ways to make rubber more durable, but it wasn't until one day when he accidentally dropped his rubber concoction on a hot stove that he discovered the process of vulcanization. Vulcanization makes rubber more durable and weatherproof.

What an idea, Sir Ji !!

Beets Bleed Blue!

Beets bleed red but a chemistry tweak can create a blue hue. Chemists can tune certain molecules' colour by adding alternating single and double bonds to their chemical structures. That can create molecules that absorb yellow/orange light and, consequently, look blue. The beet pigment already has some bonds in that alternating arrangement, but not nearly enough to appear blue. Bastos hypothesized he could achieve a blue dye by cleaving off part of the molecular structure of the beet pigment and replacing it with a compound called 2,4dimethylpyrrole, which it alternate bonds, thus extending the pattern.



Chitin-An Alternative of Plastic

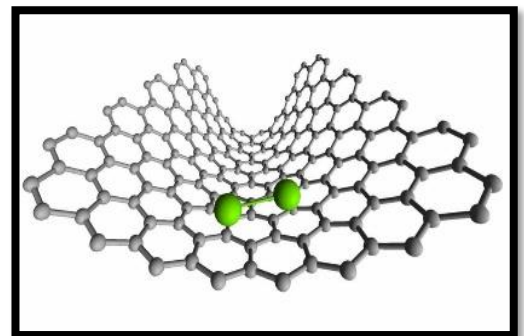
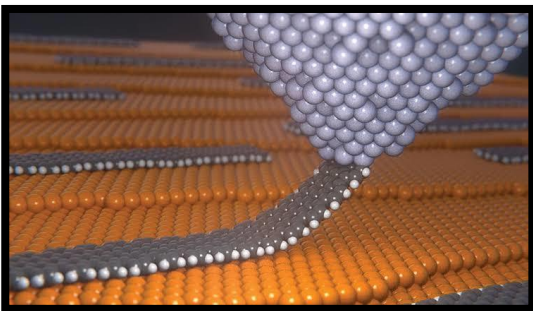
Crustaceans' hardy shells contain chitin, a material that, along with its derivative chitosan, offers many of plastic's desirable properties and takes only weeks or months to biodegrade, rather than centuries. The challenge is getting enough pure chitin and chitosan from the shells to make bio-based "plastic" in cost-effective ways.



Dancing Atoms

Scientists have now captured video of intimate dance of two atoms as they bond (create a pair) with one another, break apart and come together. In a sequence of images from an electron microscope, two atoms of the RHENIUM, bound together to form a

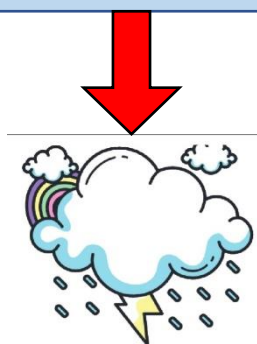
bond, shimmied around one another, moving closer and then farther apart. It is basically based on the changing of bond order between the two atoms over a period of time. Closer the atoms more bonds were formed. At their closest approach, the



atoms had four bonds tethering them together.

Matter of interest

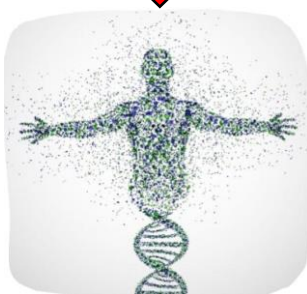
Lightening strikes produces O₃, which is ozone, and strengthen the ozone layer of the atmosphere



The Human body contains enough carbon to provide "lead" (which is really graphite) for 9,000 pencils.



You have around 7 billion atoms in you body, yet you replace about 98% of them



Hot peppers get their heat from a molecule called capsaicin. While the molecule acts as an irritant to mammals, including humans, birds lack the receptor responsible for the effect and are immune to the burning sensation from exposure.

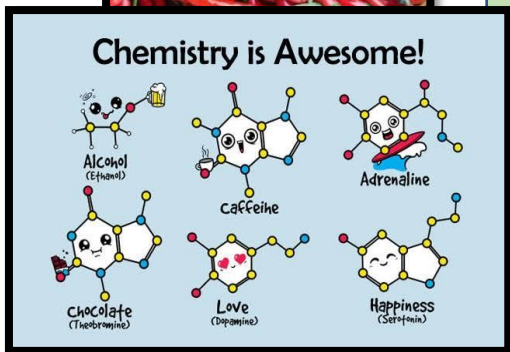


This one is for all the tea lovers! Gallic Acid (GA) is a naturally occurring phenol formed by the hydrolysis of tannins. It is one of the main components of both black and green tea and known to exhibit anti-mutagenic, anti-carcinogenic and anti-inflammatory properties.



Chemistry of Emotions
Whenever you are feeling happy, sad, ecstatic, relaxed, or stressed, there are many chemical reactions taking place in your body. It is because of the chemical messengers called neurotransmitters released in the brain that you can fall in love and cry rivers because of heartbreak.

Chemistry is Awesome!



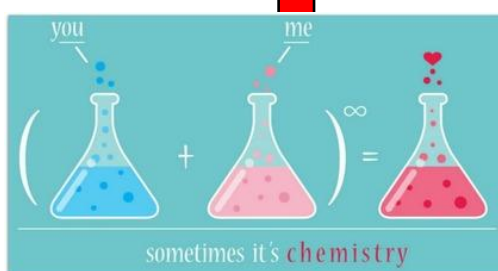
Alcohol (C₂H₅OH)

Adrenaline

Chocolate (Theobromine)

Love (Dopamine)

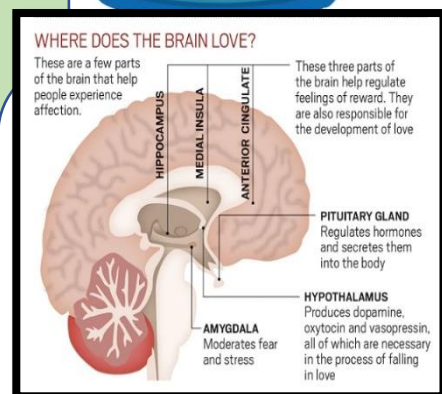
Happiness (Serotonin)



sometimes it's chemistry

WHERE DOES THE BRAIN LOVE?

These are a few parts of the brain that help people experience affection.



These three parts of the brain help regulate feelings of reward. They are also responsible for the development of love

HIPPOCAMPUS

MEDIAL INSULA

ANTERIOR CINGULATE

PITUITARY GLAND
Regulates hormones and secretes them into the body

AMYGDALA
Moderates fear and stress

HYPOTHALAMUS
Produces dopamine, oxytocin and vasopressin, all of which are necessary in the process of falling in love

9 F Fluorine 18.998403	92 U Uranium 238.02981	7 N Nitrogen 14.00674
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with Chemistry

IDENTIFY - Who Am I?(Guess the element/compound).

1.I am the lightest element in the periodic table.

Ans.

2.I am used in Mobile Phone Batteries.

Ans.

3.I get kicked out when you breathe.

Ans.

4.I am present in your bones and teeth.

Ans.

5.I am a major constituent of electrical wires.

Ans.

6.My friend Chlorine and I together give taste to food.

Ans.

7.I smell like rotten eggs.

Ans.

8.I am present in fertilisers and explosives.

Ans.



WORD PUZZLE

Take your inner chemist out and find the words!!!

G	M	Q	Y	M	D	Y	E
N	P	B	F	A	Y	L	Q
V	R	U	B	B	E	R	K
P	U	O	D	C	B	P	O
P	R	O	T	O	N	Y	E
N	E	R	I	V	T	G	W
M	O	T	A	Z	D	Y	M
N	C	A	R	J	S	S	E

ATOM
DYE
ELECTRON
PROTON
RUBBER

Q: What do you call a tooth in a glass of water?
A: One molar solution.

UNSCRAMBLE-FIND THE
CORRECT WORD

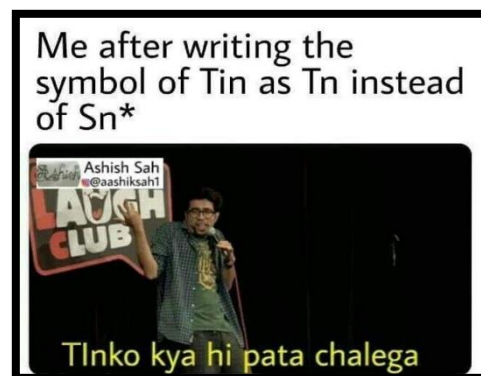
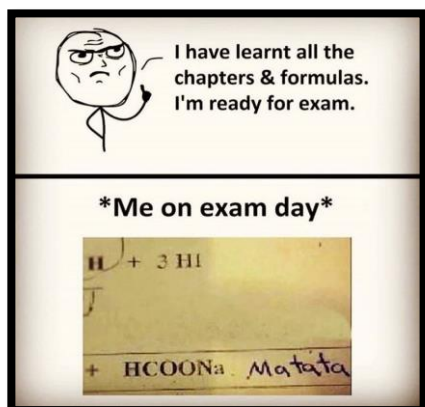
QUESTIONS	ANSWERS
1.GNOYEX	
2.GNCIORA	
3.NCTDOSINOEAN	
4.LEUMLOCE	
5.DMSOUI	

Chemical Reactions after adding
catalysts



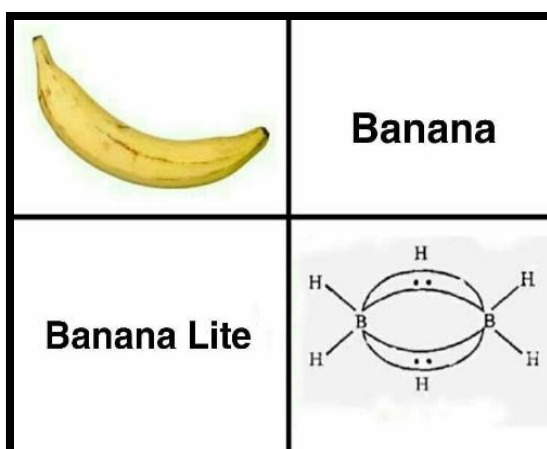
I saw that people trying to synthesize gold and silver were working in ignorance, and by false methods; I then perceived that they belonged to two classes, the dupers and the duped. I pitied both of them.

-GEBER, C. 712 – C. 815 AD



Time is the best appraiser of scientific work, and I am aware that an industrial discovery rarely produces all its fruit in the hands of its first inventor.

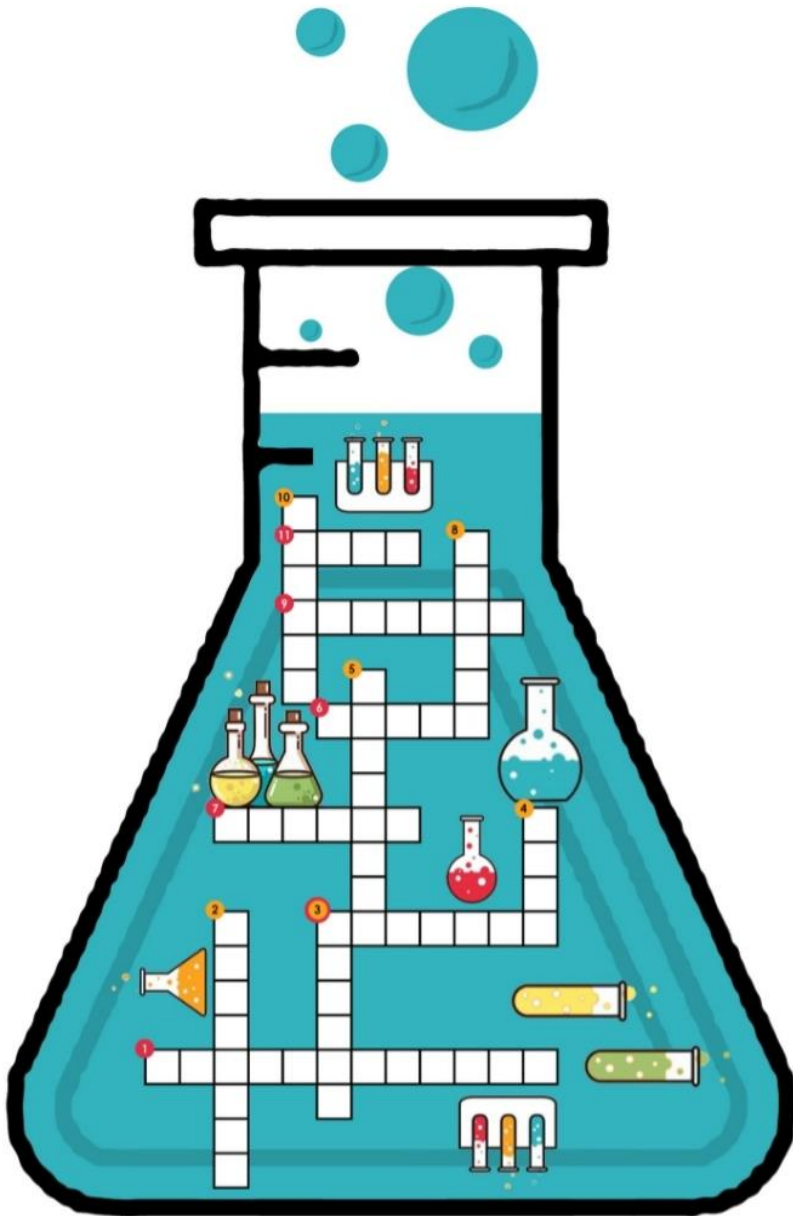
-LOUIS PASTEUR, 1822 TO 1895



REMEMBER!!!

Chemistry is not limited to beakers and laboratories. It is all around us, and the better we know chemistry, the better we know our world.

If you are Smart, Solve the CROSSWORD PUZZLE

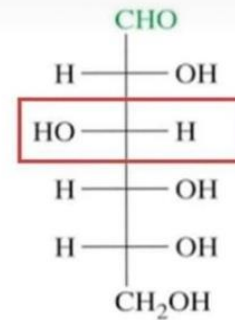


ACROSS

- 1 A colourless poisonous gas; made by the oxidation of methanol.
- 3 Heartburn remedy/Stomach drug
- 6 Excessive consumption of ethanol causes damage to the-
- 7 A non metallic element with tetra valency.
- 9 Atoms of the same chemical elements that have different atomic mass are known as-
- 11 A substance that donates protons or hydrogen ions and/or accepts electrons.

DOWN

- 2 Most commonly used bleaching agent is-
- 3 It's pH is higher than 7
- 4 Most malleable metal is-
- 5 What is the main gas found in the air we breathe
- 8 First metal used by man was-
- 10 Positively charged ions, one that would be attracted to the cathode in electrolysis



Answers

IDENTIFY WHO AM I?
 1. Hydrogen
 2. Lithium
 3. Carbon dioxide
 4. Calcium
 5. Copper
 6. Sodium
 7. H₂S
 8. Nitrogen

UNSCRAMBLE-FIND THE CORRECT WORD
 1. Oxygen
 2. Organic
 3. Condensation
 4. Molecule
 5. Sodium

CROSSWORD PUZZLE
 Across
 1. Formaldehyde
 3. Antacid
 4. Gold
 5. Nitrogen
 7. Carbon
 8. Copper
 9. Isotopes
 11. Acid

Down
 2. Chlorine
 3. Alkali
 4. Gold
 5. Nitrogen
 8. Cation
 10. Cation

WORD PUZZLE
 G M Q Y M D Y S
 N P B F A Y L Q
 V R U B B K K
 P U O D C B P O
 P R O T O N Y E
 N E R I V T G M
 M O T A Z D Y M
 N C A R J S S E

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