CATALYST

April 2019 **Chemistry News Letter** **Vol: 04 Issue: 02**

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Ms. Niriksha Kane and Mr. Nimay Kamat won 1st place at All Goa Chemistry Oral quiz and Ms. Niriksha Kane also won 1st place at the All Goa written quiz organized by ACT Goa in February 2019.

Teachers and Students Achievements

Dr. Manjita Porob and Mrs. Padmini Raikar successfully completed the 1st Online Refresher Course in Chemistry conducted by National Resourse Centre Of Chemistry,MHRD, Government of India on Swayam Portal from 1/11/18-27/2/19

Dr. Mayuri Naik has been awarded Ph.D. for her thesis entitled "Synthetic studies in Oxygen heterocycles". under the guidance of Prof. Vijayendra P. Kamat and Prof. Santosh G. Tilve, Department of Chemistry, Goa University in February 2019

Mr. Nikhil Dessai, student of TYBSc cleared the UPSC Aptitude test for Central Armed Police forces.

Intercollegiate achievements of the Chemistry Students

I. Champions at **''CHEMSCOPE''** organized by the St. Xaviers college Mapusa on 28/1/19.

II. Champions at,'**CHEMOTRON**' organized by PES college of Arts & Science, Farmagudi Goa on 02/3/19.
Mr. Nimay Kamat of TYBSc was awarded the title of Mr. Chemotron at the event.

III. Runner's up at, '**CHEMAURA** organized by Government college of Arts, science & Commerce, Khandola on 27/2/19.

IV. Runner's up at, '**CHEMTALSEA**', organized for the students on 30/1/19.

Ms Lizen Mascarenhas and Ms Sevina Dsouza Department of Chemisrty won the inter class Chemistry quiz,

Students working on the project entitled 'Synthetic studies in Xanthenes' , under the guidance of Dr. Mayuri Naik won 3rd place at the poster competition organized by the College on Prerna Diwas.

Ms. Sarita Roka, won 2nd prize at the poster competition for her TYBSc poster at the Goa University poster competition on 9/3/19.

Teachers and students activities

Talk on ' Safety measures in the Chemistry laboratory' was organized on 2/11/18 for the teaching, non- teaching staff and the students . The speaker was Mr. Richie Baracho, Executive II, EHS ,Vergo Labs Verna Goa.

Talk on 'Pharmaceutical Chemistry: Working & Challenges' was organized for the students of chemistry on 10/11/18 by Mr. Vishwas Dessai, Sr. Manager, QA, Blue Cross labs Verna Goa.

St. Xaviers College of Arts, Commerce & Science, Mapusa won the Intercollegiate Event "KYNESIS 2019" organized by the Dept. of Chemistry, ParvatibaiChowgule College (Autonomous), under DBT Star College Scheme.

Chemistry poem

Na ye Lab hoti Na Ye Accident Hota
Abhi Practical main aye nazar Ek Larki
Sundar thi Naak Uski Test Tube Jaisi
Baton main Uski Glucose ki Mithas thi
Sanson main Ester ki Khushboo bhi sath thi
Aankhon se jhalak ta tha kuch is Tarah ka Pyaar
Bin Piye hi ho jata hai Alcohol ka Khumar
Benzene sa hota tha Uski Presence ka Ehsaas
Andhere main hota tha Radium ka Ahsas
Nazra in mileen, reaction hua
Kuch is tarah Love ka Production hua
Lagne lage Uske Gharke Chakkar aise
Nucleus key charon taraf Electron hon jaise
Us din hamare Test ka Confirmation hua
Jab uske daddy se hamara Introduction hua
Sunkar hamari baat wo aisay Uchal pari
Ignesiun Tube main jaise Sodium Bharakuthe
Wo boli, Hosh main aao, Pahchano apni Auqat
Iron mil nahin sakta kabhi Gold ke saath
Ye sunker Tuta hamare Armanon BharaBeaker
Aur hum Chup rahay Benzaldehyde ka Karwa Ghoont pee ker
Ab uski yadon kesi waha mara Ka mchalta na tha
Aur Lab main ha mare Dil kesi wa kuch jalta na tha
Zindagi ho gayee Unsaturated Hydrocarbon ki Tarah
Aur ham phir te hain Awara Hydrogen ki Tarah.

By: Girish Parganiha

Chemistry Jokes

One day on the Tonight Show, Jay Leno showed a classified add that read:"Do you have mole problems? If so, call Avogadro at 602-1023."

If a bear in Yosemite and one in Alaska both fall into the water, which one dissolves faster ?The one in Alaska, because it is polar.

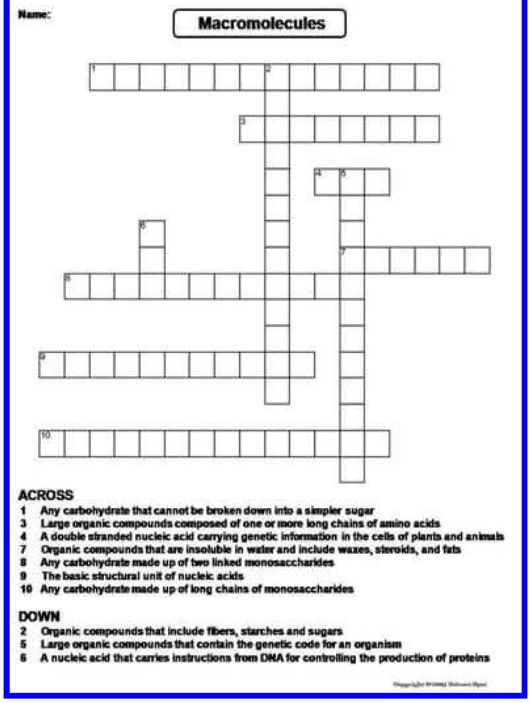
Two atoms are walking down the street and they run into each other. One says to the other, "Are you all right ?" "No, I lost an electron!" "Are you sure?" "Yeah, I'm positive!"

Did you know?....

1)**Lightning strikes produce Ozone, hence the characteristic smell after lightning storms**
Ozone, the triple oxygen molecule that acts like a protective stratospheric blanket against ultraviolet rays, is created in nature by lightning. When it strikes, the lightning cracks oxygen molecules in the atmosphere into radicals which reform into ozone. The smell of ozone is very sharp, often described as similar to that of chlorine. This is why you get that "clean" smell sensation after a thunderstorm.

2)**Glass is actually a liquid, it just flows very, very slowly**

Neither liquid, nor solid, explaining glass is a lot harder than some might think. In glass, molecules still flow, but at a very low rate that it's barely perceptible. As such, it's not enough to class glasses as liquid, but neither as solids. Chemists seem to be contend on calling them amorphous solids— a state somewhere between those two states of matter. There's also a thing called metal glass – a class of materials that are three times stronger than titanium and have the elastic modulus of bone, all while being extremely lightweight.



Chemistry Lab safety measures

- Keep path ways clear by placing extra items (books, bags, etc.) on the shelves or under the work tables.
- If under the tables, make sure that these items cannot be stepped on. Long hair (chin-length or longer)must be tied back to avoid catching fire.
- Wear sensible clothing including footwear. Loose clothing should be secured so they do not get caught in a flame or chemicals.
- Do not taste or smell chemicals.
- Wear safety goggles to protect your eyes while heating substances.
- Never point a test tube being heated at another student or yourself.
- Never look in to a test tube while you are heating it.
- Unauthorized experiments or procedures must not be attempted without supervision
- Keep solids and RED LIST chemicals out of the sink.
- Do not lean, hang over or sit on the laboratory tables.
- Do not leave your assigned laboratory station without permission of the teacher.
- Learn the location of the fire extinguisher, eye wash station, first aid kit and safety shower.
- Fooling around or "horseplay" in the laboratory is absolutely for bidden. Anyone wearing acrylic nails will not be allowed to work with matches, lighted splints, Bunsen burners, etc.
- Do not lift any solutions, glass ware or other types of apparatus above eye level.
- Follow all instructions given by your teacher.
- Learn how to transport all materials and equipment safely.
- No eating or drinking in the lab at anytime!
- Leave your work station clean and in good order before leaving the laboratory.

The chemistry of life : The human body

You are what you eat. But do you recall munching some molybdenum or snacking on selenium? Some 60 chemical elements are found in the body, but what all of them are doing there is still unknown. Roughly 96 percent of the mass of the human body is made up of just four elements: oxygen, carbon, hydrogen and nitrogen, with a lot of that in the form of water. The remaining 4 percent is a sparse sampling of the periodic table of elements. Some of the more prominent representatives are called macro nutrients, whereas those appearing only at the level of parts per million or less are referred to as micronutrients. These nutrients perform various functions, including the building of bones and cell structures, regulating the body's pH, carrying charge, and driving chemical reactions. The FDA has set a reference daily intake for 12 minerals (calcium, iron, phosphorous, iodine, magnesium, zinc, selenium, copper, manganese, chromium, molybdenum and chloride). Sodium and potassium also have recommended levels, but they are treated separately. However, this does not exhaust the list of elements that you need. Sulfur is not usually mentioned as a dietary supplement because the body gets plenty of it in proteins. And there are several other elements — such as silicon, boron, nickel, vanadium and lead — that may play a biological role but are not classified as essential.

"We don't look at them as single elements but as elements wrapped up in a compound," said Christine Gerbstadt, national spokesperson for the American Dietetic Association. A normal diet consists of thousands of compounds (some containing trace elements) whose effects are the study of ongoing research. For now, we can only say for certain what 20 or so elements are doing. Here is a quick rundown, with the percentage of body weight in parentheses.

Oxygen (65%) and hydrogen (10%) are predominantly found in water, which makes up about 60 percent of the body by weight. It's practically impossible to imagine life without water.

Carbon (18%) is synonymous with life. Its central role is due to the fact that it has four bonding sites that allow for the building of long, complex chains of molecules. Moreover, carbon bonds can be formed and broken with a modest amount of energy, allowing for the dynamic organic chemistry that goes on in our cells.

Nitrogen (3%) is found in many organic molecules, including the amino acids that make up proteins, and the nucleic acids that make up DNA.

Calcium (1.5%) is the most common mineral in the human body — nearly all of it found in bones and teeth. Ironically, calcium's most important role is in bodily functions, such as muscle contraction and protein regulation. In fact, the body will actually pull calcium from bones (causing problems like osteoporosis) if there's not enough of the element in a person's diet.

Phosphorus (1%) is found predominantly in bone but also in the molecule ATP, which provides energy in cells for driving chemical reactions.

Potassium (0.25%) is an important electrolyte (meaning it carries a charge in solution). It helps regulate the heartbeat and is vital for electrical signaling in nerves.

Sulfur (0.25%) is found in two amino acids that are important for giving proteins their shape.

Sodium (0.15%) is another electrolyte that is vital for electrical signaling in nerves. It also regulates the amount of water in the body.

Chlorine (0.15%) is usually found in the body as a negative ion, called chloride. This electrolyte is important for maintaining a normal balance of fluids.

Magnesium (0.05%) plays an important role in the structure of the skeleton and muscles. It also is necessary in more than 300 essential metabolic reactions.

Iron (0.006%) is a key element in the metabolism of almost all living organisms. It is also found in hemoglobin, which is the oxygen carrier in red blood cells. Half of women don't get enough iron

Zinc (0.0032%) is an essential trace element for all forms of life. Several proteins contain structures called "zinc fingers" help to regulate genes. Zinc deficiency has been known to lead to dwarfism in developing countries.
Copper (0.0001%) is important as an electron donor in various biological reactions. Without enough copper, iron won't work properly in the body.
Iodine (0.000016%) is required for making of thyroid hormones, which regulate metabolic rate and other cellular functions. Iodine deficiency, which can lead to goiter and brain damage, is an important health problem throughout much of the world.
Selenium (0.000019%) is essential for certain enzymes, including several anti-oxidants. Unlike animals, plants do not appear to require selenium for survival, but they do absorb it, so there are several cases of selenium poisoning from eating plants grown in selenium-rich soils.
Chromium (0.0000024%) helps regulate sugar levels by interacting with insulin, but the exact mechanism is still not completely understood.
Manganese (0.000017%) is essential for certain enzymes, in particular those that protect mitochondria — the place where usable energy is generated inside cells — from dangerous oxidants.
Molybdenum (0.000013%) is essential to virtually all life forms. In humans, it is important for transforming sulfur into a usable form. In nitrogen-fixing bacteria, it is important for transforming nitrogen into a usable form.
Cobalt (0.0000021%) is contained in vitamin B12, which is important in protein formation and DNA regulation.

Source : https://www.livescience.com

LIQUID NITROGEN GASTRONOMY

This is the science of creating ice cream using Liquid Nitrogen and not to be confused with the ice cream shop of the same name , if any. Ice cream does not seem complicated to make, but contrary to popular belief it's not as simple as just freezing cream and sugar.

Rather, this complex process requires slowly freezing cream to allow small ice crystals to form, creating a creamy texture. The process can be long and arduous, but there's a secret ingredient for much speedier ice cream: liquid nitrogen. Liquid nitrogen is a chemical that boils at a very low temperature, -312 F to be precise. This means that at room temperature, nitrogen is a gas, while at very cold temperatures below -312F, it's a liquid. In its liquid form, nitrogen provides a handy way to make ice cream fast: it can be poured over the ice cream base mixture—which is mostly heavy cream and sugar— to reduce the temperature of your ice cream mixture very quickly.
The drop-in temperature reduces the motion of all the molecules and water molecules begin to form small seed crystals and nucleation sites. As you stir, the mechanical energy breaks up the crystals into tiny pieces. By contrast, if you place your ice cream mixture into the freezer, there are no external forces to interrupt the growth of the ice crystals, and the resultant ice cream will feel grainy and coarse. We mention crystals a lot, but in the ultimate ice cream, we never want to feel the texture of crystals in our mouths; ideally, they are much smaller than the particle size that our taste buds can detect: about 20 μm [1]. If the water crystals are too large they can have an adverse effect on the texture, resulting in an 'icy' texture that is not so smooth and creamy. The formation of ice crystals starts with nucleation sites or seed crystals that are frozen in the solution of cream and sugar. The more nucleation sites, the more ice crystals. If frozen too quickly, the initial nucleation sites may develop into much larger crystals and have adverse effects on the overall ice cream texture [4]. But with rapid stirring, large ice crystals are prevented from forming and you get a creamy and smooth texture that can even rival the smoothness of store bought ice cream. Most ice cream shops centrifuge bowls filled with ice cream mixtures with a mixer to prevent the formation of large ice crystals, but flash freezing with liquid nitrogen circumvents that. A speedy freeze doesn't allow enough time for large ice crystals above 100mm to develop and creates more seed crystals [4]. Creamier ice creams contain minute ice crystals ranging around 10- 20 μm, when churned slowly or frozen quickly. Using liquid nitrogen as a freezing agent isn't new; it's used in other industries to preserve samples of cells and tissues, as well as to flash freeze food products for preservation. It's also been used in a plethora of restaurants and dishes in the recent age of modernist cuisine. For example, creating powder from flash frozen herbs with fresh picked herbs, or even creating a foie gras flower from frozen duck liver. Additionally, cryo cooking — primarily cryo 'frying' — is utilized as a technique to freeze a food product and allow it to fry without becoming overcooked.

Source: http://blogs.discovermagazine.com/scienceandfood

Editorial Team: **Dr. Manjita Porob (Head, Department of Chemistry), Asst prof. Mr. Anurag Naik and Student FYBSc. Mr. Prasheel Usapkar.**