

Editorial Team



Akshat Bhatia M1-B



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Kavish Gupta
M2C



Aryan Chawla
S2D

FROM THE EDITOR'S DESK...

DR. MANPREET KAUR
manpreet2020.gbs@gmail.com
+91 98116 65611

PRABHJOT KAUR
+91 98999 97956

Quest is an engaging platform for students to express their scientific and mathematical creativity through cartoons, art forms, creative writing, research articles, analysis, paintings, drawings and other forms relative to General Science and Mathematics.

All the students of classes P4- SS2 are encouraged to bring forth their scientific temperament in any representation of writings, videos, photography or art forms.

QUEST
FEBRUARY EDITION

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HYDROPONICS

- By Mr. Sanjay Bhardwaj, Ms. Anjali Chibber & Ms. Mini Sethi

- **HYDROPONICS” is the growing of plants in a liquid nutrient solution with or without the use of artificial media.**
- **Hydroponic systems can either be liquid or aggregate.**
- **Liquid systems have no supporting medium for the plant roots; whereas, aggregate systems have a solid medium of support.**
- **Hydroponic systems are further categorized as open (once the nutrient solution is delivered to the plant roots, it is not reused) or closed (surplus solution is recovered, replenished, and recycled).**

ADVANTAGES

- **It can be used in places where in-ground agriculture or gardening is not possible (for example, dry desert areas or cold climate regions).**
- **More complete control of nutrient content, pH and growing environment.**
- **Lower water and nutrient costs associated with water and nutrient recycling.**
- **Faster growth due to more available oxygen in root area.**
- **Elimination or reduction of soil related insects, fungi and bacteria.**

cont.

- **Much higher crop yields.**
- **No weeding or cultivation required.**
- **Some crops, such as lettuce and strawberries, can be lifted from ground level to a much better height for planting, cultivation and harvesting. This gives much better working conditions and hence lowers labour costs.**
- **Crop rotation/fallowing is not necessary.**
- **Transplant shock is reduced.**

DISADVANTAGES

- **Initial and operational costs are higher than soil culture.**
- **Skill and knowledge are needed to operate properly.**
- **Some diseases caused by Fusarium and Verticillium can spread quickly through the system.**



DRIP IRRIGATION

- By Mr. Gopal Pandey, Nehal Chaudhry (S1A), Shriya Bhatnagar (S1B) & Darshini Choudhary (S1D)

This method is achieved by making small continuous holes in a straight line on a watering pipe and connecting the pipe to the water pump or tap. This pipe is then put near the roots of plants and when the tap is opened the water drips through the holes in small drops from time to time on the roots of the plants.



TERRARIUM

-By Kiara Hissaria (M2A), Manikbir Singh (M3A)
& Panshul Prabhakar (M3A)

A terrarium is a sealable glass container containing soil and plants; however a terrarium can also be open to the atmosphere. Terrariums are often kept as ornamental items.

A closed terrarium's closed walls allow heat and light to enter, creating a unique environment for plant growth. Heat entering the sealed container allows the creation of a small water cycle due to evaporating moisture from the soil and plants. The water vapor then condenses onto the walls of the container, eventually falling back onto the plants and soil below. Light passing through the transparent walls, allowing photosynthesis, with the constant water supply provides an ideal environment for plants.

A terrarium is a demonstration which allows the viewers to see the relevant processes- evaporation, condensation etc. taking place on earth.



WATSON & CRICK MODEL OF DNA

- By Ms. Mini Sethi & Dr. Manpreet Kaur

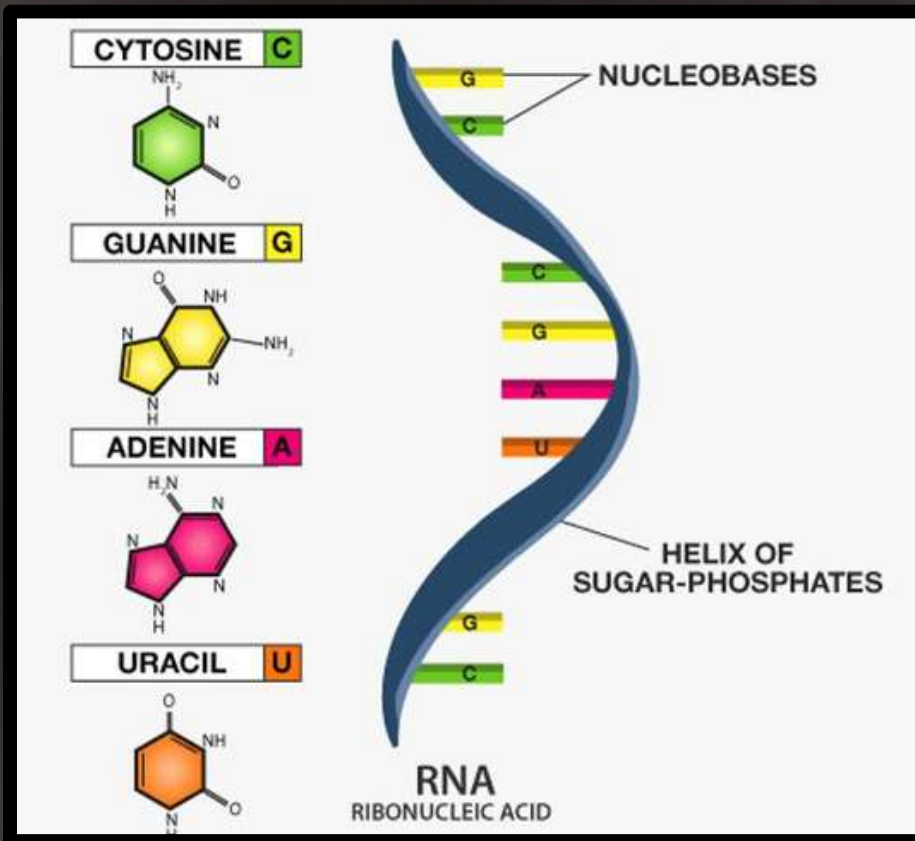
• DNA is typically double stranded and is made of deoxy-ribonucleotides that are linked by phosphodiester bonds. A deoxy-ribonucleotide in the DNA chain contains deoxy-ribose (the pentose sugar), one of the four nitrogenous bases (A, T, G, and C), and a phosphate group. The two basic categories of nitrogenous bases are: the purines (adenine [A] and guanine [G]), each with two fused rings, and the pyrimidines (cytosine [C], thymine [T], and uracil [U]), each with a single ring.

• A bases are always paired with Ts, and Cs are always paired with Gs, which is consistent with and accounts for Chargaff's rule.



RNA STRUCTURE

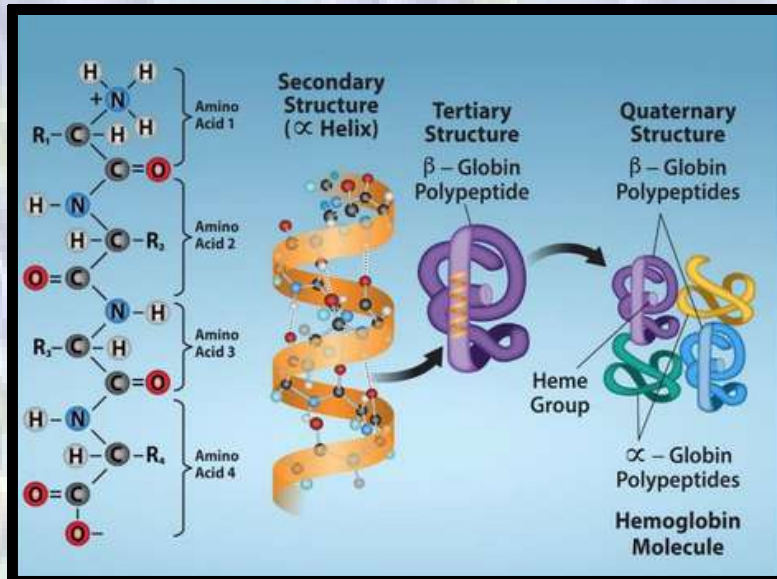
-By Ms. Mini Sethi & Dr. Manpreet Kaur



- RNA is typically single stranded and is made of ribonucleotides that are linked by phosphodiester bonds. A ribonucleotide in the RNA chain contains ribose (the pentose sugar), one of the four nitrogenous bases (A, U, G, and C), and a phosphate group. The two basic categories of nitrogenous bases are: the purines (adenine [A] and guanine [G]), each with two fused rings, and the pyrimidines (cytosine [C], thymine [T], and uracil [U]), each with a single ring.
- A bases are always paired with Us, and Cs are always paired with Gs, which is consistent with and accounts for Chargaff's rule.

Protein structure

-By Ms. Mini Sethi & Dr. Manpreet Kaur



- A polymeric chain of amino acid residues constitutes proteins.
- A protein's structure is primarily made up of long chains of amino acids. The arrangement and placement of amino acids give proteins certain characteristics. All amino acid molecules contain an amino (-NH₂) and a carboxyl (-COOH) functional group.
- The primary structure is the amino acid sequence, from the N terminus to the C terminus of the protein. The secondary structure is the local structure stabilized by hydrogen bonds along the backbone. These secondary structures pack together to form the tertiary structure. Some proteins, such as the displayed hemoglobin molecule, have more than one polypeptide chain that associate to form the functional unit of the protein; this is called quaternary structure.

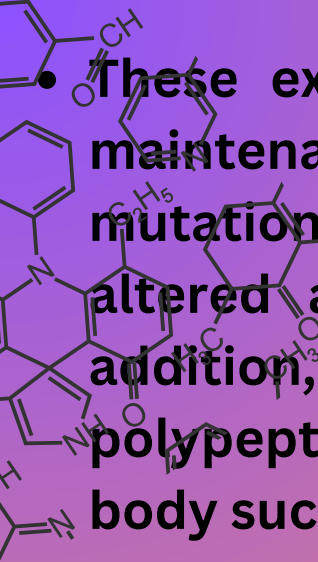
Polypeptide Synthesis

-By Shrineet Mishra, M3C

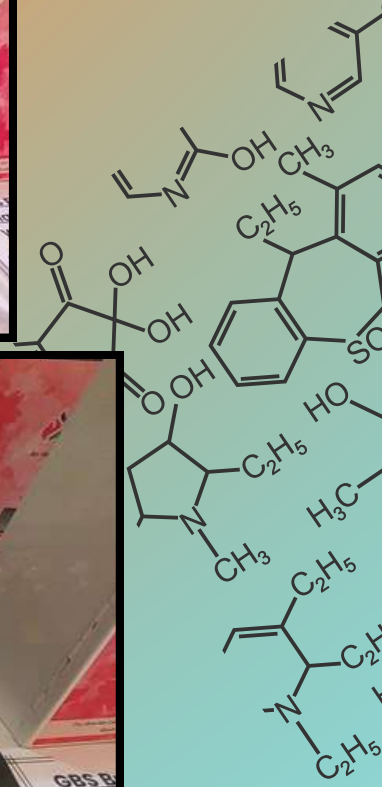
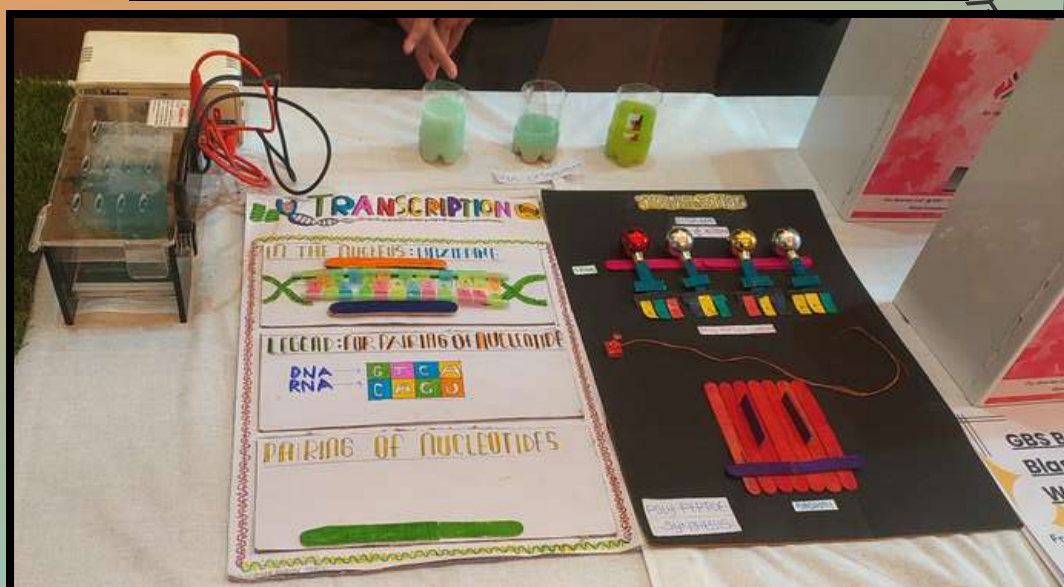
In every cell, Central Dogma is followed for Protein synthesis



- It is a biological process by which the nucleotide sequence of a gene in a DNA codes for a particular protein. Messenger RNA is an intermediate molecule that allows the code in DNA to leave the nucleus and reach the ribosome. The tRNA molecules bind to the ribosome whilst the anticodons bind to the corresponding codons on the mRNA strand, in turn leaving an amino acid behind. This process continues and a growing polypeptide chain forms. Once complete, this chain is folded into a three-dimensional shape that is exclusive to its function.



• These expressed proteins play a crucial role in the maintenance and growth of humans. If there is any mutation in DNA during replication, then it leads to an altered amino acid sequence or wrong amino acid addition, which leads to malformed protein or a polypeptide chain and many disorders and diseases in body such as Cystic Fibrosis and Sickle Cell Anemia.



BACTERIOPHAGE: LYTIC CYCLE AND LYSOGENIC CYCLE

-By Ms. Anjali Chhibber, Ms. Mini Sethi
& Dr. Manpreet Kaur

Bacteriophages are viruses that infect bacteria. Bacteriophages may have a lytic cycle or a lysogenic cycle.

Lytic Cycle

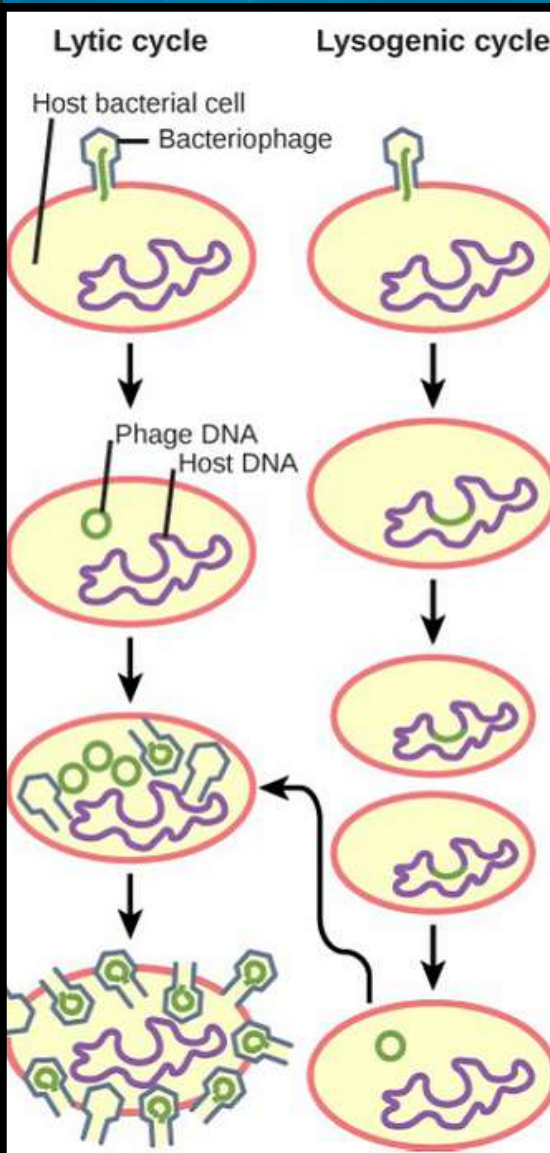
- With lytic phages, bacterial cells are broken open (lysed) and destroyed after immediate replication of the virion. As soon as the cell is destroyed, the phage progeny can find new hosts to infect.

Lysogenic Cycle

- The lysogenic cycle does not result in immediate lysing of the host cell. Bacteriophages capable of a lysogenic life cycle are termed temperate phages. Their viral genome will integrate with host DNA and replicate along with it fairly harmlessly, or may even become established as a plasmid.

cont.

The virus remains dormant until host conditions deteriorate, perhaps due to depletion of nutrients; then, the endogenous phages (known as prophages) become active. At this point they initiate the reproductive cycle, resulting in lysis of the host cell. As the lysogenic cycle allows the host cell to continue to survive and reproduce, the virus is reproduced in all of the cell's offspring.



SANITARY NAPKIN DISPENSER

-By Mr. Satish Dixit, Anwita Saini (S2A) & Khushi Sethi (S2A)

Paving the way to a better future

‘If you don’t like something, change it. If you can’t change it, change your attitude.’ Rightfully said by Maya Angelou, an empowering female of her time.

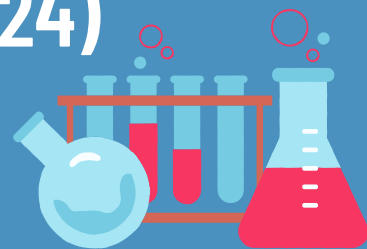
Gyan Bharati School is breaking stigma and creating betterment for young girls who have entered a more mature stage of their lives. The Business Blasters Club led by Anwita Saini of S2A and Khushi Sethi of S2A, have taken a unique initiative to install sanitary napkin wending machines to allow ease of access to menstruation supplies. This has been a taboo for too long and 21st century is surely the time for change. We at Gyan Bharati School understand the need of menstruating students who might need a push of empathy and support. The initiative with its sole objective of empowering both students and teachers will be implemented over the coming weeks.





CHEMISTRY EXHIBITS / PROJECTS - ANNUAL EXHIBITION (2023-24)

Dr. Kiran Varsha



LAVA LAMP-Bhoomi Khemani (SS1B)

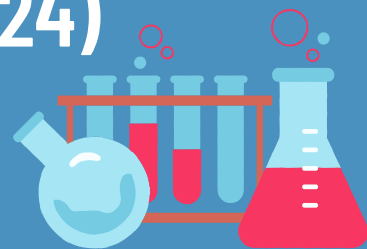
A lava lamp is a decorative lamp, invented in 1963 by British entrepreneur Edward Craven Walker, the founder of the lighting company Mathmos. A working model of Lava lamp was made and presented by Bhoomi Khemani of SS1B in the exhibition. This involved a simple reaction between Sodium Bicarbonate and Vinegar. The reaction produced CO₂ gas which is trapped in oily drops and keep moving. When enough bubbles pop, the water-and-remaining gas becomes denser than the oil. So the ball of water sinks down through the oil and joins the rest of the water. Changes in density as gas is added to or taken away from water cause it to float up and sink down through the oil.





CHEMISTRY EXHIBITS / PROJECTS - ANNUAL EXHIBITION (2023-24)

Dr. Kiran Varsha



BLUE BOTTLE - HIMESH SHARMA (SS1 B) AND HARSH VARDHAN (SS1 B)

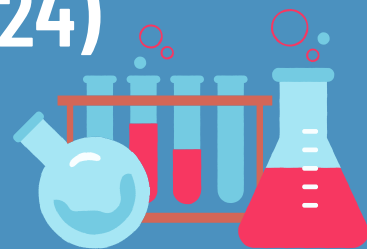
Fun of chemistry was depicted in the form of a magic bottle. The experiment could also explain and motivate the students about the blues that come in our life and go after some time. This bottle involved transforming Methylene Blue from blue to colourless and back again by mixing with glucose and shaking the solution, then letting it to settle. An alkaline solution of glucose reduces Methylene blue from blue to a colourless form. Shaking the solution raises the concentration of oxygen in the mixture and this oxidizes the Methylene blue back to its blue form. When the dissolved oxygen has been consumed, the Methylene blue is slowly reduced back to its colourless form by the remaining glucose, and the cycle can be repeated many times by further shaking.





CHEMISTRY EXHIBITS / PROJECTS - ANNUAL EXHIBITION (2023-24)

Dr. Kiran Varsha



MAGIC WRITING: HIMESH SHARMA (SS1 B) AND HARSH VARDHAN (SS1 B)

A sheet painted with Iron (III) solution. A message written with different liquids will show different colours showing the influence of our company on our behaviour.



PIEZOELECTRIC GENERATOR

-By Mr. Anil

The piezoelectric generator is a marvel of scientific ingenuity that harnesses the power of pressure to generate electricity. This innovative device is based on the piezoelectric effect, where certain materials such as a Piezo produce an electric charge in response to applied mechanical pressure. This is used to convert pressure or vibrations into electricity.

WORKING:

- **Step on the Piezo:** As your foot presses down, the Piezo material gets squished.
- **Zap! Electricity flows:** This squishing creates a voltage, like a tiny battery.
- **Power up:** The electricity can be stored in a capacitor or directly used to run small devices.



RIDDLES

- **I SPEAK WITHOUT A MOUTH AND HEAR WITHOUT EARS. I HAVE NO BODY, BUT I COME ALIVE WITH THE WIND. WHAT AM I?**
- **THE MORE YOU TAKE, THE MORE YOU LEAVE BEHIND. WHAT AM I?**
- **I HAVE CITIES BUT NO HOUSES, FORESTS BUT NO TREES, AND RIVERS BUT NO WATER. WHAT AM I?**
- **WHAT HAS KEYS BUT CAN'T OPEN LOCKS?**

“Bad news is time is flying
but the good news is you
are the pilot”

-GOJO SATOUROU