Sciphon
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Marian Star Center
St. Mary's College (Autonomous), Thoothukudi.
Learn . Launch . Lead
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Consider living in this planet as the only living species, all to ourselves, we, the humans. Does this thought excite you and take you to dizzying level of happiness? Surely not. To be frank, mankind will not survive a quarter of a year without the direct and indirect company of other living things - plants, animals and birds. Our conscious minds constantly look out for the sights and sounds of other living species, even though we may not be consciously aware of it. A bird in flight, the horse in a rhythmic motion, the sprouting of a new leaf, the blooming of a flower, the howling of a storm all adding to the invisible sustainability ingredients of the human life, without which emptiness will obliterate our existence. All the noises and sights from the natural world is the constant company with which we maintain the equilibrium of our lives throughout. Therefore, if mankind has to preserve its sanity, the natural world with its plants, animals and birds has to be preserved and protected by us.

Dr. Jane Goodall

Preservation happens only through understanding. It is in this context, the research of Jane Goodall shines brighter in the research firmament. Her long years of study conducted on chimpanzees have yielded ground-breaking insights into the early evolutionary stages of humans as well as a radical input needed for ecological and habitat preservation. Thus, the achievements of Dr. Jane Goodall stand out as pioneering, pathbreaking and inspiring to naturalists and conservationists. A woman of indomitable spirit and intellect, Dr. Goodall should be looked up by young minds, especially women for emulation.

Her Work

Jane Goodall (born Valerie Jane Morris Goodall) was an English woman born in the year 1934. After completing her studies in Cambridge, she preferred to be in the field of animals to which she was drawn from childhood onwards because of a stuffed chimpanzee toy named Jubilee that her father presented to her. In 1957, she went to Kenya, hoping to study animals especially primates, our closest in genetic composition among the animal world. Associating with Louis Leakey, the Kenyan archaeologist and palaeontologist, started her work from 1960 at the Gombe Stream National Park as the first woman in the field of primatology, the study of primates. Thanks to her achievements, this field now evenly consists of men and women.

Goodall is best known for her study of the chimpanzees. Through close and continuous observations, she was able to conclude that the animals have unique and individual personalities as well as, have rational thoughts and emotions. And she found out human like behaviour – hugs, kisses, pats, etc., among the chimpanzees. Thus, she was able to establish that there are similarities between humans and chimpanzees not only in genes but also in intelligence, family and social relationships. She also recorded and revealed negative behaviours like dominance, aggression and even cannibalism among certain groups of chimpanzees just as shades of darkness exist among humans. When earlier anthropologists and researches were of the view that humans and primates were different in composition and behaviour. Jane Goodall was able to establish that they have far too many similarities and the differences could be attributed to the difference in the evolutionary gap between humans and chimpanzees.

Goodall's several experiments have captured the imagination and fascination of the scientists and the common folk alike. Being a researcher in the wild as her study area, she has recorded innumerable hours of observation data of the animals in their natural habitats. This has contributed to the knowing of the best ways to preserve the environment and save the animals from extinction.

Sponsored By Department of Biotechnology, Ministry of Science & Technology, Government of India, New Delhi.

It can be safely concluded that primates, especially chimpanzees are on now in the evolutionary stage of what the present-day humans were in the distant past. That way her research has shed light on our own evolutionary roots and development.

Builder of Institutions

She is also a builder of scientific research institutions. In 1977, she established the Jane Goodall Institute for research in Africa with 11 offices located throughout the world for the study of animals. In 1992, she founded the Tchimpounga Chimpanzee Rehabilitation Centre in Congo for orphaned chimpanzees. In mid1990's, the University of Minnesota started the Jane Goodall Institute's centre that houses all her original data, notes and findings as archival source for researches in this field. The Lake Tanganyika Catchment Reforestation and Education pilot project was her another initiative in the year 1994. She travels extensively around the globe advocating the need for animal protection and preservation of animal habitats.

Thus, she continues to be an inspiration for enterprising researchers and environmentalists all over the world who would plunge into innovative and insightful studies in this field. What a remarkable woman Dr. Jane Goodall is! Let young minds salute this great woman of science.

(to be continued)

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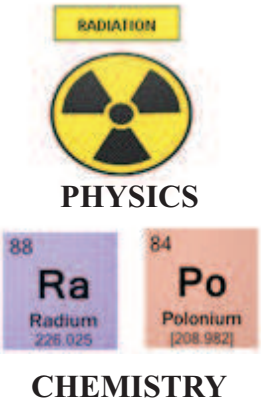
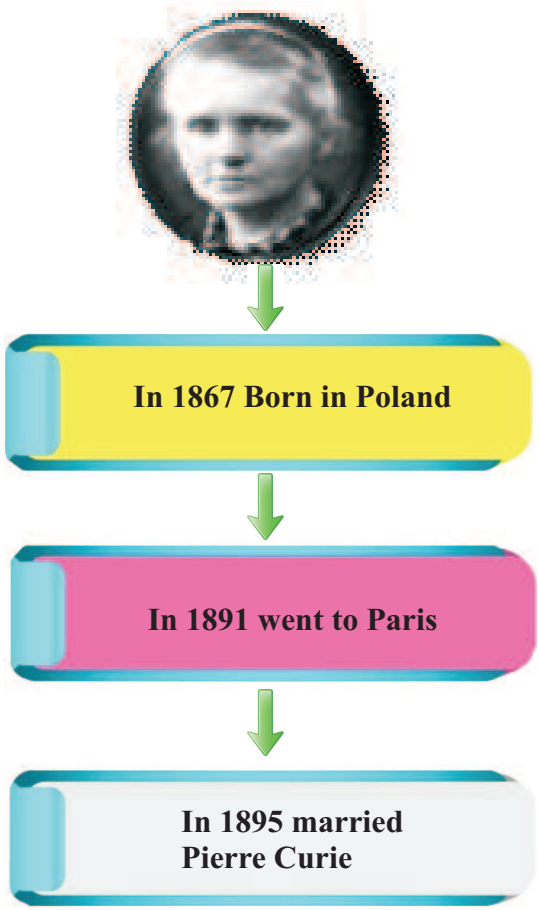
Contents

Scientist of the Month

The First Woman To Win Nobel Prize - Madam Marie Curie

Madam Marie Curie was born in Poland on 7th November, 1867. Her original name was Maria Sklodowska. In 1891 she joined in the University of Paris and there she learnt Chemistry, Physics and Mathematics. She Married Pierre Curie in 1895 and they had two daughters Irene and Eve.





In 1903 she got noble prize in the field of physics for discovering radiation phenomenon. This noble prize was shared by Marie curie, Pierre curie and Antoine Henry Becquerel. In 1911, she received the Second noble prize in the discipline of chemistry for the discovery of two radioactive elements radium and polonium.

She was the first woman to receive two Nobel prizes in different fields.

She died on 4th July 1934 due to leukemia, caused by exposure to high-energy radiation. Her daughter Irene with her husband, Frederic Joliot, shared the Noble Prize in chemistry in 1935 for their discovery of artificial radioactivity.

NOBEL PRIZE IN 1935

ARTIFICIAL RADIOACTIVITY

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The Power of Powers

Grains of Rice

When the inventor of chess presented the game to the Emperor of India he was very impressed. The emperor asked the inventor to name his reward. The inventor asked the emperor to place one grain of rice on the first square of the chessboard, two on the second, four on the third and doubling so on till the end, for the 64 squares of the chessboard. The emperor laughed thinking that it was a very simple reward and immediately ordered his treasurer to give the inventor his reward. The emperor came to know that the inventor hadn't received his reward even after a week. When he questioned his treasurer he came to know that the actual amount of rice in the reward added up to an enormous sum. The emperor was very confused. Let us see how much rice had to be rewarded.

$1 + 2 + 4 + 8 + \ldots$ for 64 squares.

This can be written as $1 + 2^1 + 2^2 + \ldots + 2^{63}$.

How can we calculate such a big sum? Let us derive an easy formula to help us.

Let $s = a + ar^1 + ar^2 + ar^3 + \ldots + ar^n$

Multiplying throughout by r we get

$r(s = a + ar^1 + ar^2 + ar^3 + \ldots + ar^n)$

$$rs = ar^1 + ar^2 + ar^3 + ar^4 + \ldots + ar^{n+1}$$

Subtracting one equation from the other we get,

$$rs - s = ar^1 + ar^2 + ar^3 + ar^4 + \ldots + ar^{n+1} - (a + ar^1 + ar^2 + ar^3 + \ldots + ar^n)$$

$$s(r - 1) = ar^{n+1} - a$$

$$s(r - 1) = a(r^{n+1} - 1)$$

$$s = \frac{a(r^{n+1} - 1)}{(r - 1)}$$

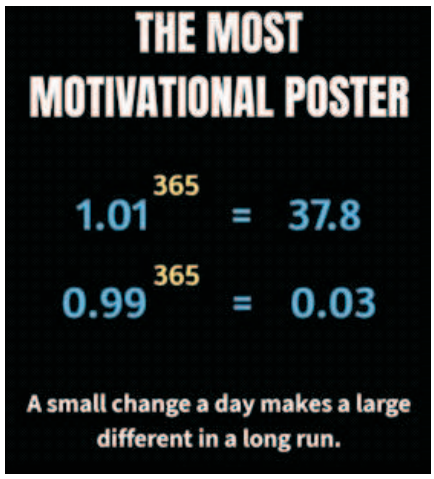
Using this formula we can calculate $1 + 2^1 + 2^2 + \ldots + 2^{63}$, where $a = 1, r = 2, n = 63$.

$1 + 2^1 + 2^2 + \ldots + 2^{63} = 1\,(2^{64} - 1) / (2 - 1) = 2^{64} - 1 =$ 18,446,744,073,709,551,615 grains of rice. That would weigh about 1,195,000,000,000,000 kg. That is more than twice the annual global production today. So there was no way the emperor could reward the inventor.

Is the square of a number always greater than itself?

It seems so but it is not always true. For any negative number, the square of the number is positive and hence the square is greater than the number.

Let us now consider ½. The square of ½ is ½ × ½ = ¼. Is ¼ greater than ½? No. ¼ is smaller than ½. So the square is smaller than the number itself for every number which lies between 0 and 1. For any number greater than 1 its square is greater than itself. So the square of the number is greater than itself only when the number is lesser than zero or greater than one. For a number which lies between 0 and 1, any power of the number like $x^2, x^3, x^4, \ldots$ is lesser than the number.



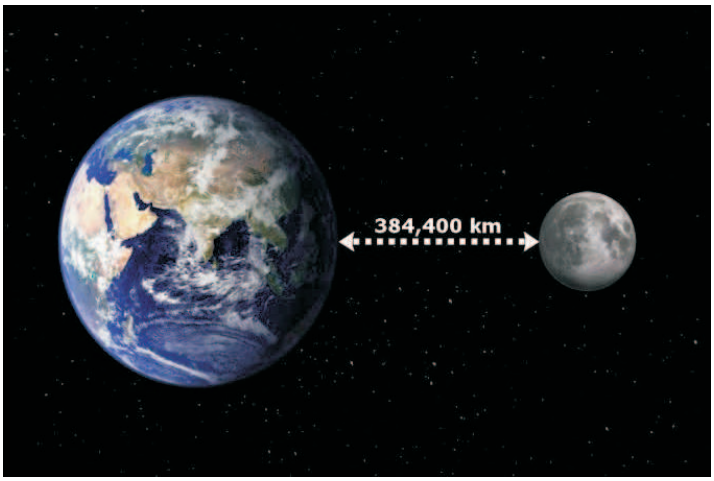
Is there any number which is equal to itself when raised to any power? Start with the power two. That is x^2 is equal to x for what number? The solution of the equation $x^2 = x$ gives the answer to the question. There are two distinct numbers which satisfy this equation.

The Art of Paper Folding

Are we going to study about origami? Not exactly but we are going to see paper folding is actually very powerful. Did you know that *"If you were to fold a piece of paper in half 43 times, the thickness of the folded paper would reach the moon"*?

Let us start with a paper of 0.05 mm thickness. After the first fold it would be of 0.1 mm thickness, after the second 0.2 mm thickness and so on. The following table gives the thickness of the folded paper after 43 folds.

Number of folds	Thickness of paper in mm
1	0.1
2	0.2
3	0.4
4	0.8
5	1.6
6	3.2
7	6.4
8	12.8
9	25.6
10	51.2
11	102.4
12	204.8
13	409.6
14	819.2
15	1638.4
16	3276.8
17	6553.6
18	13107.2
19	26214.4
20	52428.8
21	104857.6
22	209715.2
23	419430.4
24	838860.8
25	1677721.6
26	3355443.2
27	6710886.4
28	13421772.8
29	26843545.6
30	53687091.2
31	107374182.4
32	214748364.8
33	429496729.6
34	858993459.2
35	1717986918.4
36	3435973836.8
37	6871947673.6
38	13743895347.2
39	27487790694.4
40	54975581388.8
41	109951162777.6
42	219902325555.2
43	439804651110.4



So the folded paper is of 439804651110.4 mm thickness after 43 folds. 439804651110.4 mm = 439804.6511104 km. The distance from the earth to the moon is 384400 km. Therefore it is true that we can reach the moon in 43 folds. In fact if we fold it one more time we can cover both the to and fro distance. This type of growth is called exponential growth.

But it is hard to fold a piece of paper more than seven times. The world record for paper folding is 12 folds.

Question: In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?

The answer to that question is easy. Think of it this way. On someday, say day "n" the lake was half covered with the lily patch. What would happen the next day? The patch would double and cover the entire lake. That is the lily patch covers the lake on the day "n+1". Our n+1 = 48. So our n = 47. That is it covered half the lake on day 47.

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Let's Explore...

Thomas: Isn't it boring Teresa?
Teresa : Yes Thomas, I really wish the situation could be back to normal soon!

(Suddenly they see a lizard crawling on the wall. Teresa shrieks out of fear. Thomas takes a broomstick and tries to hit the lizard. Unknowingly he just hits the tail of the lizard because of which the tail alone falls on the ground and the lizard escapes.)

Teresa : Eww! Thomas! Look at the tail!

Thomas: Don't worry Teresa, it can grow back its tail.

Teresa : Really? How is it possible?

Thomas: Haven't you ever heard about lizards growing back their tails? Or about frogs that are able to grow back broken limbs?

Teresa : No I have never heard about it! How is this possible?

Thomas: It is a natural mechanism of the body called as regeneration. Frogs can regenerate limbs, lizards can regenerate tails and birds can regenerate feathers and certain parts of their beak.

Teresa : What about humans?

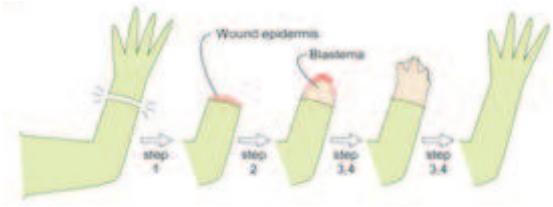
Thomas: Growing of hairs and nails is because of regeneration. The formation of skin after the healing of a wound is also because of regeneration.

Teresa : I never realized that the formation of skin is due to regeneration. What is the actual mechanism of regeneration?

Thomas: The first step involved in regeneration is wound closure. Do you know the different layers of skin Teresa?

Teresa: The outer layer is epidermis, the middle layer is dermis and the deepest layer is the hypodermis.

Due to COVID- 19 pandemic, Thomas and Teresa have been in lockdown like all of us and hence couldn't go out anywhere. They are at home and are really bored. Let's see what they recall today.....



Thomas: Right! In the process of wound closure, bleeding stops soon after clotting and the epidermal cells migrate towards the wound. The toxic substances produced from the injured tissue are removed. All the nearby cells divide and produce other cells called totipotent cells that can regenerate. When sufficient cells are produced, the epidermis is pushed out as a conical projection called blastema which increases in size and differentiates into lost parts like limb, tail, skin, etc.

Teresa : Though it seems easy, I do understand that it involves a lot of mechanism.

Thomas: Yes Teresa, the cells undergo a kind of communication such as signaling which is important for these processes to occur.

Teresa : Thomas, haven't you ever imagined that if it is possible for a frog to grow back its limb, there is even a possibility for humans to grow their amputated arms or legs?

Thomas: It's not that simple Teresa! Lots of experiments have been done but most of them have failed due to various reasons. The only successful regeneration in humans is certain tissues, skin and liver.

Teresa: Well Thomas, I do understand that all creatures have different structural components. Anyway I indeed learnt something very informative about the mechanism of regeneration. Let's hope to explore more the next time.

Thomas: Hope to see you soon after the lockdown!

If there is no regeneration, there could be no life; if everything is regenerated, there would be no death; all organisms exist between these two extremities
-Richard L. Gross

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Decoding Common Myth

"Within infinite myths lies the eternal truth;
Who sees it all?" - Devdutt Pattanak

Hello Kiddos!! Hope you are all dong well. Paula sista, is back with another myth to decode. Are you all ready??? The myth we are going to unravel this month is about rope skipping.

I wonder everybody must have known about this process. People, now a days, especially youngsters like you are very much interested in keeping your body fit. Getting a six pack abs is the greatest dream of most of the boys and girls too want to keep their body slim and elegant. For this process, the main and simple exercise we can do at home is rope skipping.

But, can girls do skipping? Does it not affect their Uterus? If we are going to do skipping regularly, will our Uterus get fall out!?

I discussed this same with my doctor. He told me, "Your uterus is not an apple that it'll fall off when you jump."

So this is a complete myth. Let me decode this to you. Let's go.

Rope Skipping

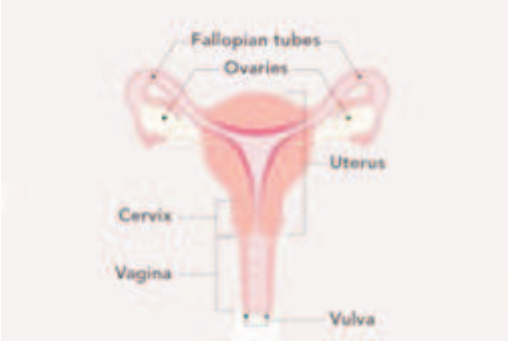
Skipping a rope translated to hours of joy and peals of laughter during our childhood. It was the best ice-breaker on the playground. Gaining the muscle strength and the agility, it brought on was a bonus. Just 15 minutes of skipping can help you burn more calories and reach your fitness goals.

Benefits

1. **Improves heart health**
2. **Increases concentration**
3. **Improves coordination**
4. **Increases stamina and gets rid of fatigue**
5. **Increases body flexibility**
6. **Boost mental health**
7. **Decreases belly fat**
8. **Strengthening your bones**
9. **Glows your skin**
10. **Improve pulmonary function**

Uterus

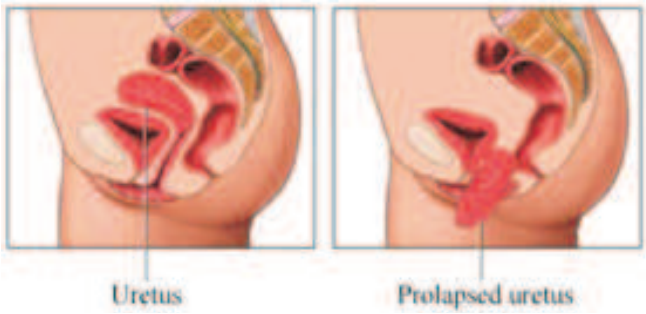
We have to understand that all our organs are held in place by muscles supported by adjoining organs which maintain the positions of various organs in place. Same is the case of Uterus, it is held in place by strong muscles and these keep the uterus at its place. As long as these muscles have a proper tone the uterus is maintained in place and nothing like jumping, skipping can make the uterus any harm.



Uterine Prolapse

Uterine Prolapse happens when the ligaments supporting the uterus become so weak that the uterus cannot stay in its place and slips down from its normal position. According to Mayo Clinic (mayoclinic.org), the reasons for Uterine Prolapse include:

- ✶ Damage to the supportive tissues (ligaments) during pregnancy and childbirth
- ✶ Effects of gravity
- ✶ Loss of estrogen
- ✶ Repeated straining over the years



Decoding The Myth

See children, no evidence is there that rope skipping will affect our uterus unless we have a weak muscles. From this it is concluded that it is a complete myth.

Chalo… Kids, Hope you have enjoyed this month's decoding process. We shall meet in the next issue of the month to decode another interesting and common myth. Till then, search and unravel the myths.

Bye! Bye!

Fun Facts About Water Mammals

Unlike fish, water mammals can't get oxygen from the water. They have to come up to the surface to breathe. But unlike most mammals, water mammals can stay under the water for a long time. Most water mammals, including seals, walruses and whales, have blubber or fat to keep them warm. Sea lions have thick fur instead. Dolphins tend to live in warm water so they don't need either. Dolphins

Most water mammals are carnivores. They eat fish, shellfish and other aquatic animals. Some water mammals, such as walruses and some seals, are fierce. They are best left alone. Dolphins are smart and friendly. They often approach people swimming in coastal areas. Most water mammals are carnivores. They eat fish, shellfish and other aquatic animals. Some water mammals, such as walruses and some seals, are fierce. They are best left alone. Dolphins are smart and friendly. They often approach people swimming in coastal areas.

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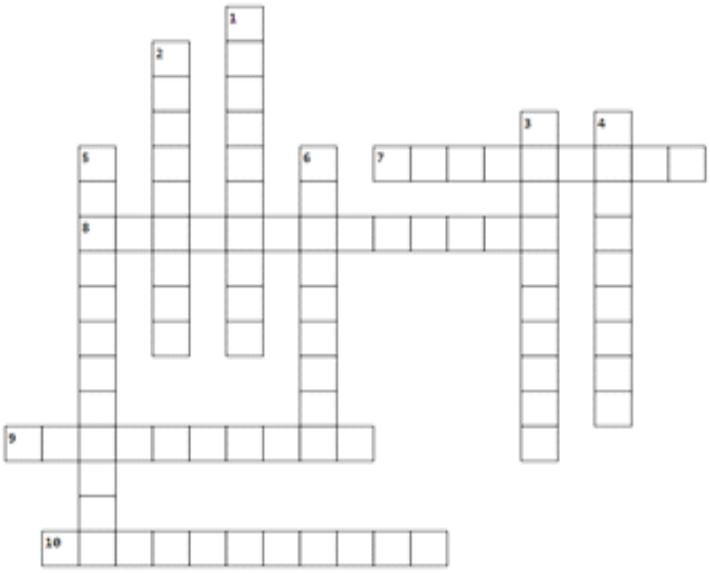
CONUNDRUM WITH PHINEAS AND FERB



Across

7. An instrument invented by Pierre Vernier.
8. An instrument used to measure solar radiation.
9. An instrument used to measure the speed, direction and pressure of wind.
10. An instrument used to measure the growth of the plant

Down

1. An instrument used to measure the moisture content of air
2. An instrument used to measure the atmospheric pressure
3. An instrument used to obtain magnified view of small objects
4. An instrument used in submarines to view the objects above sea level
5. An instrument used to measure the scattering of light by particles suspended in liquids
6. An instrument used to measure the rain fall.

NAME : _____

SCHOOL/INSTITUTION : _____

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PICTURE CONNECT

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Who am I?

a) I am a miniature tree
I grow in shallow containers
I am a part of Japanese art
Who am I?

b) I am a Japanese style of flower arrangement
My top flower denotes God
My middle flower denotes Messenger
Who am I?

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Sunflowers – The Nature Healer

Our Mother World has been punished mercilessly by Humans in many situations. In the crisis of World war II, Japan was almost pushed to death by the bombardment of Atomic Bomb in 1945, and by the massive nuclear accidents like Chernobyl disaster (1986) and Fukushima Daiichi Nuclear disaster (2011). Many ways have been formulated for the clean - up process for the radiation free environment. One among them is planting Sunflower, a natural way of healing the environment.

Sunflowers are used for many purposes as seeds, oil extraction and decoration purposes. In addition to it they also played a vital role in spot removing process from Ukraine and Japan environment after the nuclear disasters. This is because Sunflowers are **hyperaccumulators** which means these plants can take in toxicity at a high rate from the ground. Like all plants it can also absorb the good nutrients from ground. But also they have the ability to take toxic materials from the ground, particularly Lead.

The ideology of using Sunflower for removing the nuclear wastes from the land was first discovered after the Chernobyl nuclear accident. By 1996, Ukraine declared them as Nuclear free country and as a part of celebrating it, they started a mission of planting sunflower.

They are able to absorb the toxins from the water bodies too. Sunflowers can also be grown along with the mustard seeds, flax seeds and soybeans which are under practice in the removal of radiation process from the land and air. As a reflection of it, they became a symbol of peace and nuclear free world.

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Connecting the Unconnected

The internet is one of the most transformative technologies of our lifetime. It is not an exaggeration to say that an average person can hardly survive a day without internet. But, still 2 out of 3 people on earth is deprived of a fast and an affordable internet connection. The challenges ahead are not only economical but also terrestrial like jungles, mountains and sometimes even natural disasters. Right now, for most of the countries in the southern hemisphere, the cost of an internet connection is more than a month's income. The solution to this problem requires multi-dimensional analysis. Let's take a glance at how the leading tech Google have tried to address this issue through an incredible project called "Loon".

"Project Loon" was a research and development project initiated by Google X (presently X) in 2011, with the aim of providing internet connectivity to rural and remote areas and to facilitate communication during natural disasters in the affected areas. Later in 2018, it was developed into a separate company called Loon Inc.

A Loon balloon takes flight from its launcher

Loon deploys its high-altitude balloon network between the altitude of 18 km to 25 km in the Stratosphere where the wind speed is desirable. These are super pressure balloons, made up of polyethylene plastic and filled with helium. They carry a custom air pump system that pumps in or releases air which is used to control its altitude.

A small box hangs underneath the balloon contains the required electronic components like circuit boards that control the system, batteries to store solar power so that it can operate during the night and radio antennas to communicate with other balloons and to internet antennas on the ground. Each balloon's electronics are powered by an array of solar panels that sits between the balloon and the hardware. The typical life time of a balloon is about a year.

The working of Project Loon

Users connect to this balloon network using a red party ball like antennas attached to their buildings. The signal travels from balloon-to-balloon and then to a ground-based station connected to an Internet Service Provider (ISP) for instance say Airtel or Jio and then into the global internet.

A red party ball like antenna attached to a house

The first receivers of this service were some farmers of New Zealand in 2013. Later, Loon had remarkably succeeded in providing the internet connectivity to people in Puerto Rico and Peru at times of natural disasters. Last year, Loon had secured approval from the Government of Kenya and successfully achieved its aim by providing commercial internet connectivity to the remote areas of Kenya.

Despite the team's ground breaking technical achievements over the past 9 years- doing many things previously thought impossible like precisely navigating balloons in the Stratosphere, creating a mesh network in the sky or developing balloons that can withstand the harsh conditions of the Stratosphere, Google's parent Alphabet Inc. shut down this project in January 2021, saying that it lacks a sustainable business model in various countries. In brief, we can say that Loon has not failed as a technology, but as a business.

Google is not the only big tech company coming up with these ideas but also giants like Facebook and Space X have been constantly working on various projects to connect the unconnected.

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Tell Me Why?

"Hellooooo kids! Whatsapp?"

"Shhhhhhhhh----------. Keep your fingers crossed. Great news from professor Calculus. Im gonna be a secret agent! I have learnt to send secret messages with an invisible ink! Want to know how?

Come I'll teach you to brew the invisible ink! You just need a couple of lemon and a cotton swab. Squeeze the lemon and collect the juice in a cup. Your invisible ink is ready! Soak a cotton swab and use this to write your secret message on a paper. Leave it to completely dry. Do you see anything on the paper? Nope! Now you wanna decode the message. Heat the paper on the backside of the message, using iron box or showing it over a flame. Careful children! Don't burn your fingers. Ask your mom to do this for you. Do you see your message appearing gradually on the paper? That's it young detectives! Do you know why?

Explanation for last month's experiment!

When you brushed that comb through your hair, tiny parts of the atoms in your hair, called ELECTRONS, collected on the comb. These electrons have a NEGATIVE charge. Remember that, its important. Now that the comb has a negative charge, it is attracted to things that have a POSITIVE charge. It is similar to the way some magnets are attracted to certain metals.

When you bring the negatively charged comb near the faucet it is attracted to the POSITIVE force of the water. The attraction is strong enough to actually pull the water towards the comb as it is flowing! If you want to try another experiment with your comb, tear up pieces of tissue until they are as small as you can get them. I mean really small! Then charge your comb again by brushing it through your hair, and bring it close to the tiny pieces of tissue. If the pieces are small enough they will jump off the table to the comb the same way that the water was pulled to the comb.It is all thanks to the wonders of static electricity.

SCIBITZ

Speech neuroprosthesis

Speech neuroprosthesis is translating your brain waves into words. First time ever the scientist of UC San Francisco have successfully developed a "speech neuroprosthesis" that has enabled a man with severe paralysis to communicate in sentences, translating signals from his brain to the vocal tract directly into words that appear as text on a screen. This is the first successful decoding the human brain waves into words says Dr. Edward Chang, MD, Neurosurgeon at University of California, San Fransico. The authors of this work say, "It shows strong promise to restore communication by tapping into the brain's natural speech machinery." This technology will be of great help for people who are completely paralyzed and not able to speak. Dr. Chang and his team are translating signals intended to control muscles of the vocal system for speaking words into digital language.

Courtesy : Science Daily

Inorganic material with the lowest thermal conductivity

A research team, led by Professor Matt Rosseinsk at University of Liverpool, has discovered a new inorganic material with the lowest thermal conductivity ever reported. This discovery is a breakthrough in the control of heatflow at the atomic level. This new material is going to be very useful for a sustainable society because the loss of energy as heat is the major problem in many of the processes. The researchers designed and synthesised the new material, so that it combined two different arrangements of atoms that were each found to slow down the speed at which heat moves through the structure of a solid. If we take the thermal conductivity of steel as 1, then a titanium bar is 0.1, water and a construction brick is 0.01, the new material is 0.001 and air is 0.0005. This material will minimize the energy loss due to heat, and help in efficient harnessing of energy.

Courtesy: Science Daily

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Cortisol - The Stress Hormone

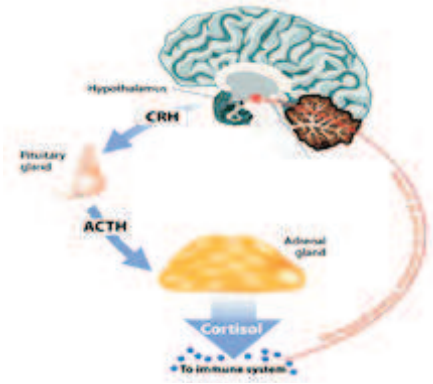
Hello…

Are you being stressed? Hold off one minute and read this passage…

During stressful circumstances, our body generates a hormone called **Cortisol**, which plays a part of our adaptive stress response. Cortisol is a glucocorticoid, a cholesterol-derived steroid hormone produced in the zona fasciculata layer of the adrenal cortex.

How Does It Work?

The hypothalamus and pituitary gland located in our brain, can sense the level of cortisol in our blood. If the level is too low, our brain adjusts the amount of hormones it makes. Our adrenal glands pick up these signals, and then fine-tune the amount of cortisol they release. Cortisol receptors receive and use the hormone, in different ways.



Role of Cortisol

- ✶ Manages the usage of carbohydrates, fats, and proteins in our body.
- ✶ Keeps inflammation down.
- ✶ Regulates blood pressure and increases blood sugar (glucose).
- ✶ Controls sleep/wake cycle.
- ✶ Boosts energy so we can handle stress and restores balance afterward.

After the pressure or danger has passed, our cortisol level should calm down. Our heart, blood pressure, and other body systems will get back to normal.

'But if we're under constant stress and the alarm button stays on?' then what will happened?

It can derail our body's most important functions. It can also lead to a number of health problems, including:

- ✶ Anxiety and depression
- ✶ Headaches
- ✶ Heart disease
- ✶ Memory and concentration problems
- ✶ Problems with digestion
- ✶ Trouble sleeping
- ✶ Weight gain

Too Much Cortisol - A nodule in our adrenal gland or a tumor in the **brain**'s pituitary gland can trigger our body to make too much cortisol. This can cause a condition called **Cushing syndrome** and leads to **rapid weight gain, muscle weakness, diabetes, etc.**

Too Little Cortisol - If our body doesn't make enough cortisol, then our body cause Addison's disease and shows muscle weakness, changes in skin tone, diarrhea, low blood pressure, etc. as a symptoms.

Ways to control cortisol level

- ✶ Get the right amount of sleep, exercise.
- ✶ Learn to recognize stressful thinking.
- ✶ Have fun and laugh, maintain healthy relationships and take care of a pet.
- ✶ Be your best self
- ✶ Eat a nutritious diet and take certain supplements like fish oil, Ashwagandha, etc.

The World is Already Full of Cortisol...

Be Someone's Dopamine

- Chronic succeeder (Renuka)

Ms. G. Mary Stephy
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St. Mary's College (Autonomous),
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"Mangroves are magical forest where we discover nature's secrets. They staddle the connection between land and sea and nature and humans. Mangrove forests nurture our estuaries and fuel our nature-based economies".

The word Mangrove is considered to be a combination of the Portuguese words "Mangue" and the English word "grove". Mangroves are woody, specialized types of trees of the tropics that can live on the edge, when rainforests meet oceans occurring along the shettered inter- tidal waste liner, mudflats riverbank in association with the brackish water between land and sea in tropical and subtropical areas.

The Great Sundarbans is the largest mangroves region in the world lies on the delta of the gangs, Brahmaputra of Meghne rivers on the Bay of Bengal. The Second Largest Mangroves region is Pichavaram. It is located 51km north cost of Chidambaram, in Cuddalore district, Tamilnadu between latitude $11^{0}20'$ to $11^{0}30'$ north and longitude $79^{0}45'$ to $79^{0}55'$ east. It is estuaraine types of mangrove.

Why do we need Mangroves?

A rich biodiversity is observed in the mangroves with plants and animals which are irreplaceable and form a good genetic treasure house. Mangrove wetlands are a multiple use ecosystem that provides protective protection and economic benefits to coastal communities mangroves contribute the stabilization of the shoreline and prevention of shore erosion. They serve as a barrier against storms so as to lessen damage to coastal land and residents. The dense network of supporting roots and breathing roots give mechanical support to the tree and trap the sediments without mangroves, all slit will be carried into the sea where turbid water weight mangrove trees act as sunks, which concentrate pollutants such as sewages, toxic mineral pesticide, herbicides.

Mangrove – Adaptations:

Physical stability adaptations:

The unusual root system give them support and stability in the loose soil. The mangroves massive root system is efficient at dissipating wave energy.

Salt tolerance mangroves:

They are able to live in harsh saline environments. Mangroves have salt excretion adaptations allowing survival in these environments.

Anaerobic sediment adaptations:

Mangrove trees are adapted for survival in oxygen poor or anaerobic sediments through specialized root structures. Mangrove have poorly developed shallow below ground root system while having well-developed aerial roots.

Reproductive adaptations:

Mangrove plants are unique in the reproduction method by viviparous.

Conservation:

If the mangroves are destroyed, there will be ecosystem degradation, species endangerment, loss of wetlands, declines in fish, wildlife population, floods and problem in water quality. Thus there arises need to conserve mangroves. Different activities should be done in order to protect mangrove such as Afforestation, Legislation, Monitoring and survey, Protection, Soil conservation.

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NEET Questions with Solution

1. What triggers activation of protoxin to active Bt toxin of *Bacillus thuringiensis* in boll worm?
   (1) Body temperature
   (2) Moist surface of midgut
   (3) Alkaline pH of gut
   (4) Acidic pH of stomach

Answer (3)

Sol : Bacillus thuringiensis forms protein crystals during a particular phase of their growth. These crystals contain a toxic insecticidal protein. These protein exist as inactive protoxins but once an insect ingest the inactive toxin, it is converted into an active form of toxin due to alkaline pH of the gut which solubilize the crystals. The activated toxin binds to the surface of midgut epithelial cells and create pores that cause cell swelling and lysis and eventually cause death of insect.

2. Which of the following is a commercial blood cholesterol lowering agent?
   (1) Cyclosporin A
   (2) Statin
   (3) Streptokinase
   (4) Lipases

Answer (2)

Sol: Statin is obtained from a yeast (Fungi) called *Monascus purpureus*. It acts by competitively inhibiting the enzyme responsible for synthesis of cholesterol.

3. Which of the statements given below is not true about formation of Annual Rings in trees?
   (1) Annual ring is a combination of spring wood and autumn wood produced in a year
   (2) Differential activity of cambium causes light and dark bands of tissue early and late wood respectively.
   (3) Activity of cambium depends upon variation in climate.
   (4) Annual rings are not prominent in trees of temperate region.

Answer (4)

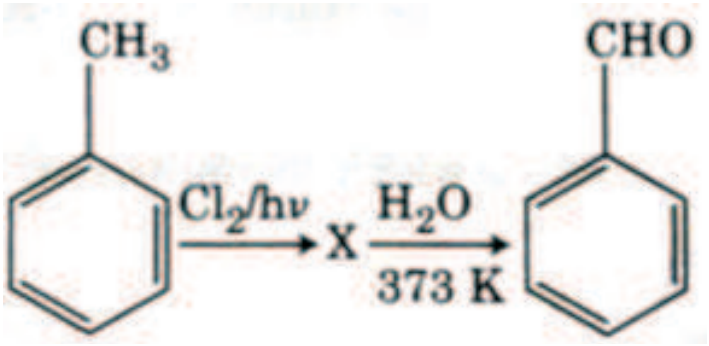
Sol: Growth rings are formed by the seasonal activity of cambium. In plants of temperate regions, cambium is more active in spring and less active in autumn seasons. In temperate regions climatic conditions are not uniform throughout the year. However in tropics climatic conditions are uniform throughout the year.

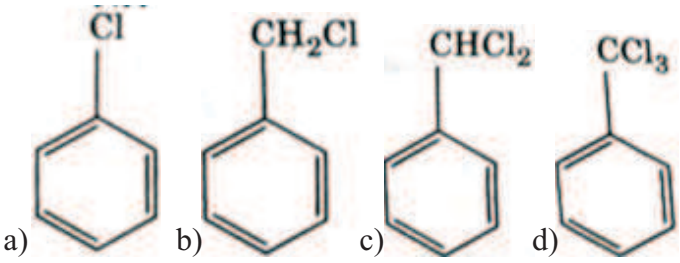
4. What is the site of perception of photoperiod necessary for induction of flowering in plants?
   (1) Lateral buds
   (2) Pulvinus
   (3) Shoot apex
   (4) Leaves

Answer (4)

Sol: During flowering, photoperiodic stimulus is perceived by leaves of plants.

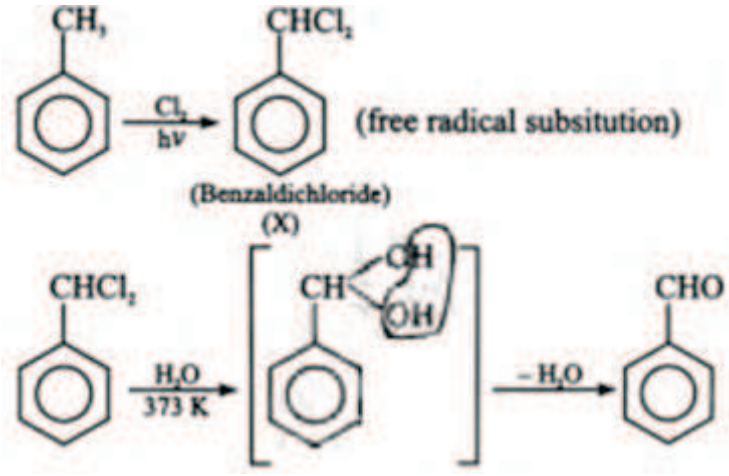
5. Identify compound X in the following **sequence of reactions**





Answer : C (53%)

Explanation :



6. Reaction between benzaldehyde and acetophenone in presence of dilute NaOH is known as

a) Cross Cannizzaro's reaction

b) Cross Aldol condensation

c) Aldol condensation

d) Cannizzaro's reaction

Answer : b) Cross Aldol condensation

Explanation : Carbonyl compounds which can enolize undergo aldol condensation. Acetophenone is a ketone and it can enolize. Benzaldehyde does not have hydrogen, so it cannot form enolate ion. Two different carbonyl compounds (aldehyde and ketone) are treated with base so it is a cross-aldol condensation. **Non-enolizable aldehydes undergo** Cannizzaro's **reaction.**

7. For which one of the following, Bohr model is not valid?

a) Hydrogen atom

b) Singly ionised helium atom (He+)

c) Deuteron atom

d) Singly ionised neon atom (Ne+)

Answer : d

Solution : Bohr model is applicable for only single electron species. Singly ionised neon atom has more than one electron in orbit. Hence, Bohr model is not valid.

8. The energy equivalent of 0.5 g of a substance is:

a) 4.5×1016J

b) 4.5×1013J

c) 1.5×1013J

d) 0.5×1013J

Answer : b

Solution : From mass-energy equivalence,

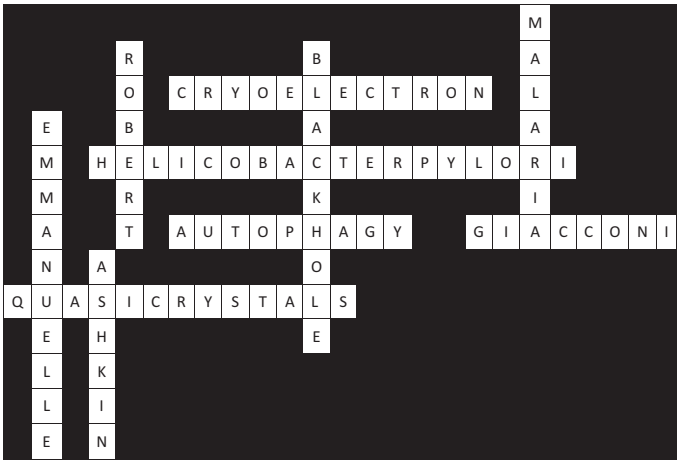
$E = mc^2$

$= 0.5 \times 10^{-3} \times 9 \times 10^{16}$

$= 4.5 \times 10^{13} J$

Answer for Last month's issue's puzzle

Conundrum with Phineas and Ferb



Picture connect

1. Geology
2. Cation
3. Cyclone

Who am I?

1. Mushroom
2. Ethanol
3. Cyanobacteria

Winners:

1. N. Felcy Gracelin
   Class VIII
   Holy Cross Anglo Indian Hr.Sec. School,
   Thoothukudi

2. G. Ajith
   Class XI
   Vani Vidyalaya School
   Chennai

3. Ankit Kesharwani
   Class: VIII
   St. Mary's High School
   Sonamukhi Jholi.
   Kharagpur

4. M. Sushma
   First year, B.A Economics
   Holy Cross College
   Nagercoil

5. S. Rahul
   Class V
   Sathya Nursery and Primary School
   Thoothukudi

செம்மொழியில் அறிவியல்

ஆம்பி

ஆம்பி அல்லது காளான் என்பது பூஞ்சையில் இருந்து உற்பத்தியாகும் சத்துமிகுந்த உணவுப்பொருள் ஆகும். தனித்துவமான சுவை, ஊட்டச்சத்து மதிப்பு மற்றும் மருத்துவ குணத்தின் காரணமாக தனக்கென ஒரு தனி இடத்தை பெற்றுள்ளது. கிரேக்கர்களும் ரோமானியர்களும் பழங்காலத்திலிருந்து காளானை உணவாக பயன்படுத்தும் பழக்கத்தை கொண்டிருந்தனர். சீனர்கள் காளானை வாழ்க்கையின் அமுதமாக கருதினர்.

இயற்கையில் பல வகையான காளான்கள் காணப்படுக்கின்றன. ஆனால் அவை அனைத்தும் மனிதனின் நுகர்வுக்கு ஏற்றவை அல்ல. பொதுவாக ஈர்ப்பு மிக்க வண்ணங்களில் தோற்றம் அளிக்கும் காளான்கள் விசத்தன்மை உடையவை என ஆராய்ச்சியாளர்களால் குறிப்பிடப்பட்டுள்ளது. இருநூறு வகைக்கும் அதிகமான காளான்கள் பலவிதமான பாரம்பரிய மருத்துவசிகிச்சைக்கு பயன்படுத்தப்பட்டுவருகிறது. உலக அளவில் ஏறத்தாழ முப்பத்து ஐந்து வகையான காளான்கள் விற்பனைக்காக உற்பத்தி செய்யப்படுகின்றது. அவற்றில் இருபது வகைகள் மிகப்பெரிய தொழிற்சாலைகள் மூலமாக வளர்க்கப்படுகிறது.

ஆம்பியில் தாவரங்களைப் போன்று ஒளிச்சேர்கை செய்ய பச்சையம் என்னும் நிறமியும் பசுங்கணிகமும் இல்லாததால் இவை உணவுக்காக மற்ற மட்கும் பொருள்களை சார்ந்துள்ளது. பூஞ்சை சமைசீலியமானது பல்வேறு வகையான தாவர கழிவுகளில் மிகச்சிறப்பாக பரவி வளரும் அமைப்பை பெற்றுள்ளது. மிகக்குறிப்பாக செல்லுலோஸ் மற்றும் லிகனின் என்னும் வேதிப்பொருள் நிறைந்த விவசாயக் கழிவுகளை வளர்ச்சி ஊடகமாகக் கொண்டு தன் வாழ்க்கை சுழற்சியை தொடரும் இவை பலவித நொதிகளை உற்பத்தி செய்து வளர்ச்சி ஊடகத்தை சிதைத்து தேவையான சத்துக்களை பெறுகின்றது.

இந்தியாவை போன்று பலவிதமான தட்பவெட்ப நிலைகளை கொண்ட நாடுகள் அனைத்தும் பலதரப்பட்ட உணவுப்பயிர்கள், பணப்பயிர்கள் மற்றும் தோட்டக்கலை சார்ந்த பயிர்கள் பயிரிடுவதில் முன்னோடியாக விளங்குகின்றன. இதன் காரணமாக விவசாயக்கழிவுகள் மற்றும் விவசாயம் சார்ந்த தொழிற்சாலை கழிவுகளும் நாளுக்கு நாள் அதிகரித்துக்கொண்டே வருகின்றது.

இந்தியாவில் உற்பத்தியாகும் விவசாயக்கழிவுகளில் ஒரு சதவிகிதத்தை காளான் சாகுபடி செய்ய பயன்படுத்தினால் கூட இந்தியா காளான் உற்பத்தியில் முதலிடத்தை பெறும்.

உலக அளவில் அதிகமாக உற்பத்தி செய்யப்படும் காளான்களின் வரிசையில் அகாரிகஸ் பைஸ்போரஸ் என தாவரவியல் பெயரால் அழைக்கப்படும் மொட்டு காளான் முதலிடத்தை பிடித்துள்ளது அதனைத்தொடர்ந்து பால்காளான் மற்றும் சிப்பி காளான் உள்ளது.

ஆம்பியின் மருத்துவ குணங்களை ஆராய்கையில் இவை புற்றுநோய் மற்றும் நுண்ணுயிர் தாக்கத்திற்கு எதிராக சிறப்பாக செயல்படும் தன்மை கொண்டவை எனவும் உடலின் நோய்எதிர்ப்பு சக்தியை ஊக்குவிப்பவை எனவும் புலனாகிறது. அது மட்டுமின்றி இவை மனித உடலிற்கு தேவையான புரதம், அமினோ அமிலங்கள், வைட்டமின்கள் மற்றும் தாதுக்களை உள்ளடக்கியதால் இது அனைத்து வகையான வயதினருக்கும் ஏற்ற உணவாக திகழ்கிறது. குறிப்பாக குறைந்த கலோரியையும் கொழுப்பு சத்தையும் பெற்றுள்ளதால் இது நீரழிவு மற்றும் இதய நோயாளிகளுக்கு வழங்க உகந்த உணவாக உள்ளது.

காளான் என்றதும் அனைவருக்கும் அடைமழை காலம் தான் நினைவில் வரும் ஆனால் சில நுணுக்கங்களையும் நுட்பங்களையும் கையாண்டு தேவையான வெப்பநிலை மற்றும் ஈரப்பதத்தை வழங்குவதன் மூலம் ஒரு சிறிய அறையில் கூட ஆண்டு முழுவதும் காளான் உற்பத்தி செய்ய முடியும். சரியான பயிற்சியும் போதிய இடவசதியும் இருந்தால் அனைவராலும் காளான் வளர்ப்பில் வெற்றிபெற இயலும். இந்த முயற்சி வேளாண்கழிவுகளை கையாளுவதற்கு மட்டுமல்லாமல் சுயதொழில் புரிவதற்கான வாய்ப்பையும் அளிக்கிறது.

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CHRONICLE OF SMC

Vision

To make young women agents of an egalitarian society through liberative education.

Mission

To empower women through regular and non-formal programmes to make them economically independent and socially aware so that they make better homes and contribute to family and social progress.

1st July 1948

Foundation of the College with 21girls at St. Aloysius Girls High School, Thoothukudi

1951

Honoured as a First Grade College of Madras University

1956

Inception of PUC with 81 Students

1957

Started B.Sc. Courses

Let's pick up where we left off in the next month issue...

For any queries we are here to stay connected

Email us in magazinesmctuty@gmail.com

Register yourself in

https://forms.gle/MwqNV4qazo7b6W4t8

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