GETA

YOUNG SCIENTIST PROGRAM

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GYS Avishkar AWARDS 2023

A National Science Projects Competition

Awardees Booklet

05.08.2023

IN CHAIRMAN'S WORDS

Hello Young Scientist,

Congratulations on your participation, achievement, as well as interest in innovation. I thank the Member Secretary, APCOST, Dr. Y. Aparna, for her consent to be the Chief Guest at the GYS Avishkar Awards 2023 Prizes Distribution Ceremony. My gratitude also goes to the Project Officer, Mr. J. Dhilleswara Rao and his team for the guidance and success of the event.

Dear Students, you are the future of the country. When I launched the GETA Young Scientist Program in January 2022, I was hopeful of presenting a few Student Innovations to the Nation through this program in three years. It is about 18 months and here we present a dozen Innovations with pride. It is all because of Guide Teachers, Parents, and you, the Students.

India is a great country. To meet the aspirations for India 2047 directed by the Prime Minister, India has to make a lot of progress on indigenous products and patents bringing down the stress on balance of trade. A lot of work is happening in the country. But, for the size of the population, the efforts are not enough. Hence, to complement, we picked up the GETA Young Scientist (GYS) Program boosting up Innovation, however little it may be.

We created a Knowledgebase of 6000+ Award-winning Student Innovations and Indexed profiles of 340 Great Indian Scientists. We ran campaigns on 36 National Science Competitions & Events like INSPIRE MANAK, VVM, NCSC, etc. The epitome of these efforts was the launch of GYST Clubs platform in November 2022.

Over the past year and half, we organized a State-wide Science Day Quiz, GYS Guru Puraskar 2022, GYS Talks National Online Elocution Contest 2022, GYS Charaka Science Medal 2023, and now GYS Avishkar Awards 2023.

Students from 11 states contested in Avishkar Awards. 29 Educators were on the Evaluation Panel. 32 Innovation Projects were shortlisted for Phase 2 online demos via zoom sessions. Three winners and nine consolation prizes were selected. Congratulations to all.

I take this opportunity to thank all the GETA Patrons, Teacher Mentors, Parents, Students, GYS Team, my children Bharath and Vennela for being a part of this great effort. Particular appreciation goes to Teacher Pavani Bhanu Chandra Murthy for his untiring efforts. It has been a great journey. Many more miles to go.

Celebrating Innovative India,
Murali Valiveti, M. Tech.
Chairman, GETA Service Trust.
Ph. +919885619996

05 August 2023
Vijayawada, Andhra Pradesh, India.

FIRST PRIZE WINNER

GARV
9th Class

THINK TASTE DRINK TASTE

Guide Teacher
Mr Narendra Singh Rawat

School
Bhartiya Vidya Mandir Sr Sec School Udham, Ludhiana, Punjab

Project Synopsis

Water plays an important role in our body mass, accounting for 70%. However, humans often don't drink enough water due to its lack of taste. "Think Taste Drink Taste" is a product designed to promote sufficient water intake.

Problem Narration

We all have seen the problem of lack of drinking water as a habit. Whether it is a child or an adult, he/she can go throughout the whole day without sufficient water intake. But drinking sufficient water daily is crucial. Otherwise, it can lead to various diseases such as kidney stones, kidney failure, high blood pressure, and dehydration.

Solution Description

It is a bottle cap design to which 4 essence tubes are attached, each tube containing different essences like strawberry, lemon, peach, orange, etc. More essences can be added. Similar to how perfumes work, the essence is present in liquid form. When the lid of that tube is opened it comes out in a gaseous form which when inhaled through the nose, the olfactory nerves present in the nostrils create taste on the taste buds of the tongue. This makes a person drinking plain water feel the taste of flavoured water. For example, if lemon essence is used, the plain water would taste like lemon water.

Solution Marketability

Each bottle would cost around Rs.150 to 200. Garv says, there is also scope to partner up with water bottle manufacturers and use the essence tubes on the partnered brand bottles.

Link for the project's video presentation
https://www.youtube.com/watch?v=4fPN8efkfVM&t=19s

HOW TO PREVENT THE TRAIN PLATFORM ACCIDENTS

Vanumu Akshaya,
10th Class

Team Member
Marukruthi Supriya,
10th Class

Guide Teacher
M Manasa

School
Yashroop Ji EM School,
Thokada, Andhra Pradesh

Project Synopsis

The coach position indicators with LED screens display colours as mentioned below

1. Red colour – when the train is about to arrive at the station.
2. Yellow colour – 30 seconds before the train departs the station
3. Green colour – while the train is moving in the station

Problem Narration

Most of the railway station's status updates and announcements on platforms are verbal. Announcements about train delays, the arrivals and departures of trains, etc., on different platforms are often confusing, especially in larger stations, which also causes haste on platforms leading to accidents. People with disabilities like deafness as well face difficulties understanding live updates.

Solution Description

Nowadays most railway stations have well-developed coach position indicators with LED screens displaying text in only two colours – black and white. The simple and innovative solution proposed is to display different colours on the LED screens indicating the status of the train on respective platforms. For instance, if the train is about the leave the station, the display turns yellow alerting passengers to soon get to their respective coaches safely in time.

Solution Marketability

Easily available, low cost, multi-coloured LED display screens.

Link for the project's video presentation
https://www.youtube.com/watch?v=YOiM1EH3xUw&t=74s

SECOND PRIZE WINNER

THIRD PRIZE WINNER

Chakka Chenna Sridevi,
9th Class

A HEALTHY BLACKBOARD DUSTER

Guide Teacher
Ms Ch Chaya Vasavi Swapna

School
AK&K EM High School, Chirala, Andhra Pradesh

Project Synopsis

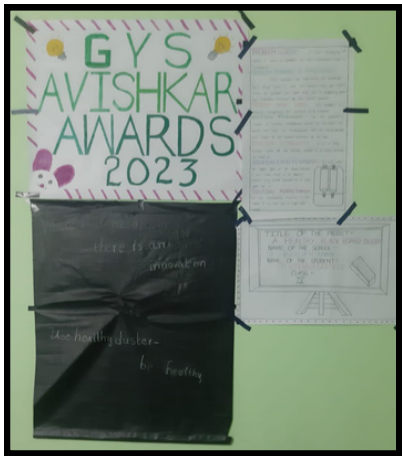
This "Healthy Black Board Duster" is very simple and easy-to-use tool. No electricity or batteries are used. This project addresses a very common problem caused by chalkdust which targets not only teachers and students, but any person who uses a piece of chalk.

Problem Narration

Whenever a teacher teaching class cleans the black board with a duster, the dust of chalk spreads all over the class effecting both the teacher and the students. Chalkdust, when inhaled, causes many problems like asthma, allergy, hairfall, eye infection, etc.
Sridevi says one of her teachers couldn't attend school for a few days as she suffered from an eye infection caused by chalkdust. This made her think and eventually come up with this solution.

Solution Description

A Healthy Black Board Duster is quite easy to make. The materials required are 1 box with two chambers (one big and one small), a sponge, two iron nails & nuts. Attatch the iron nails in the bigger chamber of the box. Roll a layer of sponge around each iron nail. Now cover the small chamber with a lid. While using this duster on a board, both the sponges rotate in opposite directions and the chalkdust gets collected in the smaller chamber. This solution is tried and tested as well.



Solution Marketability

A Healthy Black Board Duster can be made using simple materials available in a household. And the materials cost only ₹100. Every child can make this duster easily at home.

Link for the project's video presentation
https://www.youtube.com/watch?v=FcH3xNE9mJ0

TUBO HOT

ENERGY SAVING WATER HEATER AND MONEY

Guide Teacher
Ms Kartiki P Kawale

School
Bhartiya Vidya Bhavan's NTPC Vidya Mandir, Mouda, Maharashtra

S Bhardwaj, 7th Class

Project Synopsis

We all have electrical operated water heating devices in our bathroom. But what about the energy wastage that they cause. We need hot water to do many other jobs in our homes. Besides the critical concern of substantial thermal power consumption there are other disadvantages of using electrically operated water heating geysers or immersion rods. The shock!! Bhardwaj comes up with a solution – "TUBO HOT" or an Energy saving water heater and money. There would be no accidents and they have made the electric circuits are the combustion chambers of these 100% faultless.

Problem Narration

The summary of problems his Avishkar can combat are

1. Huge thermal power consumption of geysers.
2. Use of non renewable source of energy.
3. Heating water in cases of power cuts.
4. No more Accidents and deaths related to malfunctioning water geysers or immersion rods.
5. Water heating device suitable for villages without electricity.
6. Economically affordable water heating.

Solution Description

Instead of the usual stand on gas grill, we can use square hollow stand made of copper pipes and elbow connectors. The hollow stand will let the water get heated if the water connection is given to it while cooking. The trapping of heat between the pipe stand and the utensil will let gas last longer as well. Money is saved too as there will be no longer a need of a water heater. The heated water will also be fortified with copper which is beneficial to our health. The heated water can be stored in storage. Cooking a meal for 4 needs at least 1-1.5 hours. Within this time the tubo hot can generate 5 Lit. of water heated up to a temperature of 100 degree Celsius

Solution Marketability

We will make full use of this on an industrial level as well and bring sterilized water to the market at a low price. Investment & Making Cost-800RS to 1000RS. Using this instead of electrical heating appliances saves around ₹900 per person every month. Availability of Raw Materials-100% (Target group). Copper is a cheap, easily recyclable and greenest natural metal. Adding to above, the output-copper water is beneficial to fight many health issues.

Link for the project's video presentation
https://www.youtube.com/watch?v=2aKhYbZLiSE

MAINTENANCE HOLE MONITORING & CLEANING

Pradyun Koduru, 6th Class

Team Member
Abhigna Koduru, 7th Class

Guide Teacher
Mr Koduru Manohar

School
Jubilee Hills Public School, Hyderabad, Telangana

Project Synopsis and Problem Narration

The project aims at solving one of the common problems or challenges faced in our lives related to 'Man holes' or 'Maintenance holes' that we see in our streets. Many a time, manholes are not maintained properly, for example, lids are left open risking people falling inside (especially during a rainy season). There is no proactive notification when manholes are getting filled. And humans still enter inside to clean them in unhygienic conditions. The project proposes 3 solutions to address these problems as described in the 'Solution' section.

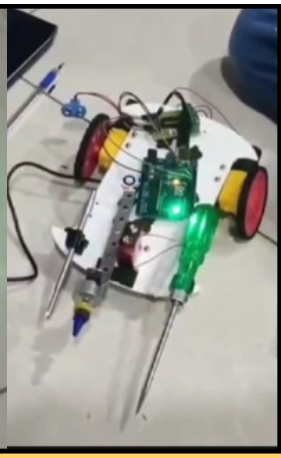
Solution Description

The solution involves three parts. The first part of the solution involves adding an IR sensor to the lid of the manhole. It is programmed to alert with a sound if the lid is open and on the ground for more than a certain amount of time. The second part of the solution involves adding a moisture sensor to the manhole's vertical tunnel to detect a rise in the level of water beyond a certain threshold. The third part of the solution involves adding simple accessories to a small moving robot that will enable it to clean the tunnel for simple blockages without a human entering it.

Solution Marketability

As part of the solution we are using a simple IR sensor and a moisture sensor for every man hole, each of which should cost less than Rs 100 per one manhole. The third solution can be can be slightly costly depending on how complex the robot can be. But the good thing is that once a robot is developed,it can be reused across all man holes, so the cost gets distributed and it can scale easily.

A very simple moving car like water proof robot with simple accessories like a small drill etc can be developed under 7k. According some online estimates there are more than 6 crore man holes in India. A good solution has a great chance to scale. More importantly, it saves human life and human dignity.



Link for the project's video presentation
https://www.youtube.com/watch?v=LV7FNCPxupY&t=80s

CONSOLATION WINNER

REDUCE AND PRODUCE

T Tanush,
9th Class

Guide Teacher
Ms T Sowjanya

School
Viswabharathi High School, Gudivada, Andhra Pradesh

Project Synopsis

Observing concerns like lack of electricity and uncontrolled waste generation in society, Tanush came up with a solution through which accumulated waste is consumed, hence "reducing" it and at the same time more electricity is generated, in other words "produced".

Problem Narration

This project focuses on two major societal issues. The first one being waste accumulation. Increase in waste generation and lack of proper waste management is leading to accumulation of waste which affects environment, human health and causes many more problems.
Secondly, Electricity shortage is a huge problem in India mainly caused due to increased demand and reduced supply. Many parts of our country suffer from frequent power cuts and blackouts, which can last for hours or even days.

Solution Description

Two stands are attached to a cardboard sheet. The four solar panels are placed on the stand using clips which are connected to a light bulb and a buzzer using connecting wires. Between the two stands, a pit made of wire mesh is placed to put in dry waste. When the waste is set on fire, the solar plates on both sides absorb the generated heat and convert the heat energy into electrical energy. Thus lits up the light bulb and rings the connected buzzer.

Solution Marketability

The materials used are cardboard, four solar plates, wire mesh, a couple of stands, a light bulb and a buzzer. The cost to put all together is quite nominal. Just around ₹500 to ₹600.

Link for the project's video presentation
https://www.youtube.com/watch?v=YOiM1EH3xUw&t=74s

COW DUNG AND COW CURD USE INSTEAD OF CHEMICAL FERTILIZERS

Jagarapu Hasini, 10th Class

Guide Teacher
Ms Badi Surya Kala

School
ZPHS, Marupalli, Andhra Pradesh

Project Synopsis

Curd Amrutha is a natural, easy-to-make and economical fertilizer that can be used instead of chemical fertilizers to kill pests on trees and plants.

Problem Narration

Waterway pollution, chemical burn to crops, increased air pollution, soil acidification, and mineral depletion are just a few of the many problems that chemical fertilisers cause. Curd Amrutha is the solution to avoid all the above issues.

Solution Description

Curd Amrutha can be prepared by mixing cow dung and cow curd. Take one litre of the mixture in a bowl, add some pieces of copper and preserve it for 15 days. Then remove the copper pieces and add ten litres of water and mix it well. Curd Amrutha is ready. Using a spray machine, this can be sprayed on trees and plants. It works effectively as a natural pesticide.

Solution Marketability

This is a low-cost product that can be easily prepared at home. It equals the effect of 50 kgs of uria. Hasini says many farmers in her village used her product and are quite satisfied with its results.

Link for the project's video presentation
https://www.youtube.com/watch?v=xOLXTGkdsfE

CONSOLATION WINNER

N Yaswanth Reddy,
8th Class

RIVER CLEANING BOAT

Guide Teacher
Mr SBVR Krishna Reddy

School
ZPHS, Bestavaripeta, Andhra Pradesh

Project Synopsis

The River Cleaning Boat is used for the collection of water debris, plastic trash and other impurities floating on water bodies or by boat thrash skimmer.

Problem Narration

Over two thirds of Earth's surface is covered by water. The quality of this water is being compromised due to population growth. Floating debris affects water quality, wildlife that lives in and around the water body, and can also hinder navigable waterways. When accumulated on the water surface they could also prevent sunlight from entering into water impacting life underneath.

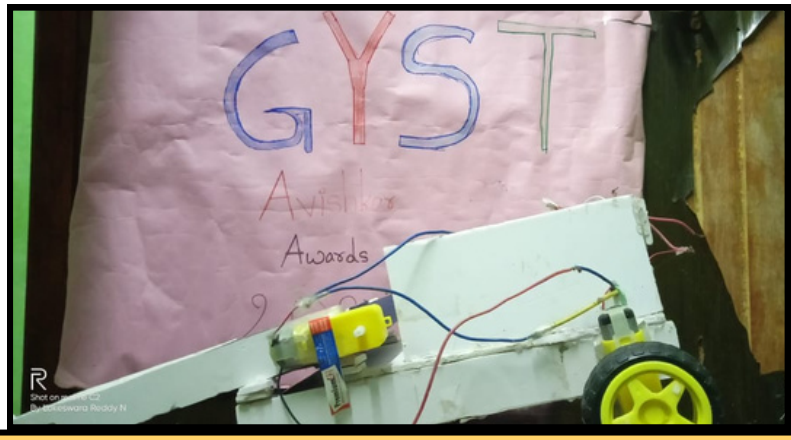
Solution Description

The river cleaning boat, when placed in water and connected to a battery, moves forwards floating on water. When it gets in contact with floating waste, a rotating cloth belt collects the waste into a compartment. This invention relates to skimmer boats, i.e., work boats for collecting and disposing of floating solid waste materials in harbors and waterways.

Solution Marketability

The device can be manufactured with easily available materials and the initial investment would be around ₹2000.

Cost of materials: Sun board sheets-₹300, Bo motors-₹400, Pvc pipes-₹200, Switches-₹10, Batteries/power bank-₹800, Wires-₹10, Cloth belt-₹10, Iron rod-₹20, Plaster-₹50, Fevikwik-₹50, Glue gun-₹300



Link for the project's video presentation
https://www.youtube.com/watch?v=hxb6afxrMXQ

POWERPLAY

Saisha Gupta,
10th Class

Guide Teacher
Ms Varsha Sharma

School
Lancer's Convent School, Delhi

Project Synopsis

The problem is about the continuous rise of energy demands and the shortage of conventional sources of energy generation and how we can further solve it so by adopting a technique of generating power using gym equipment.

Problem Narration

Due to the ever-increasing energy demands, the shortage of conventional sources of energy generation, and the adverse effects of those sources, the need for renewable energy is great. This has led to the discovery of new and unique power generation techniques that help to fulfill the demand.

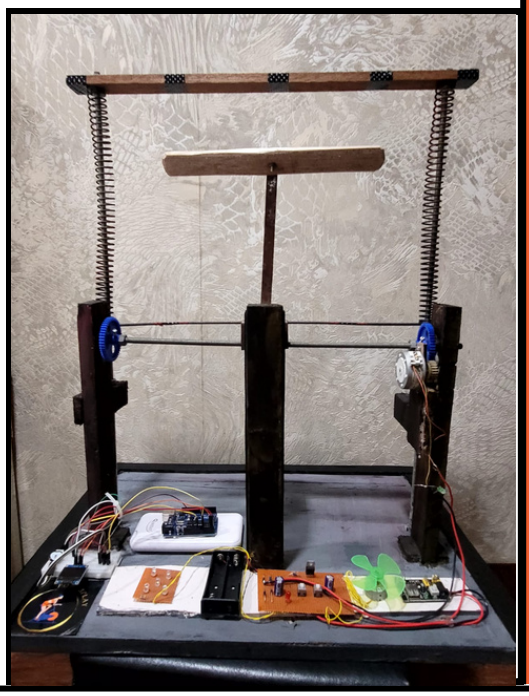
Solution Description

The solution is an energy generation system-POWERPLAY using humans as the power source to operate the equipment in the gym. This is basically a piece of equipment which can be attached or connected to the gym machines or can be inbuilt into the gym exercise machines. The muscular energy generated by the gym machines through the people using them gets converted into electrical energy with the help of a dynamo generator. Based on the principle that energy can only be converted from one form to another, the to-and-fro motion of the equipment is transformed into rotary motion by the use of a rack-and-pinion arrangement. The speed of the rotary motion is controlled with the help of a gear reduction method using a chain drive. After this, electric energy is generated by the conversion of rotary motion with the help of a dynamo generator. This energy generated can be stored or used in various appliances or gadgets like fans and lights or even to charge mobile phones.

Solution Marketability

Initial Investment: This depends on various factors, including the number and type of gym machines you plan to use, the required equipment for energy conversion, and any additional infrastructure needed to integrate the system into the gym.

Manufacturing Costs: Depends on the complexity of the energy generation system and the gym machines involved. It will include expenses such as materials, labour, production facilities, and overhead costs which can vary significantly depending on the design. Approximately it would range from ₹500 to ₹2000 depending on the quality and type of gym equipment.



Link for the project's video presentation
https://www.youtube.com/watch?v=aJYpqEMqw7Q

CONSOLATION WINNER

CONSOLATION WINNER

SMARTAPRON FOR DELIVERY BOY/GIRL

Aadhya Paul,
6th Class

Guide Teacher
Ms Mousumi Kundu

School
AECS-4, Anushaktinagar, Maharashtra

Project Synopsis

The delivery personnel employed by various platforms face odd weather conditions including scorching heat waves and controlled/air-conditioned environments of the delivery locations. Such frequent thermal fluctuations could make them vulnerable to getting sick with issues like thermal fatigue. Similarly, defence personnel at the border, chefs/cooks, industry workers etc. are also vulnerable.
SmartApron is an innovative idea/concept for use at the grassroots level. The concept makes use of phase change materials (PCM), a smart material, as an ingredient in the apron. PCM will keep the body temperature constant during the temperature fluctuations.

Problem Narration

Aadya says, during summers her mother advised her not to go into an AC room directly coming from the sun. Basically, not to give thermal shocks to the body. But when she started thinking about the various delivery personnel around, who constantly face thermal fluctuations, she realised it would cause serious health issues and make them vulnerable. And not just delivery boys, this issue is faced by people in many other professions like the army at the border, chefs/cooks, industry workers, sportsmen etc.

Solution Description

SmartApron is capable of arresting thermal fluctuations. It is made of Phase Change Materials (PCM) as the smart material as an ingredient in the apron which will keep the body temperature constant during temperature fluctuations. A similar concept was used by NASA scientist way back in 1980 where they used microencapsulated PCMs for space scientists.

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Continued...

Solution Description

A small piece of fabric is developed by sandwiching PCM loaded fabric between two layers of normal clothes. The middle cloth is loaded with paraffin wax in this case (better and customized PCM are available such as Octadecane, nonadacane etc.) and tested using a tawa to generate heat. When PCM melts it absorbs the heat (absorbs energy in the form of latent heat) and reduces the temperature. Thus, the inner side of the apron facing our body faces lower temperature by wearing this SmartApron.
Similarly when fabric is taken to a cold condition from a hot condition, it solidifies and so the body will not experience a sudden chill. Thus, the thermal fluctuation is arrested. The transformation can happen any number of times making the apron very useful to arrest large thermal variations. PCM material may be chosen as per the demand of the conditions.

Solution Marketability

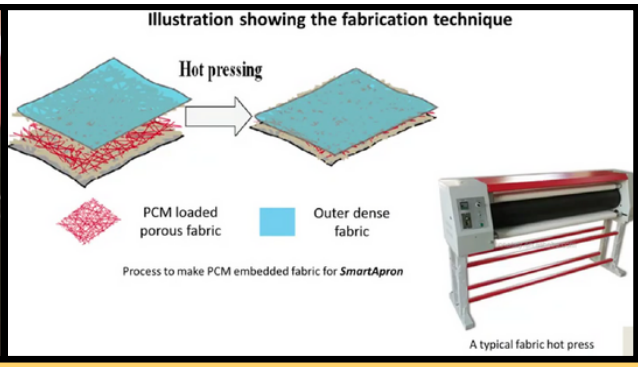
Demand: A huge need for delivery boys has been flouncing all over India as the e-commerce segment is growing rapidly. Therefore, this invention will be useful on humanitarian grounds as well as is commercially profitable considering large requirements. Indian textile industries have all the expertise and equipment to scale this concept to launch in the market.

USP: The SmartApron can be completely customised making it suitable for brand marketing and unique design production.

Material Availability: Large number of PCMs are available in any required temperature ranging from -5°C to 190°C and also at affordable prices.

Cost: Reaching break even will not be difficult because the investment cost is not very high.

Link for the project's video presentation
https://www.youtube.com/watch?v=1GQIraqj1ug&t=7s



BIO POTS

K Lavanya,
8th Class

Guide Teacher
Ms Buravilli Umamaheswari

School
ZPHS, Regidi, Andhra Pradesh

Project Synopsis

Bio pots are eco friendly plant pots and best alternative for black colour polythene bags used in plant nurseries. They are directly planted along with plant and are made up of natural substances.

Problem Narration

We use many use & throw objects in our daily life. One among them are black polythene bags commonly used in plant nurseries. They cause water, air and soil pollution.

Solution Description

Bio pots are made from compost manure, saw dust, paper pulp of waste egg trays and coconut husk. They are rich with macro and micro nutrients which enable rapid growth of plants. A plant can be planted directly along with these biopots.

Solution Marketability

It's low in cost and easy to prepare. Only ₹5. Lavanya says he supplied her Bio pots to a few nursery owner and has seen good results.

Link for the project's video presentation
https://www.youtube.com/watch?v=nKpJtjStKpg&t=24shttps://www.youtube.com/watch?v=nKpJtjStKpg&t=24s

CONSOLATION WINNER

CONSOLATION WINNER

ECO FRIENDLY POT COOLER

U Yoshini,
7th Class

Team Member
V Jasinta,
7th Class

Guide Teacher
Ms M Bhagya Lakshmi

School
LPCT Gujarati Vidyalaya,
Vijayawada, Andhra Pradesh

Project Synopsis

This model works on air circulatory principles made to minimise the power consumption without generating any air pollutants for a healthy environment. This is an alternative to expensive general Coolers and Air Conditioners.

Problem Narration

Air Conditioners emit CFCs into the air which deplete the Ozone layer causing UV rays to directly fall on earth. Also they are very expensive and consume a lot of power. To solve this, we built a cheap eco friendly solution in Pot Cooler.

Solution Description

Take 2 similar pots place one above the other, make a hole at the front side of the upper pot and put 2 holes at the bottom of the upper pot. Now fix a submersible motor to a PVC pipe which is inserted through a hole and close the PVC pipe with a PVC cap. A 12v DC fan is fixed at the top of the upper part with the help of a closing sheet. Now if we switch on the submersible motor switch, the motor will pump water up to the Upper pot through the PVC pipe and sprinkle it through the holes. The sprinkled water will fall on top of any sponge or dry grass kept inside the upper pot. The fan which rotates blows the wind vertically down into the upper pot.

Solution Marketability

This pot cooler occupies less space and uses less amount of water. It's easily portable and consumes very less power (one month of use would probably consume around 1 unit). The materials required to make an Eco Friendly Pot Cooler are easily available in the market and would just cost around ₹1000.

Link for the project's video presentation
https://www.youtube.com/watch?v=J4Bk11mEPC8

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