Children Creativity and Co-Creation Workshop - May 2018

Day 1:
Orientation: Chetan Sir emphasised on the fact that every individual thinks differently. They were shown various innovations which were made by the same age group children and received appreciation from various people, this was quite inspiring for the young minds. Children were shown some of the previous innovations from SRISTI to give them an idea of what it really is. This was followed by lecture of Prof. Anil Gupta where schedule of the whole program was given.

Day 2:

The day started with dividing the students into four groups along with engineering students and volunteers. The Groups went to their respective field areas Aluva, Amrapur, Arjunpura, Gaushala, Manasa, slum near Gandhinagar Railway Crossing, GMDC Gandhinagar (Industrial Area) to meet local people, workers, farmers, to get to know their problems in their daily life. They came to know about the various

problems they face for basic commuting needs and learning about their daily routine. They wrote down their observations.

Day 3:

They started with analysing the problems that they jotted down on the previous day. Chart papers and sketch pens were distributed among the children. In a matter of an hour from there, children came up with some sketches and ideas. Engineering students were instructed just to observe them do their work. Children were divided into 4 groups along with engineering students, teachers and volunteers. Children were not stopping in producing only one solution but multiple solutions of the same problem. The session was concluded with acknowledgement in the form of certificates to teachers, students and volunteers. Professor Gupta delivered a speech and explained various techniques which will help them in development of children's attitude towards innovations and communication of ideas.

The workshop ended on a high note with the message that children possess sensitive hearts and curious minds which feels what we can't and something us adults should look into.

(Brief of field)

Group No: 1

A summary:

- **Field Visit 1:**

Having finished with breakfast, we departed from Grambharti at 8am for Aluva. Failing to find a local business operable there, we went on a hunt for our next destination, which concluded with a Local Potter-manufacturer's house along the Gandhinagar Highway. Dineshbhai, the owner of the potter house greeted us. He was very kind to us and showed us every technique applicable in the fine art of pottery making, right from mixing the clay with water to humidifying it,

thrashing/mixing it to giving the clay a specific shape using bare hands. We continued our visit, with the next stop being a lumbar workshop. At the workshop, they had two main machine-One, to cut big wood into planks of specific thickness and the other to cut logs into normal semi-sized pieces. Both machines use super-sharp metal blade, planted on a conveyor belt. Also, their inventory comprises of a machine to sharpen the above mentioned blades. They sell these wooden pieces to Furniture Manufacturers, the precise ones, the sawdust generated as fuel to rice factories and normal-sized wood pieces to the farmers as fuel.

- **Field Visit 2:**

Herein, the group-1 got divided into two specific groups and visited two different areas:-

We departed at 4pm. We directly went to the construction area inside Grambharti. Where we noticed one interesting phenomenon. They were using Circular column for making base of the building. Drilling was being done with help on tractor diesel engine. It was very effective process. They told us that earlier they used to dig pits and do column building. It was very time consuming process. Now with the help of drilling and circular column. It has become very efficient. We then went to the Gaushala.

They have around 35 cows. There was mainly two types of cow: Kankrej (desi), HF(Australian). Kankrej cow b gives higher litres of Milk whereas HF Cows have good quality milk compare to Kankrej. They have their own farm for growing grass food for Cows. They did try Automatic Milking Machine to extract Mink from cow but they shifted back to manual milking.As per him it is not much animal friendly and does not left enough milk for baby cow. Another thing was that they used automatic grass cutter machine previously but due to some mechanical problem now they do manual grass cutting. They suggested us spaying water time to time on cows to their comfort. Then we went on streets to learn problem of local vendors. We went to auto repair station. We observed process of changing tyre of auto. Then we went to vegetable vendor we asked them their daily experience. They said life span of vegetables is 3 days in winter and 2 days in summer with water spraying two-three times a day. We went to sugarcane juice maker. He was not very friendly so we didn’t bother him much and came back to Grambharti.

MORNING VISIT

Name of all Children :

1. Happy Raval
2. Priyanka Chouhan
3. Samyak
4. Kuldip solanki
5. Rathore Jaydeep Singh
6. Haresh Thakur
7. Darjee Dhruv Rakeshbhai
8. Raval Smith
9. Rabari Vijya
10. Sohan Kiran
11. Himani Sagar
12. Vidhi R.Yelsattiwar
13. Priyanka Raval
14. Patel Samyak
15. Patel Harikesh

Name of Summer School Participants:

1. Pulkit Goyal
2. Pankaj Saini
3. Devik
4. Amanat Mishra
5. Rahul Kumar
6. Raj
7. Rishabh
8. Ajwad
9. Ajay
10. Gautham
11. Mahak
12. Agrata
13. Namrata

Name of Volunteer:

1. Chaiti Chatterjee
2. Hiral Shastri

❑ Mubarakpur Potter shop

➔ Introduction:

Mubarakpur Potter Shop was an inherited home for Mr. Dinesh whose family has been involved in the pottery business for a number of generations. He gave us a demonstration of the general pottery making process and the problems he faces daily in the practice of this business.

➔ The process was:

1. Mixing Soil after sieving (Red and Black soil in proportions 10:3) with water in a mixing tank. The black sand being sticky is used in low proportions and is responsible for the mountable property of the clay. The mixture flows out of the pipes at the bottom of the tank and collects in small areas where it is dried for 2-3 days. The black sand cost ₹4000 and the red sand 3000 per standard tractor. Drying the mixture for 1.5 days.
2. Fining of the mixture. The mixture is fed into a mixer that has a screw like mechanism that beats and mixes the clay to make the grains finer which makes them easier to form.
3. Forming the pot from the clay. The clay is put on a rotating platform, then moulded into desired form by hand.
4. Drying the pots for at least a day.
5. Painting the pot using natural dye first manually and again with help of the moulding platform.
6. Roasting the pots, once in three days in open furnace for 3 hours.

➔ List of problems identified by children and summer school participants

1. Crack generated due to uneven heating. This is because the heat generated in open furnace is not uniform. -Pulkit
2. The cost of closed furnace (chimney) is very costly to afford, which gives uniform and faster heating of pots.-Amanat
3. One of the biggest problem is the seasonal business (especially in rainy season, there is no way to make pots).-Rahul Kumar
4. Machine price for soil mixing seems costly.-Devik
5. Posture while making pots seems uncomfortable, and long use can lead somebody related problems.-Gautam

➔ **Brief Challenges Identified in detail (Story of conversations)**

1. Find the causes for the breaking of pots and find solutions for them. Some possible reason being:
2. Uneven thickness of the pot walls
3. A temperature gradient due to structure of furnace
4. Making cheaper machines for the pottery jobs
5. Finding methods for making cheaper furnace readily installable
6. Making the working place ergonomic and efficient by assigning proper and designated job places and by introducing a value chain.

❑ Woodworking Shop

➔ **Introduction:**

The second stop for the day was the woodworking shop/lumber mill. After interacting with the owner, we came to know the various details of their business. We were acquainted with various processes under which the logs of wood go to finally be supplied as lumber to the industry.

➔ **Process:**

1. Large logs of wood are delivered to the mill
2. Very Heavy logs are put on the trolley mill whereas less heavy logs are put on a mechanical trolley to bring to the band saw
3. At the band saw, logs are cut and finished into lumber
4. The wastage is passed on as firewood
5. Sawdust is supplied to rice mills for their furnace

➔ **List of problems identified by children and summer school participants:**

It is situated in the Gandhinagar highway. The main purpose is to cut the wood trunk into three sub-pieces which are large pieces(used for furniture), medium pieces(used for rice plant), small pieces(used as a burning purpose).The main issue faced by the workers are-

1. Spreading of wood's dust particles in the surrounding air which is the main cause of health's hazard of the workers-Pulkit
2. Sudden damage of band-saw may cause the instant death of the worker and serious injuries-Rahul

➔ **Brief Challenges Identified in detail (Story of conversations):**

1. Finding a method to prevent the spreading and formation of saw dust; and facilitate the collection of saw powder.
2. A way to prevent the breaking of the band saw, predicting the breaking of the band saw and having a method for safety of the worker in case the band saw breaks.

AFTERNOON VISIT (G1)

Name of all Children :

1. Rathore Jaydeep Singh
2. Thakur Haresh
3. Raval Smith
4. Vidhi R.Yelsattiwar
5. Rathore jayveer singh

Name of Summer School Participants:

1. Pulkit Goyal
2. Pankaj Saini
3. Devik
4. Rahul Kumar
5. Raj
6. Rishabh

Name of Volunteers:

- Chaiti Chatterjee

❑ NIF Construction Site:

NIF construction site is situated in Grambharti.We had a interaction with the manager of the site, in which we came to know about drilling(vertical columns)technique. Square steel bar was used instead of circular bar because of uniform distribution of stress around a particular cross section.

➔ **List of problems identified by children and summer school participants:**

1. Brick Transportation-Raj
2. Bending Steel Rods-Rishabh
3. Soil Leftover from the Drill around the hole after excavation-Pankaj

➔ **Brief Challenges Identified in detail (Story of conversations)**

A. Brick Transportation: The workers have to carry the bricks from the store to the construction site on their head which is big problem and is the source of a lot of uneasiness and health problems. So the challenge is to devise a method to transport these bricks that either supports or replaces the current manual method at at a minimal price.
B. Bending Steel Rods: The masons have to bend steel rods (in circles and squares) after cutting to make columns. These takes a lot of effort and causes strain in wrists and shoulders which

may lead to health problems in the future. The challenge is to make a mechanism, easily workable semi-automatic or automatic machine that bend steel rods in required sizes and shapes.

C. Soil Leftover from the Drill around the hole after excavation: When the drill excavates the land to form a hole, a pile of sand gathers around the hole that might fill up the hole again if not removed immediately. Currently, the sand in removed manually using ploughs by a number of workers. So, having an automatic system to prevent sand accumulation is an important challenge. The system should be cheap enough.

❑ Auto Repair Shop

We went to a auto repair shop situated on Gandhinagar road. During interaction with the man working there, we came to know that he face problem during the process of jacking. A large amount of force is required during unbolting the lower part of tire which causes strain in his hand.

➔ **List of problems identified by children and summer school participants:**

1. Heat-Devik
2. Removing Rims from small tyres of two and three Wheelers - Devik, Rahul, Pulkit

➔ **Brief Challenges Identified in detail (Story of conversations):**

A. Heat: Working near the road in the afternoon takes a big toll on the body. The challenge is to find a solution to this heat problem that is cheaper, installable and feasible.

B. Removing Rims from small tyres of two and Three Wheeler: One of the major tasks of an auto repairman is to fix punctures in tube tyres. This requires removal of the rim to take out the tube from the tyre. Surprisingly, this is a very exerting task and requires a lot of effort that causes pain in the wrists and shoulders of the worker. Also, of the entire process of 15 min, about 10 minutes are involved in this task. So the challenge is to design a mechanism capable of removing the rim of the tyre after undoing the nuts and bolts automatically and a secondary task being making this mechanism cheap to be installable and fast/efficient enough to save time.

❑ Gaushala

We went to the Gaushala located near Grambharti, Amrapur. There were around 35 cows. Mainly two types of cows were there: Kankrej(Desi) & HK(Australian). Around 25 cows were Kankrej and rest are HK. Kankrej cows gives more milk while Milk of HK cows have more nutrients compare to Kankrej. They have their own field to grow grass for cows. They have around 11 vigha land for that. One of the major problem they were having is about cutting grass. Although they have electric grass cutter due to some mechanical problem they were not using it. Gaushala keeper suggested us that if they had a water spraying system on cows shelter it would be better, especially in Summer.

➔ **List of problems identified by children and summer school participants:**

1) Cows move while in the milking place, creating disorganization and making the milking difficult. This also spreads the litter all over the place.-Raj
2) Pungent odour due to cow dung and cow urine-Pankaj
3) No reuse of byproducts-Rishabh

➔ **Brief Challenges Identified in detail (Story of conversations):**

A. Cows move while in the milking place, creating disorganization and making the milking difficult. This also spreads the litter all over the place. So challenge is to introduce some system to stability them and make the process easy. And also have proper stations for pooping and urination for the cows. There was a lot dunk-cake which was scattered in the cow shelter, it was smelling there.
B. Dung-cake and urine can be used for a variety of purposes that can be used to generate extra revenue or for generating power or as other resources in farming and in the cattle farm.

❑ Vegetable Vendor

We went to street vegetable vendor near Grambharti, Amrapur. There were 2 vendors both have similar problem of rotting of vegetables .During winter season, vegetables last for 2 days whereas in summer season it last for 3 days even after sprinkling water.

➔ **List of problems identified by children and summer school participants:**

1) Food Preservation for vegetable vendor and farming communities.-Rahul,Pulkit
2) A system to ease the loading/unloading of goods from vehicles in market.-Rishabh

➔ **Brief Challenges Identified in detail (Story of conversations)**

A. Food Preservation for vegetable vendor and farming communities. The design challenge is to make a storage plan that has following things:-
    a. Avoiding microbe growth and exposure to light and heat
    b. Maintaining low temperature and high relative humidity
B. A system to ease the loading/unloading of goods from vehicles in market. The challenge is to make a mechanism that can be used to help in the lifting of loads.

❑ Sugarcane juice Vendor

We went to sugarcane juice vendor near Grambharti,Amrapur.The main problem he faced while making juice was the uneasy movement of hand .He had to bent again again to get the sugarcane from the other side of the machine.

➔ **List of problems identified by children and summer school participants:**

1) Efficient Juicing Procedure-Sagar
2) Waste Reuse-Sagar

➔ **Brief Challenges Identified in detail (Story of conversations)**

A. Efficient Juicing Procedure: Currently they use their hand to remove the sugarcane to take off reusable sugarcane at the other end of the roller. The design challenge is to modified the existing machine so that by passing the sugarcane to the roller ,there is a bending roller or bending machine so that it will bend the sugarcane by 360 degree which is become easy to use and become more productivity
B. Waste Reuse

AFTERNOON VISIT (G2)

Name of all Children :

1. Happy Raval
2. Priyanka Chouhan
3. Samyak
4. Sohan Kiran

Name of Summer School Participants:

1. Mahak
2. Amrata
3. Ajwad
4. Amanat
5. Ajay
6. Agrata
7. Namrata
8. Gautam

Name of Volunteers:

- Hiral Shastri

❑ Farm Behind ONGC Oil Asset

Introduction: We stopped by an ONGC crude oil extractor to inspect the machine and visited the farm beyond. The farmer was harvesting bajra and he also introduced us to a tool that he uses to split castor shell from its seed.

➔ **Process** (splitting castor shell):

1. The farmer pours the spikey castors plucked out of the field into a drum.
2. The farmer then oscillates the assembly until cracked open shells fall down with the castor seed.
3. The mixture is then separated by blowing it through the wind.
4. The seeds are then sent to oil mills for extraction.

➔ **List of problems identified by children and summer school participants:**

1. Bajra Cutting Procedure-Ajwad
2. Castor Shell breaking- Amanat

➔ **Brief Challenges Identified in detail (Story of conversations):**

1. Bajra Cutting Procedure: Farmers can hurt their fingers during the process of harvesting the crop with traditional sickle
2. Castor Shell Breaking: Farmers waste a lot of time and energy in cracking open castor seed with the traditional mechanical strain-like device

❑ Ceramic Factory

The team then went to a large scale ceramic factory located nearby. The factory dealt with numerous manufacturing and polishing of tiles. The team explored the same along with the challenges faced by the factory, it's workers and other stakeholders.

➔ **Process:**

1. White clay is mixed with water to form a smooth dough
2. The clay is then poured into casts of a sheet
3. The sheet is then cut into a number of tiles but are still not solid
4. Tiles are then put through a hot press where the tiles become solid under excessive heat and pressure.
5. Conveyor belts run throughout the factory
6. The tiles are then polished to perfection with help of chemical thinners\
7. Some tiles are also further cut into smaller tiles
8. The conveyor belts go through quality checking and are collected at the end

9. Labourers box the tiles and wrap them with plastic strips
10. Final boxes are then stored in a large warehouse awaiting delivery

➔ **List of problems identified by children and summer school participants:**

1. Ceramic Dust Pollution-Mahak, Ajay
2. Excessive Heat in Working condition-Agrata

➔ **Brief Challenges Identified in detail (Story of conversations):**

1. Ceramic Dust Pollution: Workers are exposed to a high concentration of particulate matter that can lead to serious complications.
2. Excessive Heat in working conditions: Workers are exposed to heat waves emitting from the gas based tile oven in the factory.

❑ Broom Making Labourers

Introduction: The team visited broom making labourers around 5 in the evening where they came face to face with the process of broom making along with the challenges they face in the process.

➔ **Process**

1. The process starts with climbing a date tree where from plucking of khajoor leaves takes place. Similar process is repeated for coconut tree.
2. They are then tied in a bundle using a string.
3. The leaves are soaked in water for 10 min where they soften.
4. Water is dried off by gentle shaking of the leaves.
5. A person from the family then sits on the plank and beats the broom against spikes of length 8-12 inches, followed by pulling of stick towards himself .
6. The process is repeated till the leaves become sufficiently fine.
7. The broom is now ready.

➔ **List of problems identified by children and summer school participants:**

1. Difficulty in Shredding broom fibres-Gautam
2. Uncomfortable Posture in work-Namrata

➔ **Brief Challenges Identified in detail (Story of conversations):**

1. Uncomfortable Posture in work: Students noticed that the labourers are not sitting in the correct posture and are vulnerable to back ache problems.
2. Difficulty in Shredding broom fibres: The labourer complained of excessive physical stress in the process of shredding broom fibres.

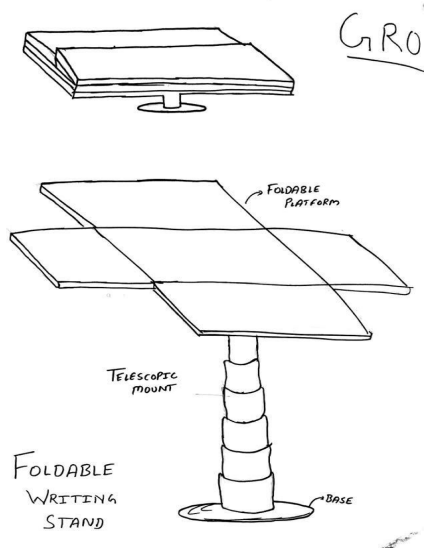
➔ **Key Learning points by Children, Summer School Participants and SRISTI:**

The group learned to sympathize with the problems of other people in a spectrum of professions. They also learned to work in teams, communicating with people and forming meaningful and good questions and also learned how to report the finding to others in an efficient manner. They also had an experience in communicating with people speaking different languages thus breaking the barrier.

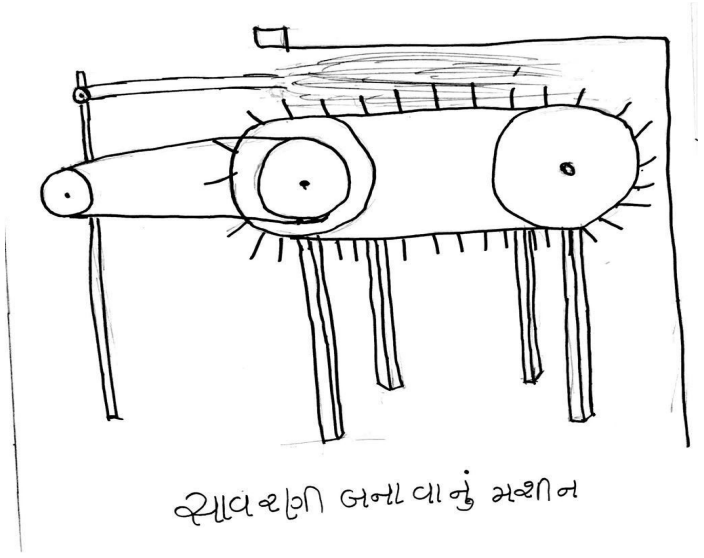
Other Ideas:

A. By Vidhi: Making a device that is portable and be used as pads when writing. These pads should be easy to transport (small), foldable and cheap.
B. By Chaiti:Making a simple device for carrying bricks which comprises of a foldable 3 storeyed system,where straps are attached to the shoulders, upper chest and waist,for uniform distribution of weight.

Group Idea:



1.Adjustable stand



2. broom making device

List of problems and solution by children

Samyak Patel and Harishikesh
Class - 4th, 6th, Contact - 9428645200 ,7874850804

Problem: A person sometimes can get lost by walking in the wrong direction while directing.

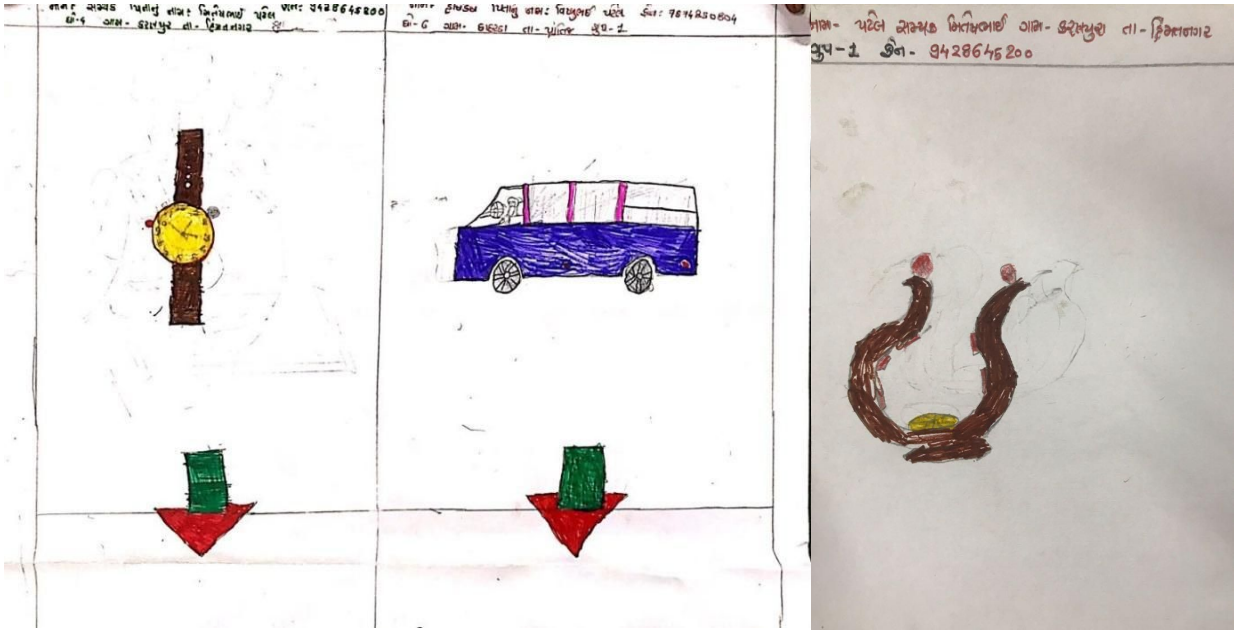
Solution: Include a chip in the watch that will ring when the person walks in the wrong direction.

Problem: A number of accidents happen due to speeding

Solution: A indicator light on the car can indicate when the car goes at a speed higher than permitted.

Problem: Coloring earthen is a manual task that requires monotonous work.

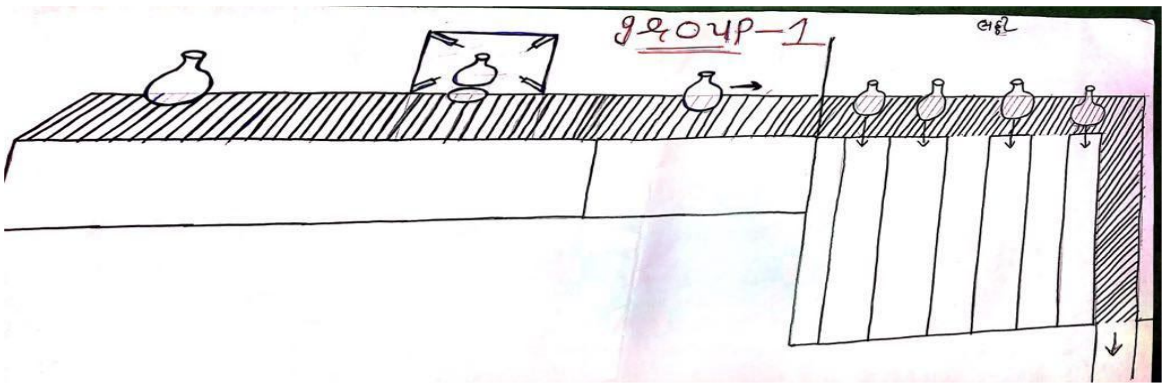
Solution: A clamp-arm type mechanism with revolving plate that can hold the pot and has brushes on it than can color the pots properly in a some rotations.

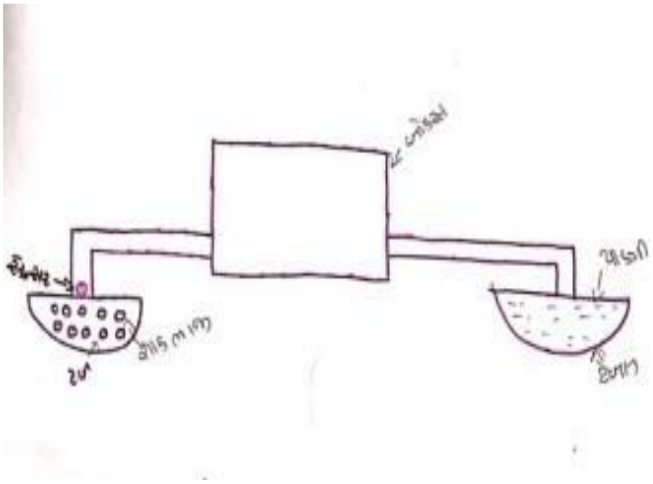


Chauhan Kiran, Hemani Sagar, Solanki Kuldeep
Class - 9th, 9th, 8th

Problem: A number of jobs take place in series at the pottery shop but are very unarranged that created a lot of delays.

Solution: Create a conveyor belt type assembly line that has stations for all the jobs to speed up the process.





Rathod Jaydeep Singh

Problem: A lot of time gets wasted in cleaning and cutting of vegetables

Solution: A machines that can automatically wash vegetables and then cut them.

Problem: A lot of time gets wasted in washing the floor and mopping in general

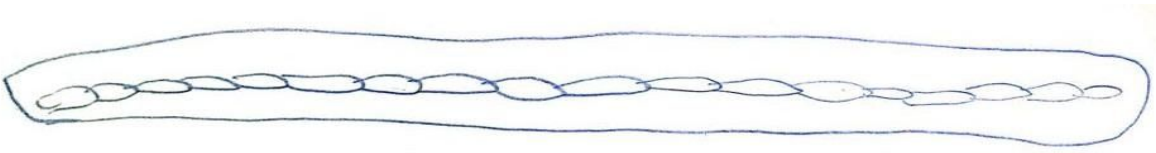
Solution: A broom type shoe, the mop can be joined to the bottom of the shoe making the mopping job easier as it can be done while walking in the house.

Rabbari Vijiya

Class-5th

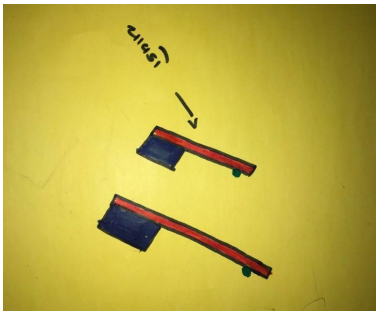
Problem**:** A conventional cow neck tie hurts can hurt the animal and the cattle bearer due to its design.

Solution**:** The necktie can be covered with rubber cover.



Darji Dhruv
School-Grambharti Primary School

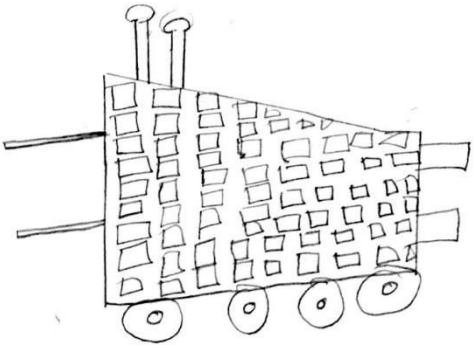
Problem**:** A conventional plough has a fixed height that can be difficult to use for different height users.
Solution**:** The height of the plough can be made to be adjustable so that it can work for users of all heights.



Rathore Jayveer Singh, Rathore Jaydeep Singh, Thakor Haresh, Darji Dhruv, Rawal Smith

Problem**:** It is very difficult to transport bricks from one place to another. Conventionally it is done on head which is very painful and time consuming.

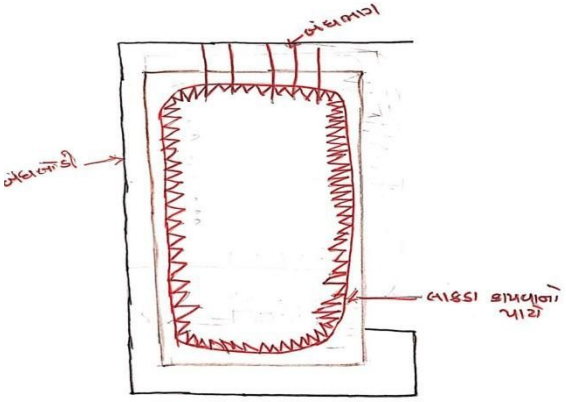
Solution**:** Create a track based trolley system that can be used to transport large number of bricks efficiently in less time.



Kuldeep Buddha Solanki
Class-8th

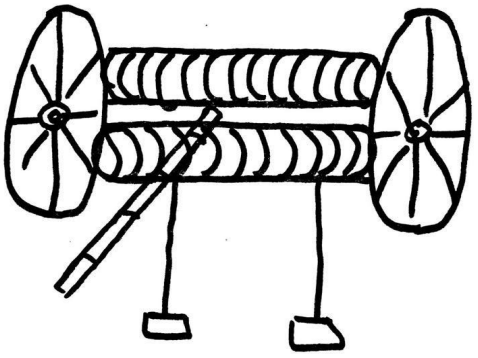
Problem**:** The band saw in the lumber industry is very dangerous as it can break and cause very serious injury.

Solution**:** A case can be made around the blade that can protect the user in case the blade breaks from flying shrapnel and dangling blade



Happy Rawal, Priyanka Rawal
Class-8th, Contact-7203834241
Problem**:** In the broom making industry, there is a very important step to fine the broom leaves on a machine that works by throwing the broom impulsively on thorns and then pulling it. But it is very strenuous for the user and cause shoulder pain and takes a lot of time.

Solution: Create a machine that has a motor and thorns on a belt with a clamping mechanism that can do the job easily without any strains on the user.



Problem**:** Sugarcane juicer requires two men, one to push and another to pull the sugarcane.

Solution**:** A plate type guider that can return the sugarcane again to the user for the next pass.

Vidhi R. Yelsattiwar

Class-10th, School-Pawan Public School, Contact-9766370959

Problem**:** Rolling carpets is a very hard task that takes a lot of time that requires the worker to bend continuously that causes load on the spine.

Solution**:** Create a movable machines that rolls the carpet automatically by roaming around the floor.

Problem**:** Sometime there is no writing pad to act as support for writing that makes taking notes hard.

Solution: A foldable stand that is portable enough in its folded state that it can easily be transported in a bag. And can be unfolded when required and has adjustable height.

Problem**:** Chalks become unusable when they become very short.

Solution**:** A holder for chalks that can even make small chalks usable and also prevents the sticking of dust on the users hand.

Problem**:** Almirahs have a very compact design that can make placing and removing things very difficult.

Solution: A revolvable shell almirah that can be rotated to place things all along the periphery of the almirah

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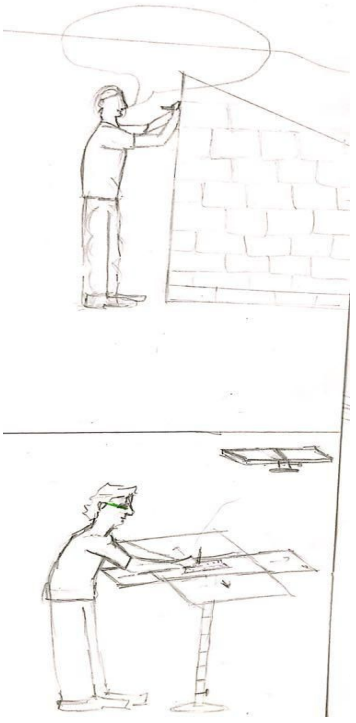
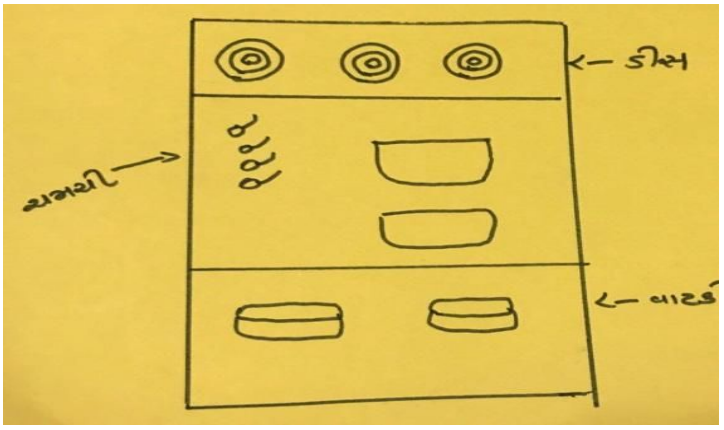


Rawal Smith

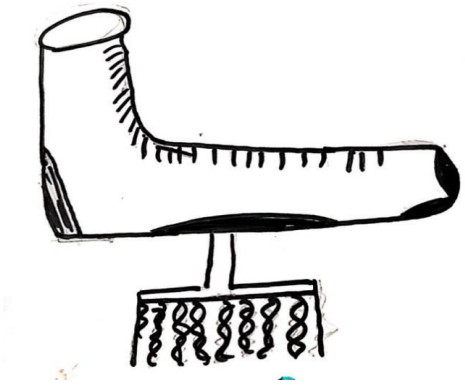
Problem: Carrying dishes can be a tough and time consuming task.

Solution: A trolley that can contain a number of dishes that can transport a number of dishes together saving time and a lot of effort.



Rathod Jayveer Singh N.

Idea: We should make such type of shoes that its lower part should be tied with moop which should be adjustable and when we walk around it should clean the floors.



Group No: 2

A summary:

- **Field Visit 1:**

We visited two places to get acquainted with the surroundings and the people. This introduced us to their working conditions and social context to some extent.

The first place was Village Amrapur where we visited a few families on their farms and talked to them about their farming practices and any other problems that they faced. We found out there that most people got regular electricity and running water. We found about the growing practices used for Jowar and Bajra. We briefly interacted with a brick kiln worker to understand how bricks are made. We went for a short visit to the river bank(Sabarmati) as well and saw an instance of (Illegal, most probably) sand mining.

- **Field Visit 2:**

The second field trip included multiple stops with visits to a dairy and a potter. And a failed attempt to talk to a blacksmith. dairy held a surprise with an automatic milking machine that was really unexpected. Another surprise was a cooling system that used a system of fine mist coming from the ceiling. The second stop was a potter who showed us the entire process of making a pot from the constituent type of soils.

Name of Children

1. Manavadiya Vidhi Rameshbhai
2. Chauhan Nisha Kiritkumar
3. Patel Man Saileshkumar
4. Bhandarkar Aryan Kundanbhai
5. Gabhane Sakshi Sureshkumar
6. Hemani Jitendrakumar Kiranbhai
7. Himani Nileshkumar Kantilal
8. Hemani Sanjay Kiranbhai
9. Machi Raj Kantibhai
10. Bhatt Het Hasmukhkumar
11. Sisodiya Keval Jitendrasinh
12. Bhagora Kartik Mukeshbhai
13. Solanki Jaimin Rameshbhai
14. Chaudhary Jiya Amreshbhai
15. Patel Om Hasmukhbhai

Name of Summer School Participants

1. Rishabh Jain
2. Tarun Punia
3. Saswat Nanda
4. Aditya Thaker
5. Kuldeep Oriya
6. Rohit Kumar
7. Aashaka Shah
8. Shashank Adhikari
9. Alpesh Sonagra
10. Nikita
11. Sanjucta Roy
12. Vrushali

Name of Volunteers

1. Sagar

2. Sanjana
3. Dhruvi Patel

➔ **List of problems identified by children and summer school participants**

★ COMMON PROBLEMS

1. Problem of the vegetable seller pushing the cart
2. Still need to finish milking using hand
3. Breakage during baking of pots
4. Social stigma against adoption of anything (even shoes)
5. The farmers feel back ache after farming.
6. Chilli plantation causes irritation if plucked by bare hands and wearing gloves is a discomfort for the farmer.
7. Very smelly and unhygienic because the cow wastes are not cleaned efficiently.
8. Hands and clothes get dirty WHILE MAKING POTS.
9. The vegetable seller gets tired while pushing it around in the sun
10. Wastage of vegetables in off season when the price of the commodity goes low.
11. When bricks are thrown from that height, they have quite an impact on the hands. Even seasoned workers develop skin problems on their palms due to the repeat impact of the heavy bricks on their hands.
12. Difficulty in picking fruits from plants or vegetable from crops.
13. Back pains due to bending and working on fields and farm for grass and/or crop cutting.
14. No harvest machine available for mix crop cultivation.

★ UNCOMMON PROBLEMS

Nikita (NIT GOA)

- Unhygienic conditions of the floor of Gaushala (the excretion of the cattle creates unhygienic conditions)
- The inlet part of the grass chopper machine doesn't have an inward sloping shed which leads to the grass not entering properly in the machine.

Aditya Thaker (G.P. PORBANDAR)

- Manually operated peanut shell remover.

Shashank Adhikari (IIITDM JABALPUR)

- Wastage of vegetables in off season when the price of the commodity goes low.

Rohit Kumar (IIT Pallakad)

- Insects sticks on the skin of cows/buffalo, which sucks the blood.
- Pain in hand during milking.
- In brick foundry, one person has to throw the brick to other person so sometimes accident can happen, and their hand can get damage.
- People use their leg to collect the cow dug.

- During the process of making of clay pot, they mix the two types of soil with the hand and they use filter to differentiate the liquid soil and bigger particles so Hand pain problem is there.

Vrushali (PVPSNDT Mumbai)

- While brick making, woman makes one brick at a time using a mold made for molding one brick at a time. The number of holders in the mold must be increased.

Ashaka Shah (IIT Roorkee)

- Field - tiffin is kept on the ground, then dogs might come and spoil it. Instead a warning system must be maintained for the tiffin which raises an alarm when it gets disturbed.
- Water comes sporadically and at different times in villages. People need to keep checking the taps continuously. There should be a warning sound to tell that water has come.

Rishabh Jain (IDC, IIT Bombay)

- Possible ergonomic problem that can cause lower back pain for potter.

➔ **Brief Challenges Identified in detail (Story of conversations)**

1. The smoke from a chulha.
2. Still need to finish milking using hand.
3. Mist based temperature control is also manually operated
4. Possible ergonomic problem that can cause lower back pain for potter
5. Breakage during baking of pots
6. Problem of distributing water to crops through borewell situated somewhat at an uncomfortable distance from the field
7. Water storage system is absent
8. Some kids run away to Sabarmati river and drown, there is no one to check them
9. Cutting of bajra is somewhat problematic, hand and fingers ache
10. Clay and mud used to make pots often dirty the hands of the users. They are indeed washed off but they get trapped in their nails that may be harmful for their health. Even if they were gloves, the pot making process becomes difficult.
11. Grass cutter outlet sends out cut grass at high speed and many small grasses escape and may cause irritation in nose and ears or create a mess.
12. Women carrying weights on their head feel irritation and tiredness, especially in heat and rains.
13. The gas cylinders are not used because when they get empty, the gas operator does not arrive in time to change it because the area is far off.
14. The women use chula due to and face irritation in their eyes.
15. Goats waste are present everywhere and small kids play naked feet on the ground and many diseases carrying microorganisms are spread.
16. In the afternoon, all windows need to be closed to prevent heat from entering rooms, it is tedious and sometimes when there is no one in room, the house becomes very hot.
17. No biogas cultures
18. An insect sticks on buffalo skin and the quantity of milk is halved.

19. The farmers feel back ache after farming.
20. Chilli plantation causes irritation if plucked by bare hands and wearing gloves is a discomfort for the farmer.
21. The legs remain unprotected and prone to injury.
22. Some stray animals damage the field.
23. Bricks are burnt in charcoal for 15 days, causing major pollution.
24. No instrument to cut jowar and bajra dried crops.
25. Some amount of milk remains and they have to be manually removed instead of suction machine else the cow may feel pain.
26. The grass cutter releases minute dust particles in large amount that may cause irritation.
27. Wastage of vegetables in off season when the price of the commodity goes low.
28. When bricks are thrown from that height, they have quite an impact on the hands. Even seasoned workers develop skin problems on their palms due to the repeat impact of the heavy bricks on their hands.
29. Difficulty in picking fruits from plants or vegetable from crops.
30. People have very much problem harvesting the crop specially bajra.
31. Floor becomes very dirty because of animal excreta.
32. The pest or tickle that get on the cattle suck the blood and hence will affect the quantity and quality of milk.
33. Birds often destroy crops even if there are scarecrows present.

➔ **Key Learning points by Children, Summer School Participants and SRISTI volunteers**

1. Social stigma present around the adoption of new technology.
2. Absence of technology from scenario
3. Unavailability of time to install technologies suggested

List of problems and solution by children

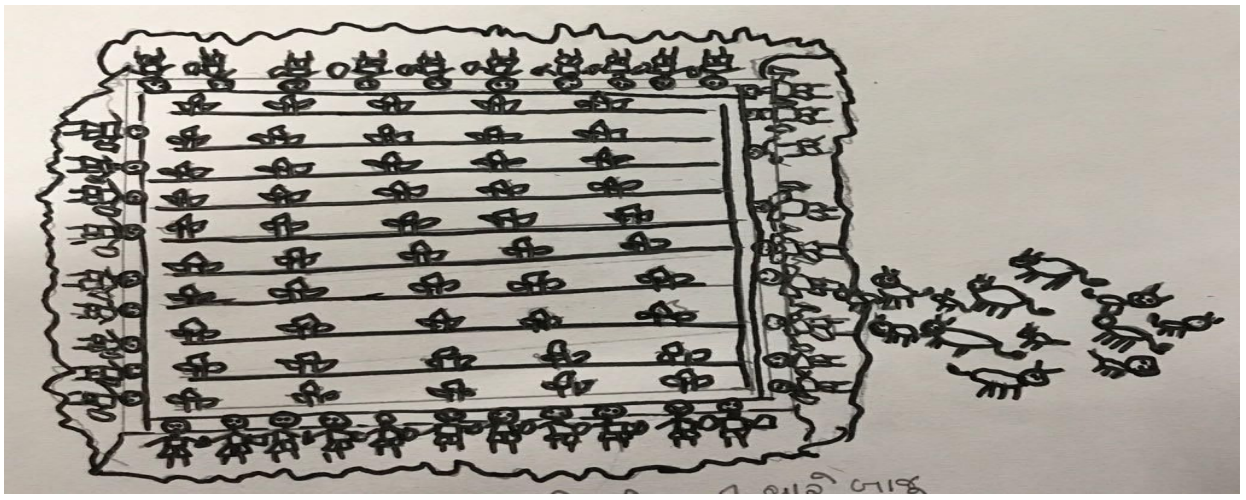
Nisha Kirit Kumar Chauhan
Age-13 years
Village- Chadderadda
School Name- Nachikat Vidyalaya, Hariyol
Mobile no- 9427693081

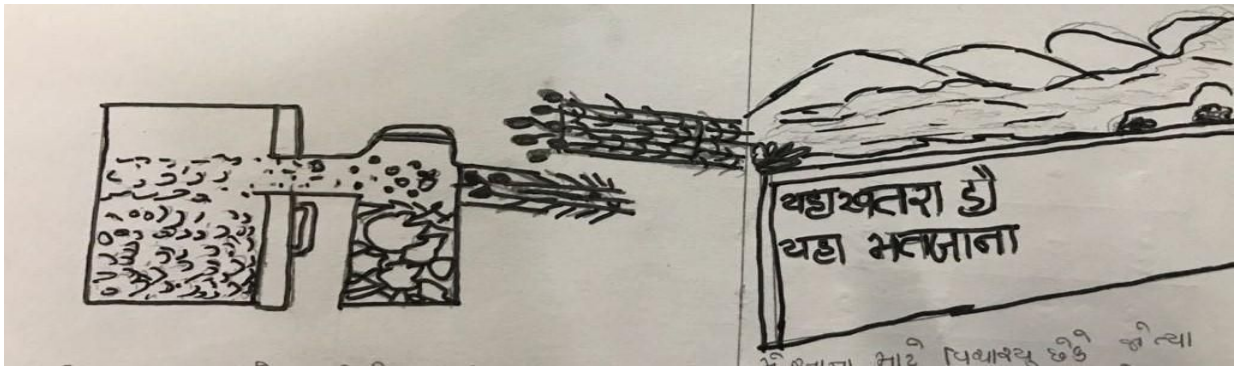
Area of Visit: Amrapur

Problem seen:

1. Problem of distributing water to crops through borewell situated somewhat at an uncomfortable distance from the field
2. Water storage system is absent
3. Some kids run away to Sabarmati river and drown, there is no one to check them
4. Cutting bajra is somewhat problematic, hand and fingers ache

5. Some isolated lands are present which are of no use
6. Animals interfere and destroy crops





Solution:

1. For problem no. 1, we can create a system with inverted water bottles with holed lids, they can be sprinkled around the crops through a moveable wire (attached to a motor), then all crops shall be watered.
2. For problem no 6, it has been informed by villagers that animals are afraid of human beings coming with sticks, so there may be a sensor system which starts a motor which transports moveable scarecrow holding sticks. So human beings may not come out also and animals run away

Area of Visit: Arjunapur

Problem seen:

1. Clay and mud used to make pots often dirty the hands of the users. They are indeed washed off but they get trapped in their nails that may be harmful for their health. Even if they were gloves, the pot making process becomes difficult.
2. Not symmetrical pots

Solution given:

There can be a round cage that does not move, it can have some materials that may be moveable and attached around the cage. These may be held by hand and used to shape the pots. They become symmetrical and the users hand do not get dirty.

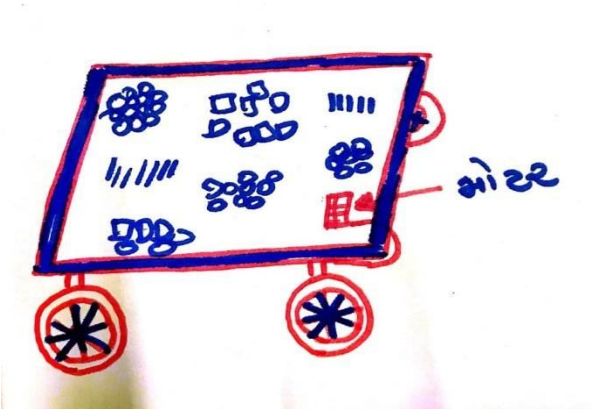
Area of Visit: Gaushala

Problem: Grass cutter outlet sends out cut grass at high speed and many small grasses escape and may cause irritation in nose and ears or create a mess.

Solution: They can attach a pipe through the outlet that can directly go to fodder of cows. So, they will directly get the food and there will be no mess.

Om Patel
Village- Kutch
Phone number -9428100275
School- Sri Hari International Public School
Observations

- Pot Maker
- Wood cutting
- Cows milking
- Field work
- Saw the Sabarmati River



Problems: The vegetable seller gets tired while pushing it around in the sun

Solution: Motorised thela (The cart used by vegetable vendors)

Sakshi
9766370959, 8007558431 | AGE – 14 | Pawan Public School, Pauni

Village Visited - Amarapur

Problem: Difficulty in carrying heavy pots on head while fetching water.

Solution: Design a trolley (with feature like foldable mechanism to save space when kept in house or its storage area).

The carrying capacity of the trolley depends on the following factors:

- Affordability of the user – depending upon this factor the capacity can be varied from carrying 2 pots to 4 or 6 pots.

- Width of the path the trolley will cross – if there is a narrow pathway then the size of the trolley must be small and therefore the capacity may reduce to only 2 pots.

Problem: Injuries due to the pointed tip of the sickle.

Solution: weld the pointed end of the sickle into a round tip.

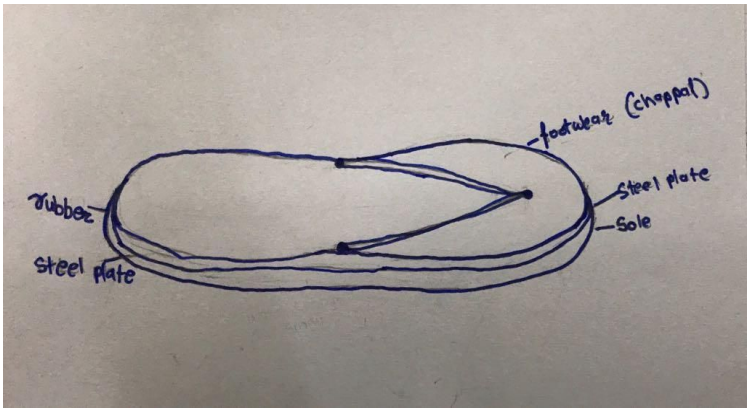
Problem: Normal footwear (open sandles and slippers) do not prevent feet from thorn pokes while on the fields.

Solution: footwear with metal sheets below the soles will provide a solution and also it will be low in cost (affordable by the farmers).

Problem: Metal leash around the necks of the cattle causes issues to them.

Solution: the region of the leash which stays in contact with the cattle's neck can have a belt attached below it (similar to how pet dogs have). This will reduce harsh pressure on the necks of cattle.

5. Add note on wrapper that throw in dustbin.

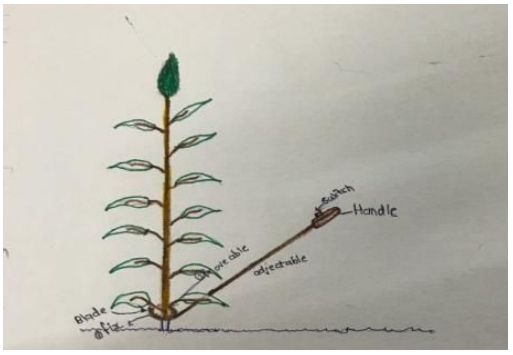


Village Visited: Arjanpura

Gaushala:

Grass cutter (few modifications are required)

Problem: After the grass is cut, the small pieces are shot out and fly here and there. Some pieces may get into eyes too.



Solution: design and attach a foldable cover (which saves space and can be opened or closed as per requirement) at the exit of the cutter. This will not allow the pieces to scatter or fly away and cause issues.

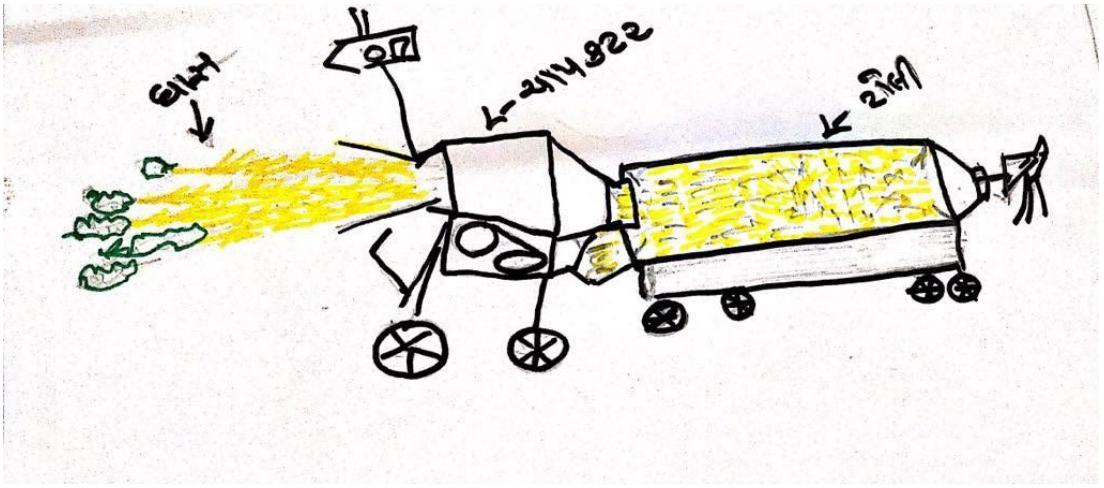
- Noise pollution due to the motor.

Solution: the machine must have a sound absorbing mechanism (a Silencer).

Manavadiya Vidhi
School Name: Uchchatar Uttar Buniyadi Kanya Vidyalaya
Phone Number: 7698090966 (Mom)
Village Name: Grambharti Sanstha
Age: 17

Problems and Solutions:

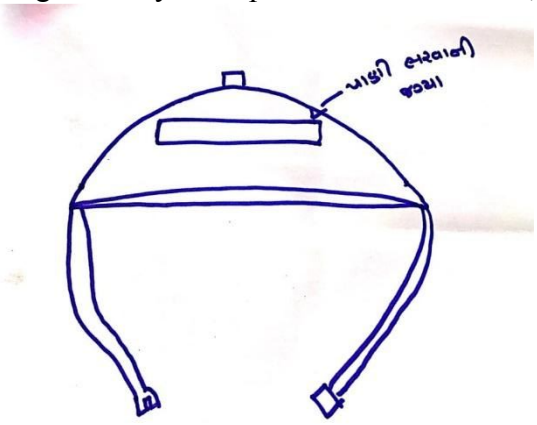
1. Field - tiffin is kept on the ground, then dogs might come and spoil it. Instead a warning system must be maintained for the tiffin which raises an alarm when it gets disturbed.
2. Water comes sporadically and at different times in villages. People need to keep checking the taps continuously. There should be a warning sound to tell that water has come.
3. Arjanpura dairy. Cut flying grass from the chopper is blocked by a khatla, and it then falls down on the ground. Instead, we should have a box like equipment which allows collection of cut grass into it easily.
4. Jiru, small plant with small grains. Cutting it from plant hurts the hand. Use an automatic cutting machine with a vacuum to collect.
5. Blackboard chalk duster - sends a lot of dust, causing problems to the person teaching. Instead, we should make a duster which can collect the chalk dust.

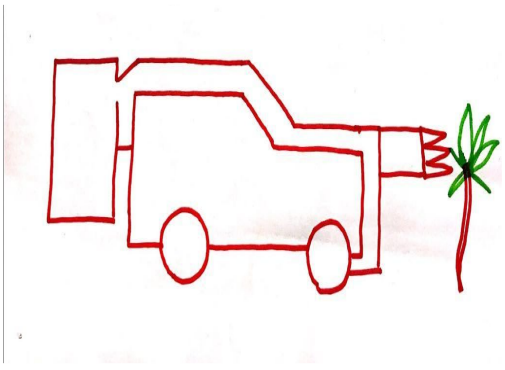


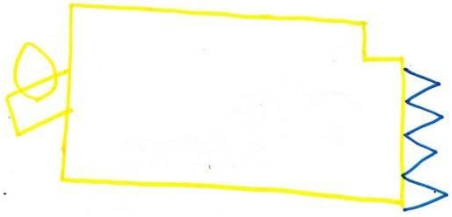
Patel Man ShaileshBhai
School Name - Nachiket Vidhyalay Hadiyol
Village Name - Chadaroda
Mobile No- 9427077904
Age -13-Year-Old

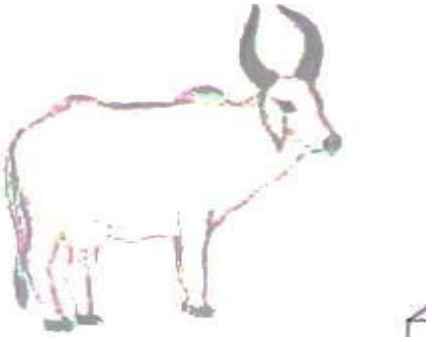
Problem & Solution: -

1. While Cooking, the cook get cooking smoke in her eyes which is harmful for cook.
2. Medicines are used by people to avoid mosquitoes on cattles. This medicines are not capable to remove mosquitoes. Thus solution or formula can be derive to improve that medicines capability.
3. while separating corn from the corn stick it required time as well as hard work.
Solution:- Machine should be used to separate the corn from the corn stick which saves time as it is done separately one by one.
4. Problem:- Farmers suffer from hot sun while farming.
Solution:- A cap can be made which will allow cool air in so make them feel good.
5. Raw material of corns after extracting corn beans can be used for making pickles. This material is giving far away from place it is made. Thus, that pickle making process should be done at that place.





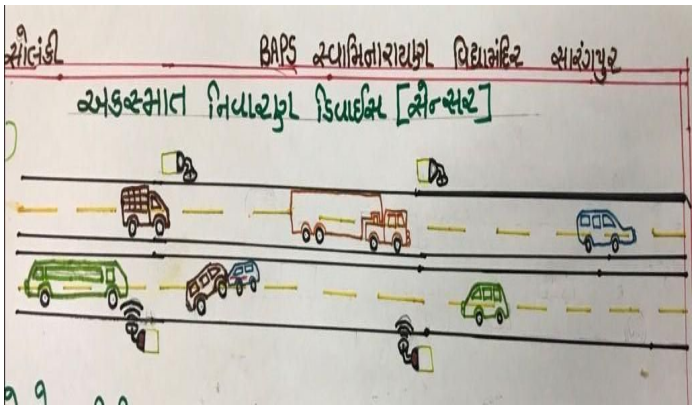


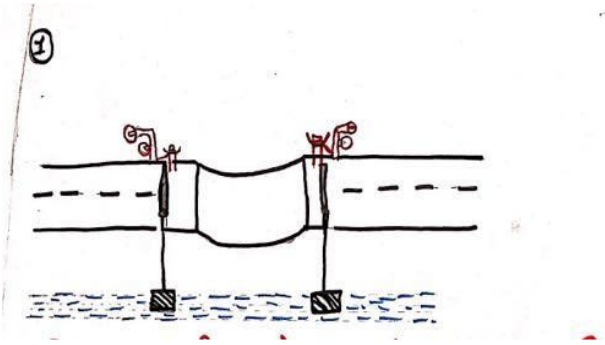


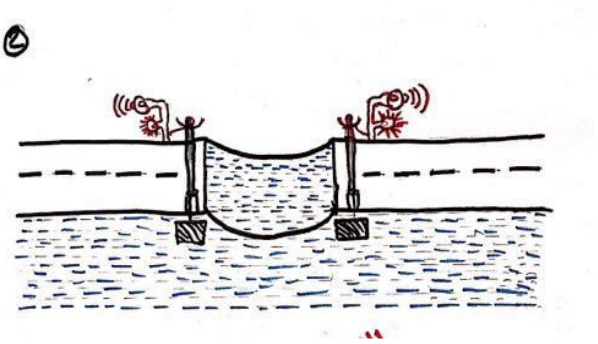
Solanki Jaimin
School: Swami Narayan Vidya Mandir, Sarangpur
Address: sodhi ,barwala, Dist. – Ahmedabad
Mobile : 7046837196
Age : 14

Problems Identified:

1. During cooking food, the women get irritation in their eyes.
2. The small insects stick to the skin of cows and buffalo, which sucks the blood, which is very dangerous to their health.
3. During the harvesting of Bajara and Javar, the farmers sit and cut the fruits because of that they get a huge back pain.
4. People get huge pain in their hand during milking.
5. Farmers get tired during all the processes of cultivation due to hot weather.
6. In Dohlera, I identified one problem related to crossing a rod. The height of bridge is very less so, during rainy season, the people cannot able to cross the bridge/road due to full of water.
7. In Uttar Pradesh, accidents in the rod during foggy weather is common.







Ideas:

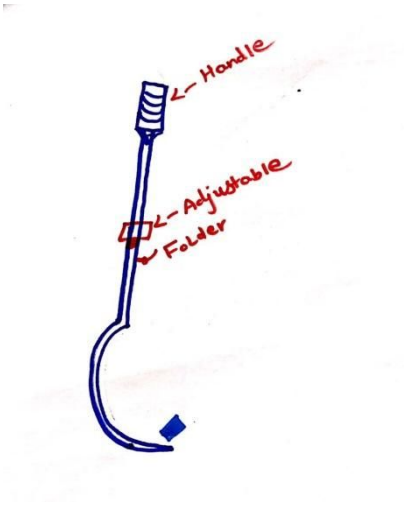
1. Small insects are generally removed by the medicine which is easily accessible but they are not killed so, we can use a tray of Kerosene in below to kill them.

2. To cut the Bajara and Javar plant, we should have a vehicle which can easily be carried by a worker, and both cutting and holding tool should attached at the bottom of the vehicle so, in one stroke the cutting device will cut a bunch of plant and then move forward again cut.
3. For Dohlera Problem, two gates should be there on both sides of the road and gates can move up and down easily and two big wood rollers should attach to the gates and when the water level will increase then the rollers will also move along with the gates.
4. For Uttar Pradesh problem, Sensors should be fix at an interval of particular distance and if any accident occurs in between two sensors then the signal should send to the next vehicle so that the drive slowly.

This is the major problem on the bridge.

Arjun

9766370959, 8007558431 | age – 14 | Pawan Public School, Pauni



Case 1:

Observation 1: The harvesting of jowar and bajra is done in a sitting posture.

Problem 1: The sitting posture leads to fatigue in the lower back region leading to back pain when continued for longer time span.

Solution 1:

The proposed tool suggests the use of an adjustable mechanism such that it can be used for crops at a distance and also the crops at hand. It also allows for bending of the rod so that it can reach difficult to reach spots in case of mixed plantation. The proposed tool heads a curved blade with a semicircular shape in line with the existing design of the traditional sickle. The curve blade has a rubber tip cap for safety purposes in case of a mishap or accident.

Case 2:

Observation 2.1: The people usually have to work in the daylight hours when the temperatures in a tropic region like Gujarat are are soaring high. Also the sun is really harsh.

Problem 2.1: When working in the field, the harsh sun acts as a catalysing agent for fatigue. It also results in frequent fevers, sunburns and other such minor but quite relevant health issues on a daily basis.

Observation 2.2: While carrying heavy load, the people have to carry it over their heads or shoulders. The people said that the dry husk from the crops causes irritation while carrying it over their heads.

Problem 2.2: The airborne husk from the crop cause irritation to the skin.

Solution 2: The proposed solution suggests making a basic roof like framework which can be balanced on the head. The framework will be fitted with a solar powered fan and a misting device which will provide constantly required cooling in the harsh situations. The top of the frame will have a belt system to help carry the heavy weights. As the framework acts as a shield from the sun, in a similar manner it acts as a barrier for the dry husk reducing the instances of it being irritating.

Case 3:
Observation 3: When walking through the field, a lot of people risk getting pricked by thorns from the wild bushes and even the plants used as boundary for security by some farmers.
Problem 3: Being pricked by thorns on a regular basis for a person who has to work on his foot for a major part for his day is a big inconvenience. Also in some cases the injury can be more severe and thus keeping in mind the scarce healthcare services available, can turn into serious infections.
Solution 3: Special footwear as a modified version of the traditional "chappals". The proposed design includes a pick proof knitted material of soft metal fibres as a layer in the sole so as to not compromise on comfort.

Case 4:
Observation 4: It was notified that a heavy metal chain is used to bind he cattle to the posts in the dairy.
Problem 4: It is hypothesised that the heavy metal chains cause irritation and pain as they start digging into the skin due to the constant tugging by the natural movement of the animal and also its own sheer weight.
Solution 4: It is proposed that the metal chain be replaced with a lighter chain with a modified inner lining of foam. The foam acts as a barrier between the chain and the skin of the animal and thus reduces the chances of getting skin lesions.

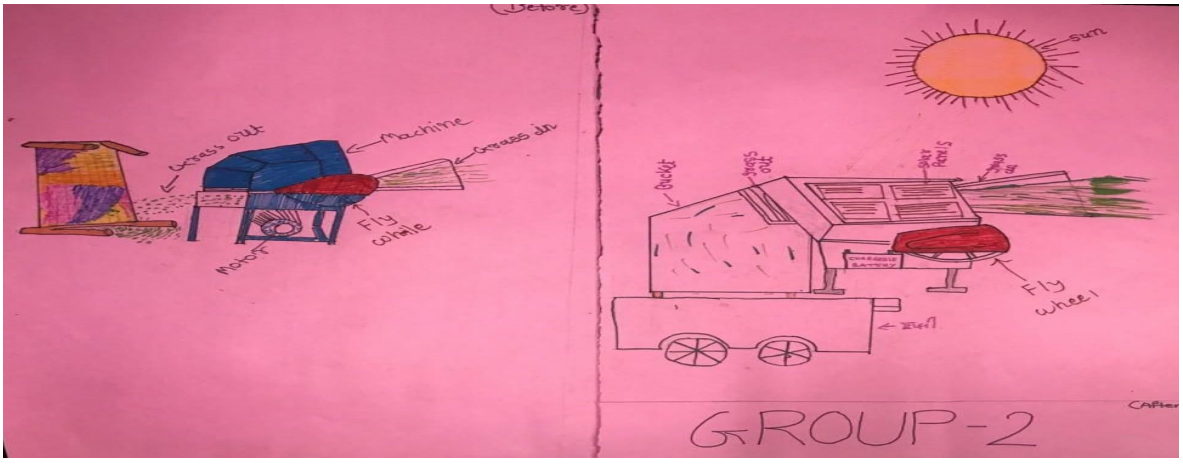
Case 5:
Observation 5: Even with a machine for milking the cows, a human presence is required while the machine is being operated.
Problem 5: This time spent operating the machine is quite redundant and can easily be utilised for other activities.
Solution 5: The pipe through which the milk travels in the milking machine houses a sensor which will keep track of the amount of milk being extracted in a unit time. As soon as the rate of milk extraction reduces a sound based alert system that will inform the caretaker so that the machine can be switched off and disengaged.

Nilesh Kumar
Class: 8th
contact number:9429120294
village: Palanpur
AGE:12

SCHOOL: Palanpur devine touch school
village visited: Amarapur

Problem statement: People have very much problem harvesting the crop specially bajra.
Solution: we can apply or install a blade or cutter rotating with tractor so that with the motion or movement of tractor the blades will move and hence cut the crop from the bottom also we can apply another blade just below the bajra bunch and hence the bajra will get separated and there will be an ease in harvesting
Also, we can apply or put the solar panel that would help us to install motor and we harvest it easily.

Problem:2 The pest or tickle that get on the cattle suck the blood and hence will affect the quantity and quality of milk.
Solution: we can apply or spray that once if sprayed can remove all the tickle from the cattle so that it improves the health and hygiene of the cattle.
Problem :3 harvesting problem
Sol: we can attach a block on a machine operated by peddle or small battery by using this we can cut and hence arrange the crop.



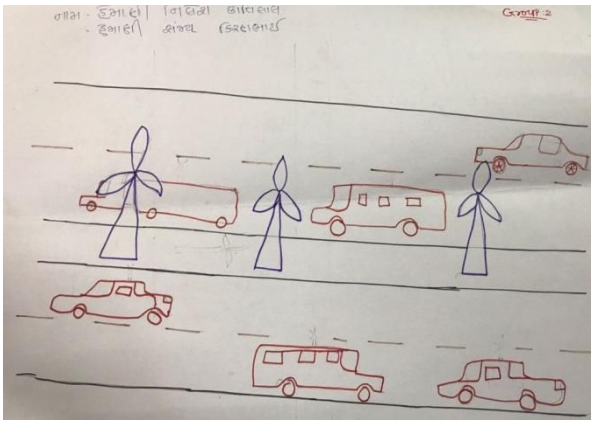
Jitendra Hemani
child's village: Palanpur
Problem: production of clean fuel so as to help restore nature.

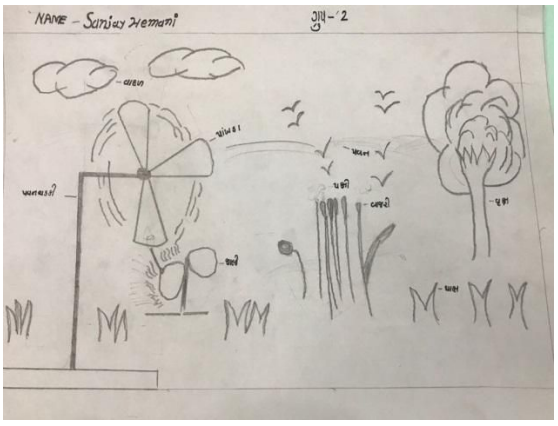
Solution: There only one way to produce clean fuel without harming nature that is also cheap and easy produced that is bio gas. The plant is small and that has a small chamber that has gobar gas and other biodegradable thing the process is simple and easy produced this gives clean fuel without any problem and also produces organic fertilizers that help restore nature again. This gobar gas plant will help the farmer get a bit of help in burning fuel and provide clean fuel.

Sanjay Hemani
contact-9727899565

child’s village- haripura

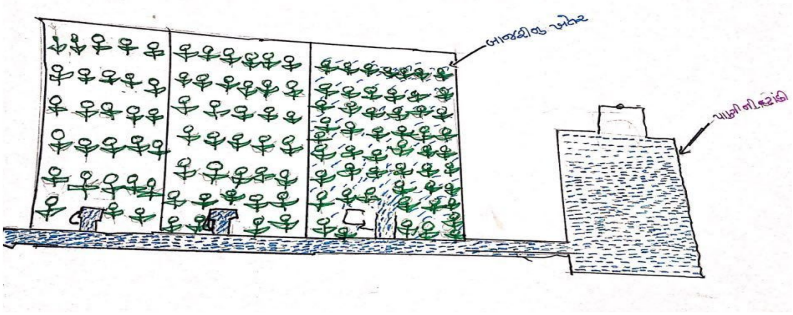
Problem: the problem of birds that destroy and hurt the crop





Solution: the sol can be a wind chime that can be used so as to threaten or scare them away. The idea is to let the fan rotate with the help of wind once the wind is flowing the fan are connected with a heavy material or stone which when rotated hits the metal surface and this produces the sound and scares the birds away and protects the crop.

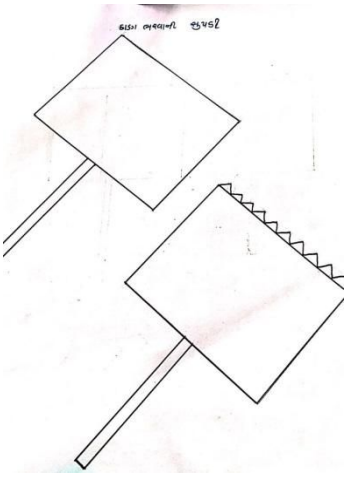
Manchi Rajkumar Kanti Bhai
Class-6
Village- Navndisar
Contact-8753828261



Problem: irrigation problem

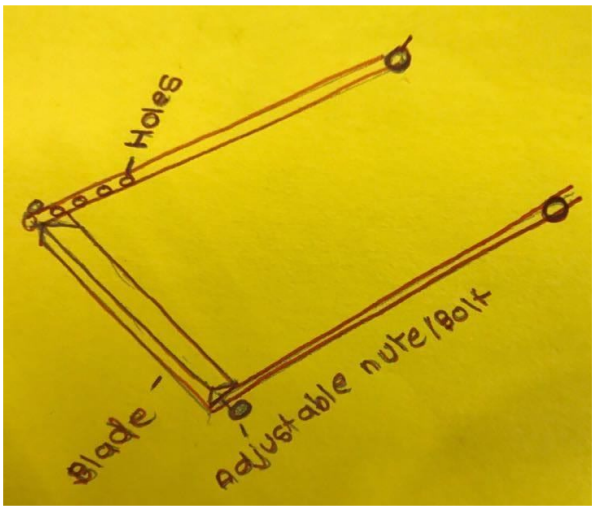
Solution: the problem is the irrigational that is the irrigational without the motor or electricity help the sol revolves around the use of gravity that is a water tank and a pipe system that goes into the field with a web kind of structure and gravity that helps the water to flow with high velocity and hence the fields get irrigated.

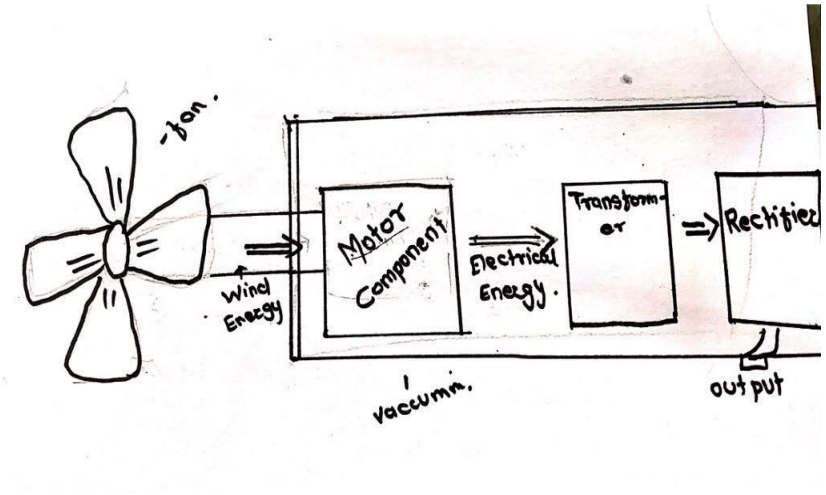
Jiya And Om
Class-7th ,5th
Village-Grambharti
Contact-9998016012,9428100275



Problem 1
Idea: Cow Dung Collector
Problem 2
Idea: To fix sensor on scarecrow so that if any creature comes near to it sensor starts buzzing.

Aryan Bhendarkar
Class-7th
Village-Pawan Public School,Maharashtra Contact:9766370959



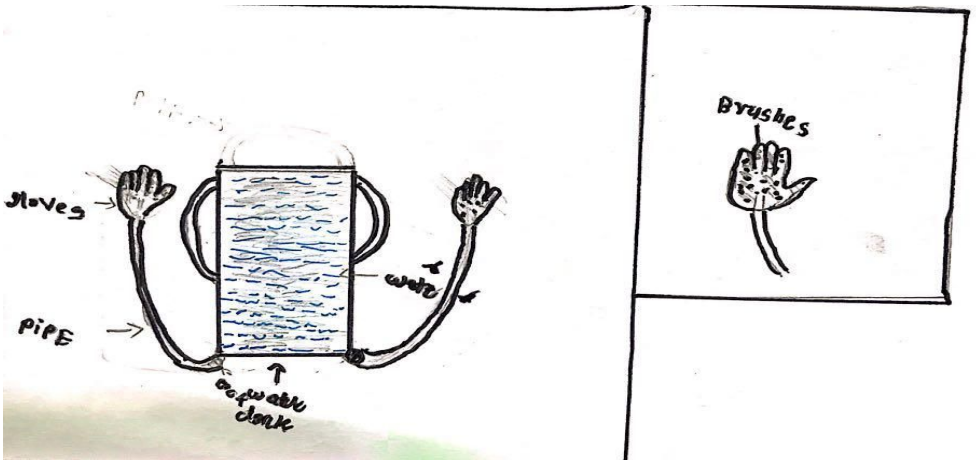


Problem 1: Due to rain mud gets sticks on bike and due to it bike gets slipped . So everytime we have to remove the sticky clay over the bike.
Solution: Below the mudguard of bike a strip type adjustable metal rod should be attached .

Problem 2: There is no charging point in bus.
Solution: There should be an instrument in the bus in which fan should be present. Whenever air flows fan starts rotating and it should get connected inside the box. So machine which is present inside box converts wind energy to electrical energy and thus electricity is produced which can be used to charge our mobile phones.

Bhatt Het
Class-9th
Contact- 9714234634

Problem: Whenever animals are taken to river or ponds for bathing water gets polluted and if this water is used for drinking diseases are spread among humans .

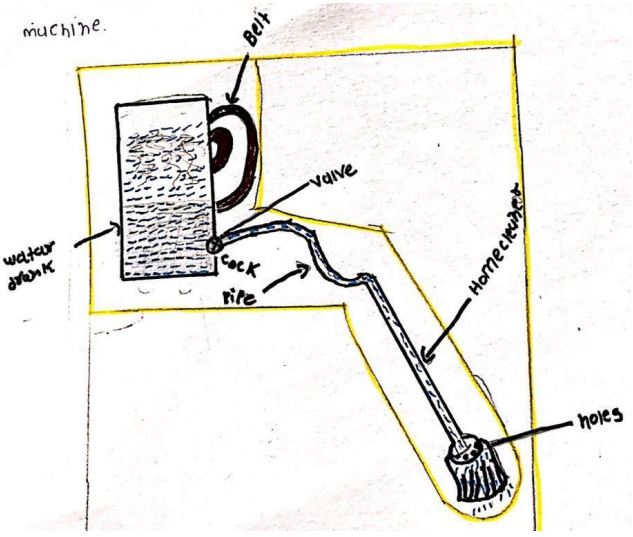


Solution: A special type of gloves should be designed to which pipe is attached and this pipe is connected to a plastic square type box full of water. When we on switch water reaches to gloves with the help of pipes and brushes which are attached to gloves starts cleaning animals so no man power is required.

Sisodiya KevalSinh Jitendrasinh
Class-10th Contact: 9924014747

Problem-While cleaning the floor one has to bend down due to which back pain problem arises.

Solution: Automatic Cleaning Machine



Group No: 3

A summary:

❑ Pottery

The potter was busy making a big pot. He was actually patting the surface of the pot, which was actually needed to increase the size of the pot and to increase its strength. There was a place filled with different types of soil. The potter was making mud by mixing water with the soil taken with required proportions in a tub using his hands. There was an outlet through which processed mud (mixed and sieved) was coming out. This processed mud was further required to bake it under the sun .Later the soaked mud is taken to a mixing machine to shape it out as cylindrical shape. Then it is taken out to the potter's wheel called charkha to shape it into different shapes. Every matka or pot is first made into a specific shape and then its size is increased by elongating via a process called patting done manually. Once the pots are made into desired shape they are send for coloring via GERU. After coloring the pots send for sunbaking .After that for more heating and strengthening of the pots they are further placed in a manually made furnace using wood and coal. After that pots are properly baked, dried and strengthened they go for designing process done by brush and white color made by rice(MAND).

❑ Brick Making

We travelled in car till the field in which brick making was happening. When we got down the car, we first observed rows and rows of brick, which were drying in the sun. Some were extremely fresh (i.e recently moulded, while the rest were half dried) There was a huge structure made of bricks, which we later found out was the kiln in which bricks are baked.
There were also huge heaps of sand and husk. There was a cement water tank which was filled with slightly dirty water. We observed that wheel barrows were being used to transport bricks. There was also a truck which was unloading coal nearby. On the same field was a small hut made of bricks in which the family was living.

The brick maker showed us around the field and explained to us how the bricks were made. First the lady showed us how bricks were moulded. She used a single die for the brick where she first applied sand on the surfaces of the die so that the mixture does not stick to surface of die. After that the die was upturned to be emptied so that the newly formed unbaked brick gets baked under the sun. Husk and ash were also added to the mixture. After that, we climbed onto the brick kiln. We used a steel ladder, which was a very precarious way to climb onto and off the kiln, especially since the surface of it was so hot. He then explained the structure of the kiln, which is made of layers of coal, husk, sand and bricks. After building the entire structure, which takes about a month, the coal is burnt, which takes another month to fully burn. When the fire dies out, it takes another month before the kiln is dismantled and transported away.

❑ Cobbler

After a journey from potter, baking site we visited a local problem and discussed with him his problems. He first has to perform several job on leather right from washing it initially with cold water and then beating it to remove the wrinkles formed on leather. He then cuts the leather according to foot size based on his experience and then several leather pieces joined using kaolin clay to form sole; and threaded together to form a part shoe. Threading requires thread to be wetted and needle to be dipped in oil. Internal sewing and several patterning is done on the shoes using complex tools. The entire process is manual right from cutting the leather to cutting the thread.

❑ Broom making

The broom making site was on the road side. It covers a long stretch of area, the entire family lives there. The children were playing on site, it didn't look like they went to school. They had a very big family. Even selling the brooms was taking place on the same stretch of road. There were 3 different sizes of brooms.

Brooms are made using the date leaves which are brought from Rajasthan. First they are divided into small parts and then they are made into bundles. They are tied using metal wire. There is a long plank which has steel spikes affixed onto one end of it. The broom maker sits on the other end of this plank and takes the bundle. He keeps beating the bundle onto the spikes and then pulling it so that the long leaves split into finer fibres. As he repeats this process it becomes smoother. Once it has become sufficiently fine, then the handle is bound. It is first bound with plastic. The lady generally does this work. She then winds tape around her feet.

Children Name

1. Parth Vishnubhai Patel
2. Raval Jaydip
3. Yash Raval E
4. Poonam Rameshbhai
5. Rabari Ankita
6. Rabari Shilpa
7. Chaudhary Devendra
8. Raval Sahil
9. Rohit Manavadiya
10. Chauhan Khushi
11. Aditya Kiritbhai Chauhan
12. Goswami Vaibhav
13. Devashree Agrawal
14. Vishakha Ramteke
15. Sameer Ramteke
16. Sisodiya Rajdeep
17. Mayur Ashokbhai

18. Yash Desai
19. Desai Luv kumar Arvindbhai

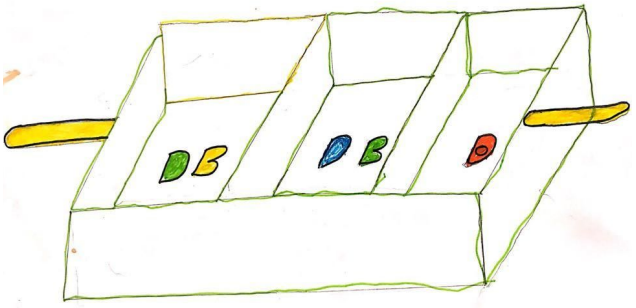
Summer school participant Group Members:

1. Prabhudatta Mishra
2. Mallampalli Parinita
3. Rupali Tripathi
4. Ved Prakash Mishra
5. Jethava Jaydeep
6. Hard Matarkar
7. Ankit Chauhan
8. Dhaval Pankhaniya
9. Anjali Jha
10. Sulekha Mali
11. Vinod Ratre
12. Monark

List of problems and solution by children:

Goswami Vaibhavpuri J. and Rabari Shilpa
Class-8th and 2nd,School-Grambharti School

Contact-9726570287

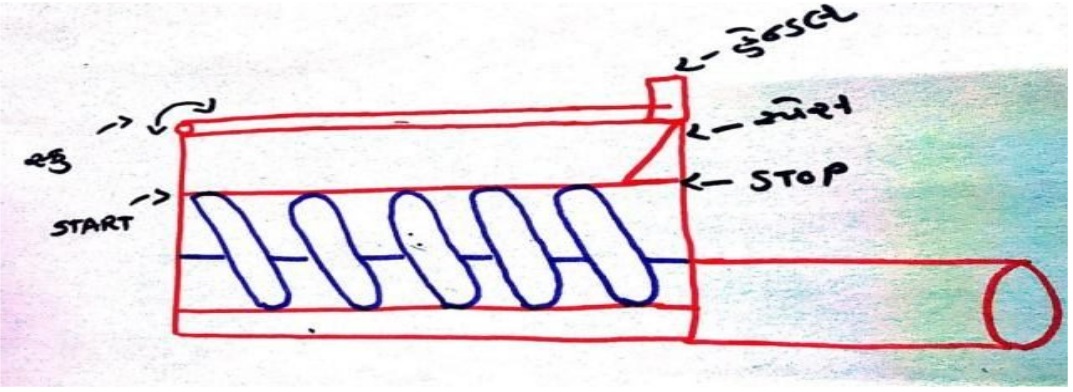


Problem: She observed that brick makers only had one brick mould which wasn't efficient for their productivity.

Solution: She thought of a design which would have a series of brick moulds attached together, so that multiple bricks can be made at the same .time

Manavadiya Rohit and Raval Jaydip Bharatbhai

Class-10th, School-Gramsala,Grambharti
Contact-7698090966



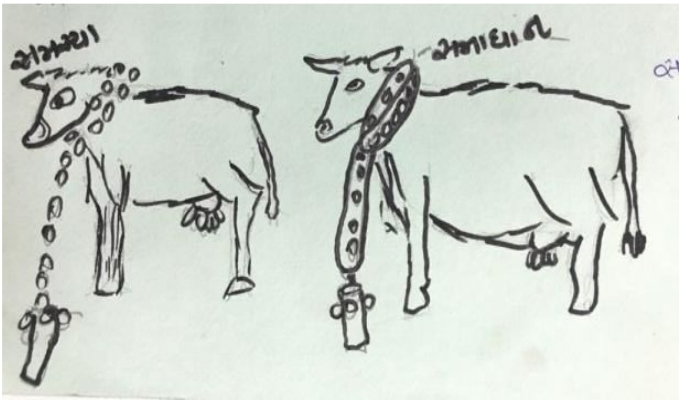
Problem: The clay used to make pots need be prepared by a mixing machine in which the clay is pushed by hand which may cause major injuries like loss of fingers.

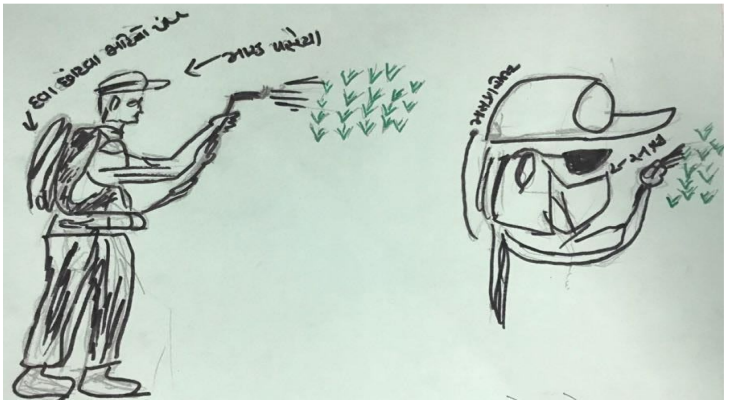
Solution: He suggested making a handle to push the clay inside the mixer to avoiding any injuries.

Problem: Cattles mostly have a leash made of chain which forces them to keep their head leaning downwards and causes neck injuries.

Solution: We should make a leash in such a way that it provides free movement of head and doesn't cause any injuries.

Problem: Farmers don't use mask while spraying pesticides in the fields. Inhaling those can cause health Solution: The tank in which the pesticides are stored should have an attached holder for a mask equipped with a sensor sensing that the person using the tank has the mask on. After sensing that only will the spraying will start.



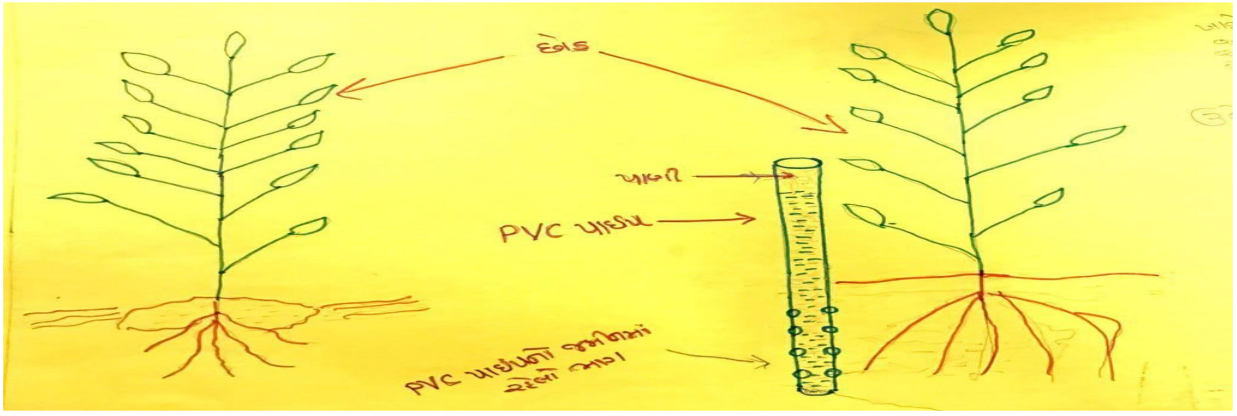


Desai Luv Kumar Arvindbhai and Desai Yash

Class - 5th and 9th School-Shree Swaminarayan Sanskar Dham

Contact - 9998423414,6351742162

Problem: When we water plants, water takes time to slip through the top soil. In the meantime the water also evaporates causing loss of water.



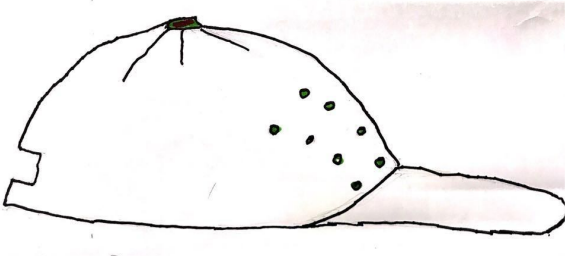
Solution: A PVC pipe must be set beside the stem of the plant, in the bottom of the pipe there should be multiple holes all around. The bottom part must be filled with small gravels to hold in place. The water must be poured into the pipe so that the water goes directly to the roots. Therefore controlling the water flow to the plants and avoiding excess water evaporation.

Raval Yash

Std-6th,Contact-8337424642

Problem: A cooling cap to tackle summers better.

Solution: He suggested a cap design with a layer of puff coating and semi layered with water. The cap should be soaked in water before wearing.



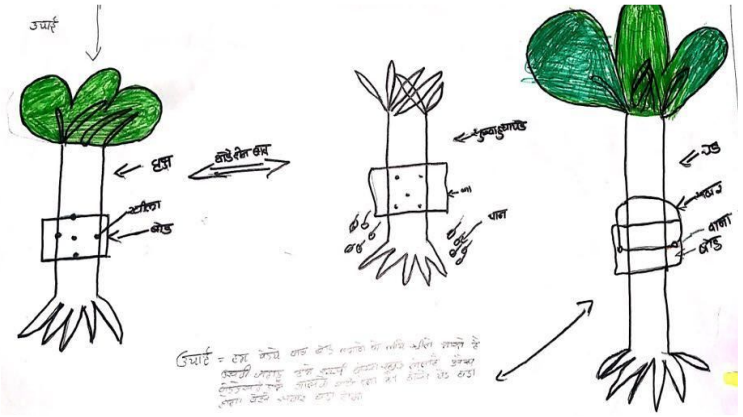
Goswami Vaibhavpuri J.

Class - 8th,School -Navandeshar P.School

Contact - 9726570287

Problem: The advertisement done by boards on trees is fixed by hammering nails on it, causing damage and dryness in that area of the tree.

Solution: An elastic band should be made to fix the boards which can be open and closed. This band will expand along with tree, so that no damage is done to the trees.



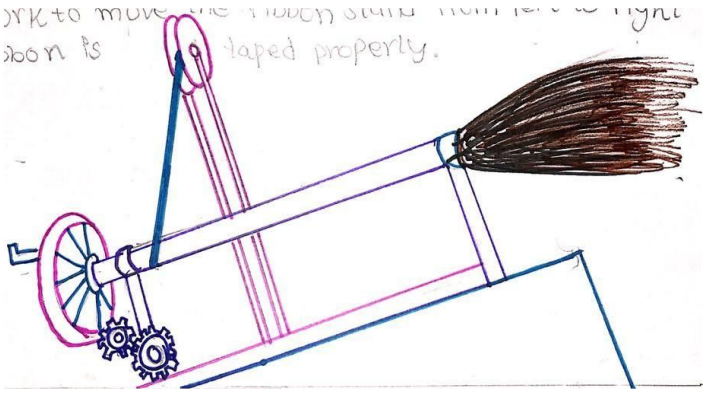
Devashree H. Agarwal

School-Nirma Vidhyavihar

Contact-9558815280

Problem: She saw a lady, who was tying ribbon to the broom stick, had tied the end of the ribbon to her toe. This caused pain to her toe and leg.

Solution: She thought of a machine in which the broomstick will be attached to the stand and wheel to the other end of the broomstick. There will be a ribbon holder at the end of the stand and the person using it will have to



attach the tip of the ribbon to the broomstick and spin the wheel to tape the broomstick. The gears will work to move the ribbon stand from left to right taping the broomstick properly.

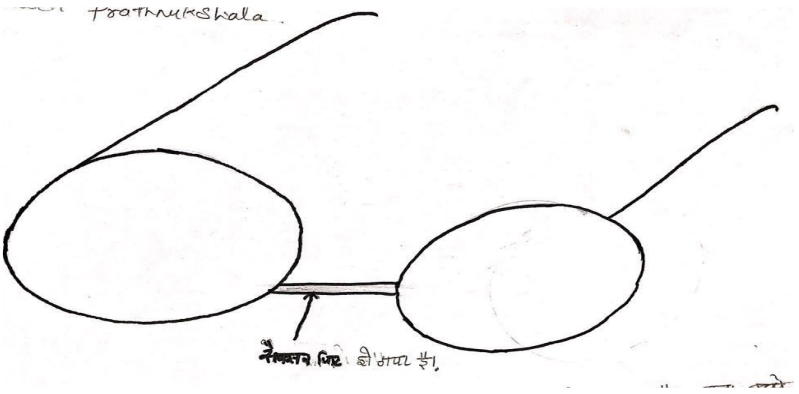
Poonam Rameshbhai

Class-8th,School-Grambharti

Contact-7698090966

Problem: Old people often misplace and forget their spectacles.

Solution: The spectacles should be equipped with a sensor and a buzzer which locates the place and sound an buzzer.



Parth V. Patel and Aditya K. Chauhan

Class -6th,8th

Contact- 7874250804, 9427693081

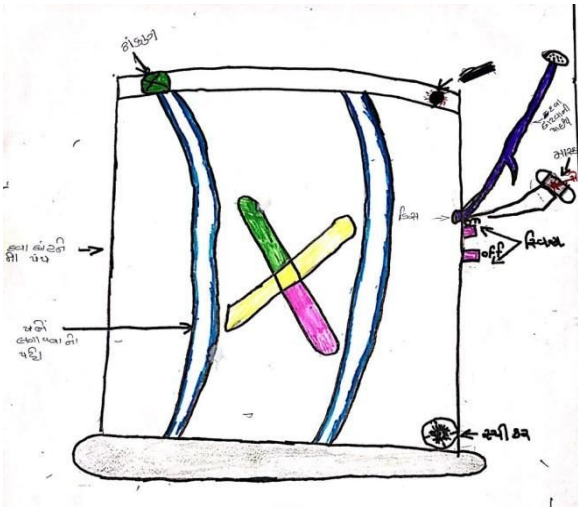
Problem: Farmers don't use mask while spraying pesticides in the fields. Inhaling those can cause health problems.

Solution: The tank in which the pesticides are stored should have an attached holder for a mask equipped with a sensor sensing that the person using the tank has the mask on. After sensing that only will the spraying will start.

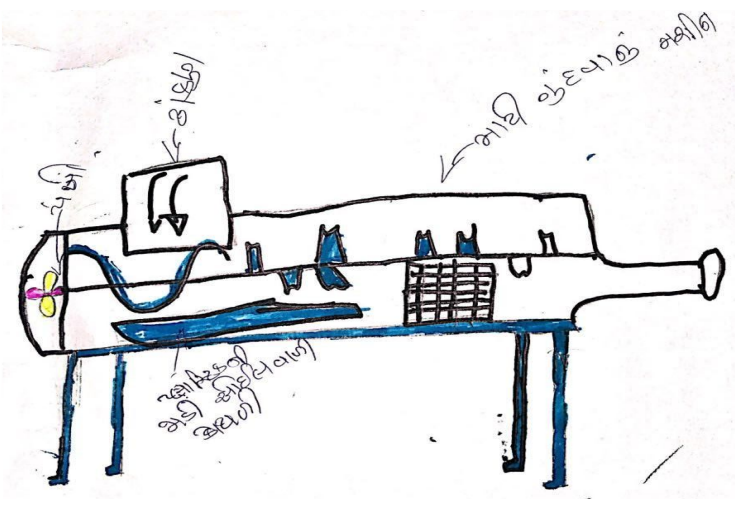
Problem: The clay used to make pots need be prepared by a mixing machine in which the clay is pushed by hand which may cause major injuries like loss of fingers.

Solution: He came up with an idea to design the cover of the mixing machine from where the clay is fed such that the cover itself pushes the clay in the mixer.

(Fig 1)

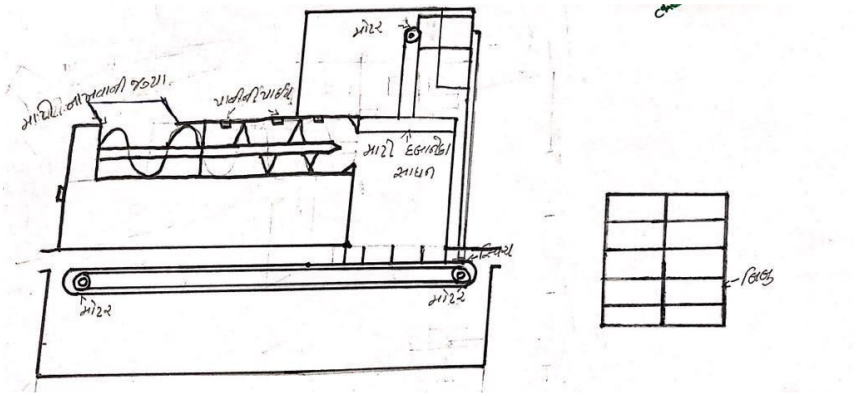


(Fig 2)



Chaudhary Devandra Hemrajbhai
Class-10th,School-Grambharti

Contact-9737361395



Problem: Brick makers are able to make only 100 bricks per day due to a single mould.

Solution: A brick making device should be made which would be able to produce 10 to 14 bricks at a given moment. The machine should be able to run on generator as well as from solar panels.

Mayur Ashokbhai Maghrala
School-Sodhi Primary School

Contact-7046837196,8511378770

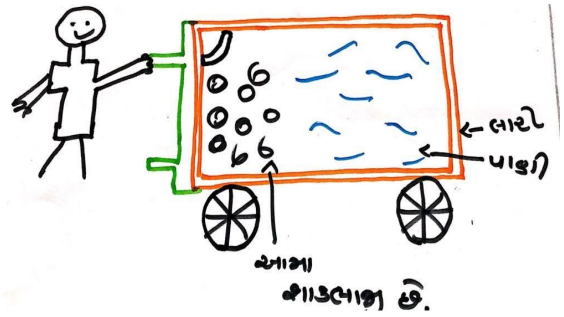
Problem: Fruit/Vegetable sellers who use a lorry have to spray water over them multiple times. Solution: The lorry surface should have a plastic laid on it and the vegetables/fruits should be kept on it, so that the water will be retained for longer time.

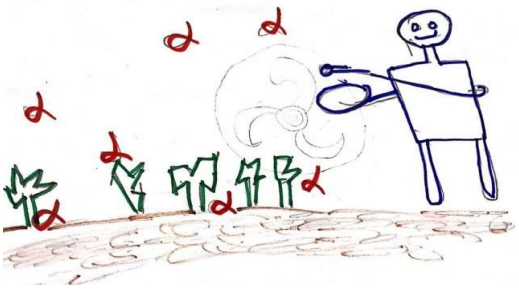
Problem: Farmers have to manually bang plate against a spoon to produce sound so that birds don't vandalise the crops.

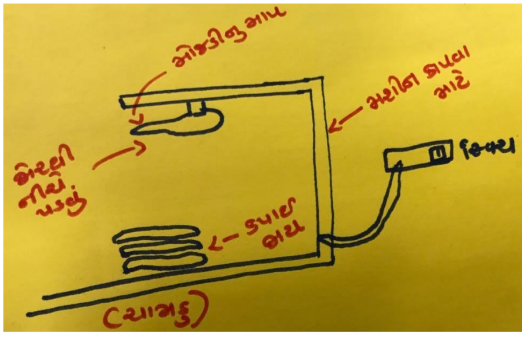
Solution: He suggested a simple idea of making a wind chime of spoons with a fan attached a top to make it spin and produce sound preventing crop vandalism.

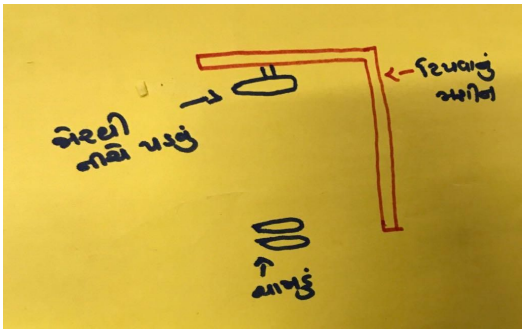
Problem: Cobblers have a hard time cutting and beating leather into shape and have to do much iteration to get it in perfect shape.

Solution: A machine should be made with a mould which can cut up to 10 layers of leather into shape. This will reduce the labour and avoid any potential injuries from hammering the leather.









Sameer Ramteke and Vishakha Ramteke
School -Pawan Public School

Contact -9890093997,9325568490

Problem: Lack of a place to put down phone while charging it.

Solution: A holder should be attached to the charger to rest mobile on it where there is no space available to put down the phone.

Problem: Chakado (Pottery Wheel) while spinning has quite significant rpms, in this situation if the potter's hand gets caught or brushes against it causes major injuries.

Solution: The spinning wheel should have a layer of foam in and around of it to reduces the impact of it on hands.

Problem: Potters use their hand to colour and polish the pots; this cause cut on their hands and may lead to infection as the colour sips in to the cuts.

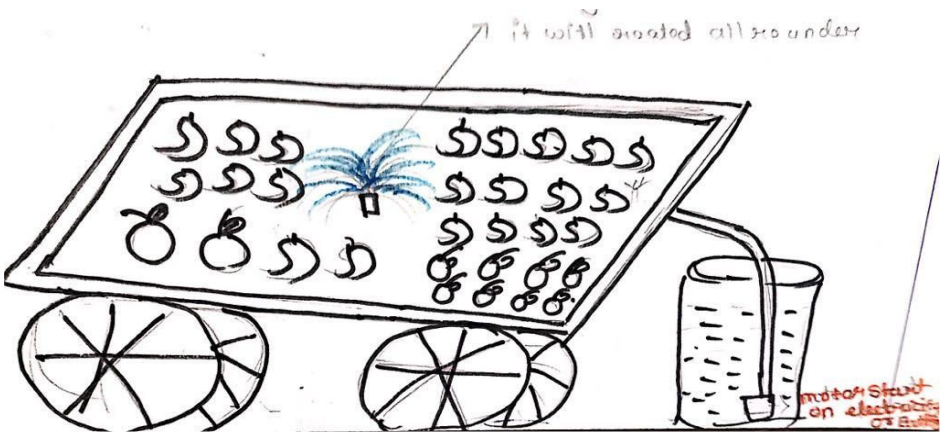
Solution: A machine should be made which automates the process of painting and polishing of the pots.

Problem: When a person mops the floor, they repeatedly have to dip the mop in water and squeeze it out. This causes pain it the lower back and in the wrist.

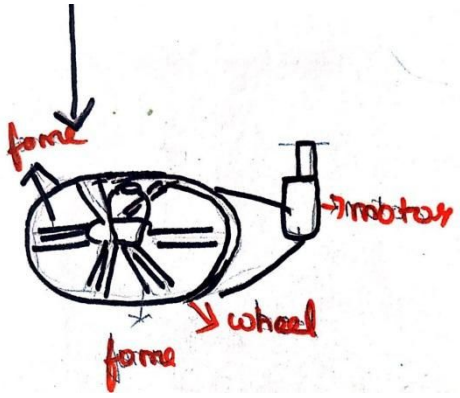
Solution: A mop should be designed in such a way that it is capable of holding some water in it. A button will be provided at the top to release water in to the mop. The design will also save water.

Problem: Fruit/Vegetable sellers who use a lorry have to spray water over them multiple times.

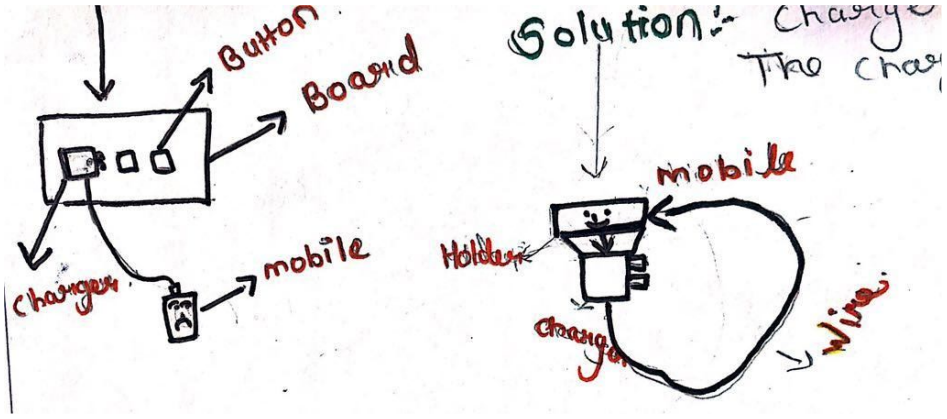
Solution: A small sprinkler should be mounted in the middle of a lorry which would spray water over the fruits and vegetables. A small water tank will be attached in the bottom of the lorry to fetch the water from it.



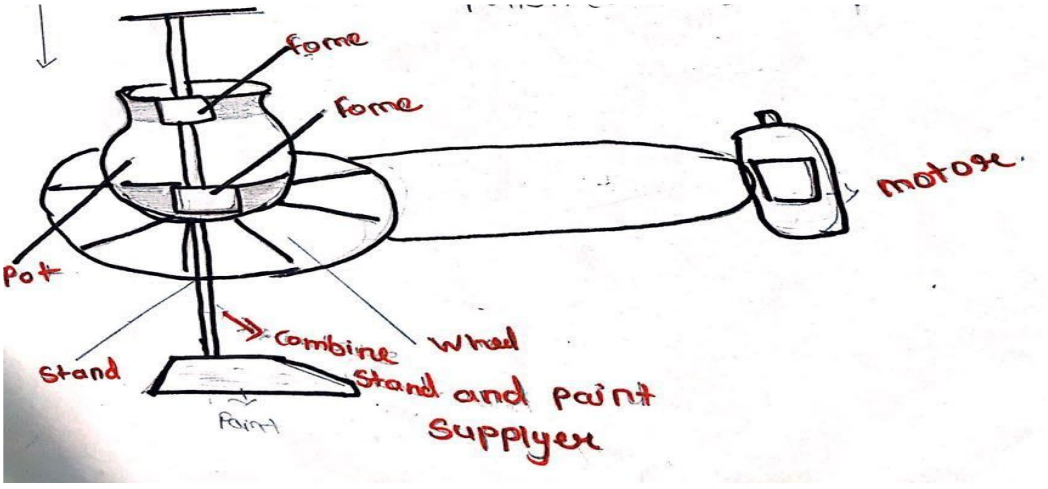
(fig. 1)



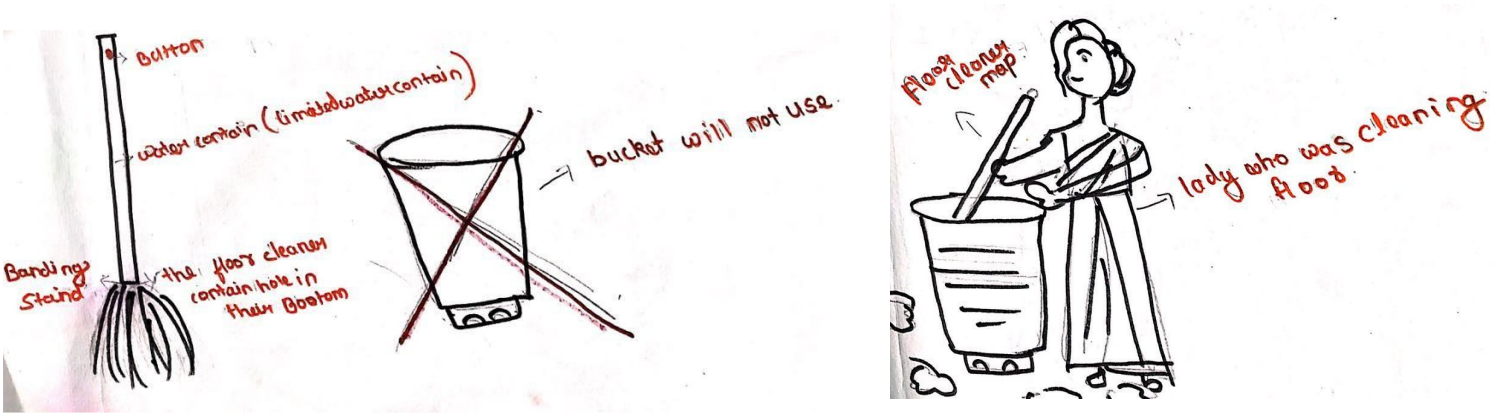
(fig.2)



(Fig.3)



(fig.4)



(Fig.5)

Some other Ideas by children.

Wear mask to avoid inhalation of dust particles.(Yash Desai)

Gloves for precautions for avoiding any hand injuries.(Yash Desai)

Die should be capable of making multiple bricks at the same time(so series die system) (Devendra)

Device to avoid finger injuring while mending of shoes(Shoe) (Mayur Sutlaya)

Loading lifting device for building brick monument for brick baking sites (Ankit Chauhan)

Mask with sensors on spraying machine (Parth Patel)

List of Problem and solution by summer school participant

Pottery Problems

Problem #1:
The clay softening machine requires the potter to input hard clay. He needs to pressurise it in order for it to properly get into the machine. He currently does this using his hands, but it poses a safety hazard since there is the possibility of his hands/fingers getting mutilated by the rotating screw shaft.

Solution:
1. For initial clay moulding in the machine, their hand was used to push the clay. Instead, a mould/die with a handle can be used with an initial water jet fitted inside the machine for pouring water on the inner surface of the die so that the clay doesn't stick to the die. (Ved)
2. Use a pressing type door for the machine. (Prabhudatta)
3. Make an appendage that can be used to push the clay without getting stuck to it. (oil or a waxy layer can be used) (parinita)

Problem #2:
The mixing process of the different types of clay in their proper composition is currently done manually, and then it is sieved in order to remove the impurities. This is time taking and not very efficient.

Solution:
1. Automated machine (complex design) such that the input is the 3 different types of clay, and according to the instructions fed, it will mix the clay and filter it also in the appropriate composition. (Rupali)
2. Use a type of mixer similar to fan blades that are connected via a ring to a motor. (appropriate materials to be decided) (vinod)
3. Homogeneous mixing machine (Sulekha)
4. Use meshes of differently sized grids to sieve the pebbles and other unwanted materials(prabhudatta)

Problem #3: It takes 3 days to dry the mixed soil in summer heat.
Solution: A special glass enclosed or heat entrapping arrangement of drying beds can quicken the process. (Hard)

Problem #4: After mixing 3 types of clay together, it is left in the open to dry, but dust, leaves and twigs fall into it, increasing their workload

Solution

1. Use a fine net to cover the soil so that sunlight can reach it, but it keeps the dust away (prabhudatta)

Problem #5:
While painting the pots, a rotating device is used. However, the same sized base is used for different sized pots, which isn't very stable for all sizes.
Solution: Use bases of varying sizes that can be removed and replaced. (Parinita)

Problem #6: While centring the clay mound on the pottery wheel, the hands experience shock. It is also a difficult process.
Solution:
1. Speed(rpm) control of the using voltage regulation (Prabhudatta)
2. A clutch-like mechanism to control the rpm (Ved)

Problem #7: Making the intricate designs on the huge number of pots is a time consuming process that also involves a lot of manual labour
Solution: Make a mould that is similar to a stamp. It can be made to fit the different curves and shapes of the pots, and also have different designs on it. We only need to dip or apply the desired colours on it and apply it on the pot. (Rupali)

Problem #8: There is no procedure to clean the clay softening machine
Solution: Refilling with a material and redefining the machine design for it's cleaning. Electrically automated cleaning process can be used to cater to this need. (a process similar to a dishwasher can be used) (Rupali)

Problem #9: "Teepna" process is time consuming and labour intensive (5-7 minute per pot)
Solution: An automatic machine that will have the pot on a revolving base, and tools that will hit it to the proper shape. (Rupali)

Problem #10: Pots crack if they are of uneven thickness. There is no way to detect this.
Solution: Use sensors to check pot thickness (LVDT) (parinita)

Brick Making Industry

Problem: Brick making more efficiently (more in numbers in less efforts)
Solution: A multiple brick-making device with a number of dies together. (Vinod)

Cobbler

Problem**:** Cobbler said it is an uneasy method for cutting the leather with the old tool.
Solution**:** We can use a scissor-type tool that can cut the leather with precision and it can be handy. (Prabhu)
Problem**:** cobber has to make a approximate the curves of the sole recalling the his/her memory
Solution**:** A mud piece to take an impression of the foot so to achieve a greater comfort for the user. (Hard)

Problem**:** Screws and pins are hard to handle and get lost during work by Cobbler.
Solution**:** A screw dispensing mechanism, which dispenses a single screw at a time.
(If magnetic, a magnetic strip to keep them in a single place.) (Parinita)

Broom
Problem: Making the broom by bashing on spike involves more energy and effort.
Solution: Make a motor driven or pedal driven apparatus for the process. (Parinita, Sulekha and Prabhu)
Problem: Skin of hands gets irritated after thrashing the cluttered broom on the shaping spikes.
Solution: create an ergonomic grip to hold the cluttered broom. (Hard)

Miscellaneous Problems

- Loading lifting device for building brick monument for brick baking sites (Ankit Chauhan)
- Portable furnace for small scale baking of pots during high moisture period like monsoon and winter. (Jethava jaydeep)
- Die/pattern for pot mold making (Jethava jaydeep)
- Two sided nailed spindle using rotatory motion for leaves cutting during broom making (Monark)
- Use a mould and water jet to avoid sticking of clay to the mould and this will prevent any injury to the hand while pressing the clay in machine. (Jethava jaydeep)
- Cement mixing mechanism for making clay to get proper proportion and liquid clay (Dhawal Pankhaniya)

Group No: 4

Introduction (Summary of Field Visit 1 and 2 in two different paragraph)

❖ **Field visit 1:**

In the morning the team went to a slum near Gandhinagar Railway Crossing. The total population of the slum was about 50,000. People there are indulged in working professions like blacksmiths, construction works, vegetable vendors, etc. They had miserable living conditions, they used plastic sheets to cover their houses in rains. Hindu as well as Muslim communities live there. They face common problems like shortage of water, electricity, and a few subjective problems like unstable income etc.

❖ **Field visit 2:**

In the evening the team went to GMDC Gandhinagar(Industrial Area), for a demonstration and learning about printed circuit board .The team went across learning about the process of printing PCBs and the basic fabrication process like welding and powder coating where some of the field specific problems and safety issues where observed.

Name of Children

1. Devjayesh Sutar

2. Lency harshadbhal Patel
3. Raval Pratikha Shailesh Bhai
4. Pushparaj Singh
5. Murnmai Chandrashekhar Funde
6. Shreya Premchand Bawankar
7. Lay Patel
8. Mahendra Hemani
9. Ketan Baraiya
10. Rohan Bhagura
11. Dantani Kuldeep
12. Rathore Kuldeep
13. Amit Thakur
14. Sanchit Gupta
15. Vedant Gupta

Name of Summer School Participants-:

1. Aman Garg
2. Ananya Gupta
3. Poonam Chourey
4. Ranjit V S
5. Lakshya Agrawal
6. Soumyajeet Mahapatra
7. Anshuman Pattanaik
8. Dhaval Nakum
9. Shiyani Kuldip

Name of Volunteers:-

1. Deepali Gajjar
2. Prem Shah
3. Chetan

➔ **List of problems identified by summer school participants**

Problems Faced by Blacksmith-:

- Respiratory Problem Due to emitted smoke.
- There working process is very slow and requires 3 persons at one time and the efficiency is very low.
- Using heavy tools like Hammer which causes body pain

Problems Faced by vegetable vendors-:

- Picking heavy loads of vegetables in big containers.
- Pulling and driving vegetable carts.

- Body pain due to long walking on unequal terrain without slippers.

Problem Faced by Marriage Bands-:

- Back pain due to hanging drums on waist.

Water Scarcity Problems Faced by local slum people-:

- No specified water timings.
- There was no rain water collection system.
- There was no filtration of water and the potholes which they use to collect water are not filtered.

Problems Faced By Construction Workers-:

- Cuts on their hands due to roughness of cement powder.
- Heavy loads cause body pain.

Problems Faced By Women-:

- There was no LPG connection instead of this they have to use Coal and woods which affect their respiratory system.
- No use of tong in cooking.
- Small children cannot sleep properly due to heat and no electricity.

Problems Faced By Fabricators-:

- Cuts and damage of hands during grinding & cutting process.

List of common problems	List of un-common problems
Carrying heavy load which causes body pain.	Pulling and driving vegetable carts.
No specified water timings.	There was no rain water collection system.
There was no filtration of water and the potholes which they use to collect water is not filtered	Cuts on their hands due to roughness of cement powder.
There was no LPG connection instead of this they have to use Coal and woods which affect their respiratory system.	Cuts and damage of hands during grinding & cutting process.
There working process is very slow and requires 3 persons at one time and the efficiency is very low.	Small children cannot sleep properly due to heat and no electricity.
Respiratory Problem Due to emitted smoke.	

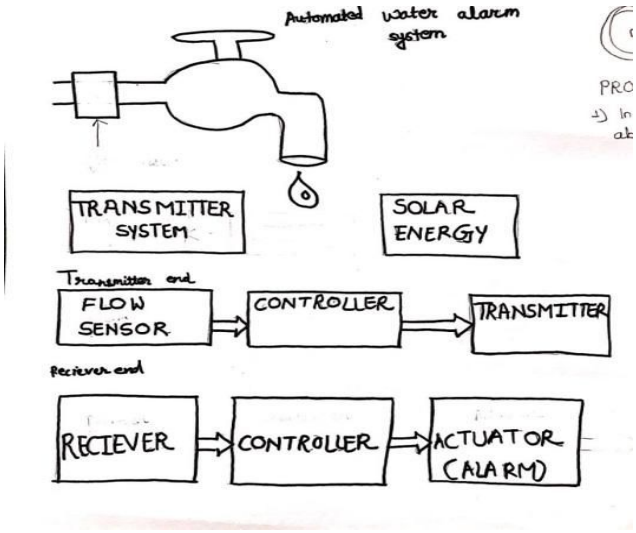
Group Idea

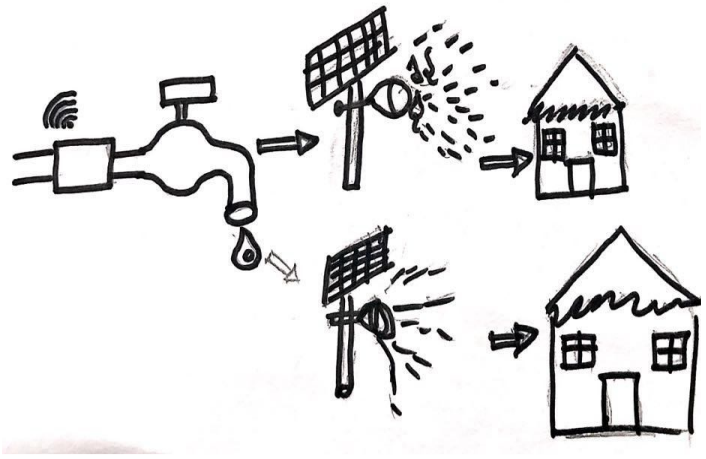
Problem: Blacksmiths have respiratory problems because of the ash particles from the coal. 3 workers are required in a single job increasing labour and time.

Solution**:** A machine should be made which eliminates the need of 3 people and has a filtration system for the smoke/smog produce from the coal.

Problem: In slum areas water usually come for a specific time period, however the timings are not maintained and often preponed or postponed. So have to stand in queues for unspecified durations.

Solution: A system should be incorporated in the water systems which rings an buzzer when the sensor senses water in the pipe. The signal is transmitted to the receiver which rings an alarm informing the people living there of water availability. The system will be powered by solar panels.





Amit Thakur and Rohan
School: Grambharti, Gramshala, Amrapur
Gender: Male
Age: 16yr
Problem**:** The sparkles from welding metals together can get scattered and cause injuries.

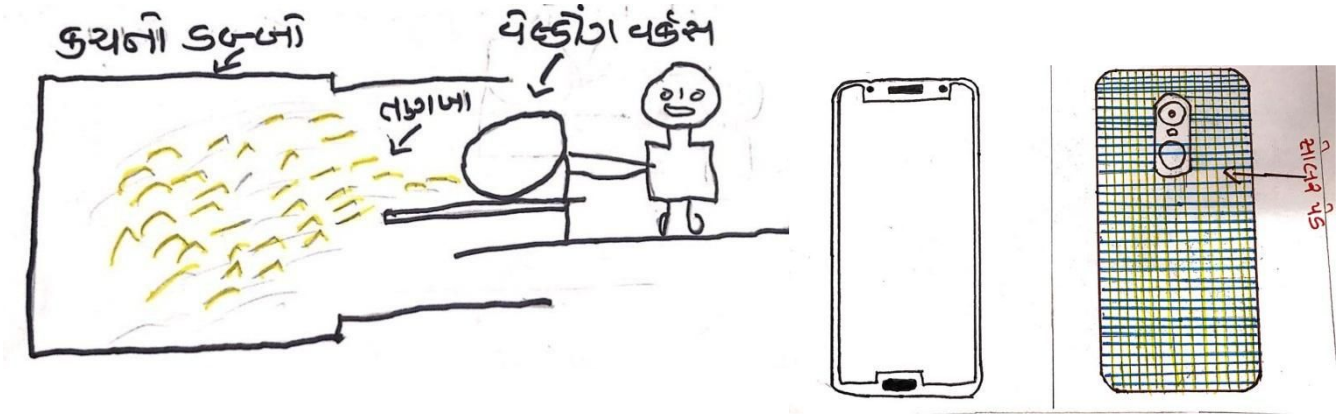
Solution: A glass box should be made and pieces should be welded inside it while keeping the welder outside the box avoiding injuries.

Problem**:** Whenever a clock's battery charge reduces, the clock speed reduces. The change in the speed is not noticeable.

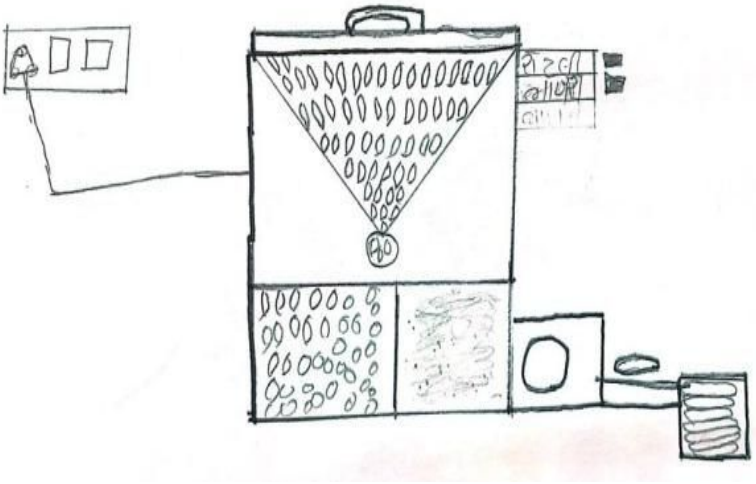
Solution**:** Clocks should have a battery level indicator just as in mobile phones. So that we can change it in advance before the clock slows down.

Problem: If we are outside and our mobile battery is low what do we do?

Solution**:** Mobile phones should have a back cover with an embedded solar panel on the back, which would directly charge the phone.



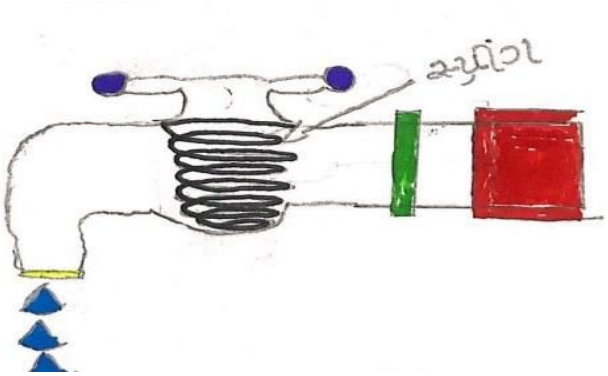
Dantani Kuldeep, Raval Pratikha Shailesh Bhai, Rathore Kuldeep
School: Gramshala , Grambharti
Class-9th,9th,10th
Age: 14 yr
Contact-9687725722, 8347427642, 9879318191
Problem**:** They observed that in marriage/party a lot of rotis are needed, and the flour is not up to the standard.

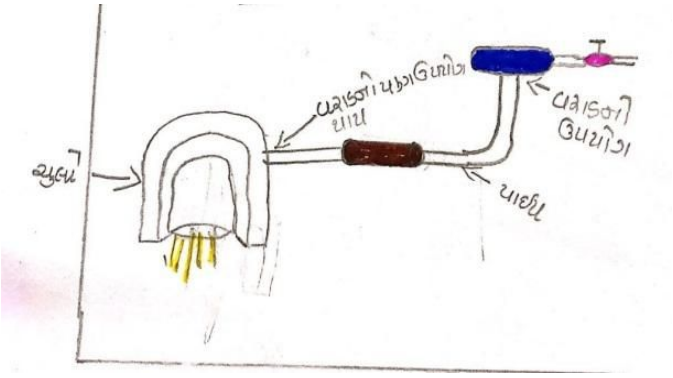


Solution: They thought of a machine which would do all the things from the wheat/millet to rotis. The process goes something like this – Wheat/Millet → Flour → Salt, Water and oil (added from a separate opening) →Roti → Ghee is applied on the roti.

Dev Jayeshbhai Suthar
School: Nav Nadishar Primary School, Panchmahal
Gender: Male
Age: 12yr
Problems:

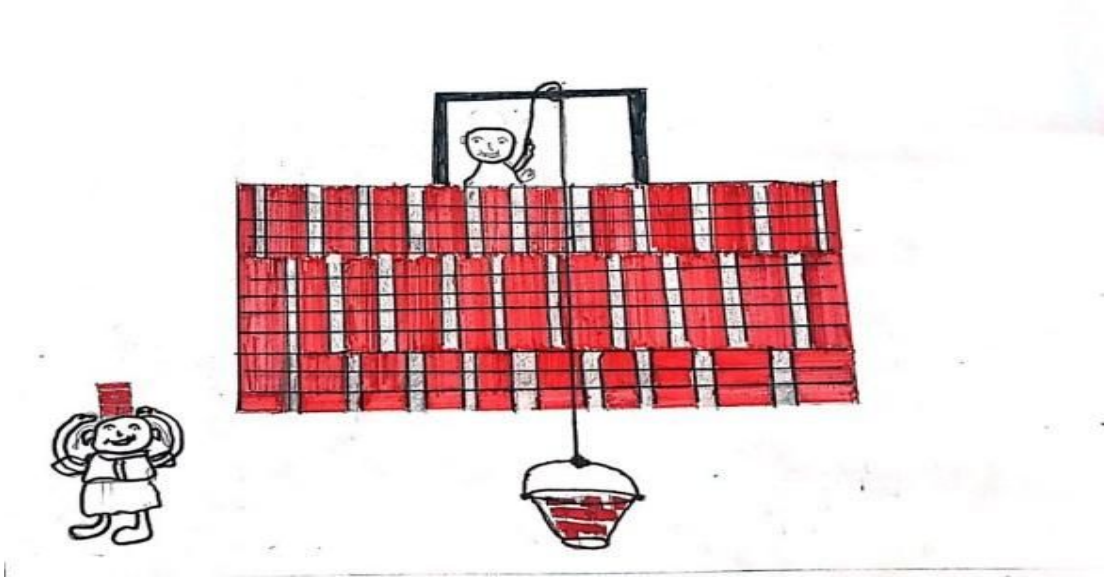
1. Blacksmith facing difficulty in breathing
2. Water pipe bursts very often
3. The cooking stove is an open chulha , if we close it(partially) then maybe less fuel is wasted





Ketan Baraiya
Age:15
School: Sodhi Primary School
Contact: 8511200503
Problem **:** On a construction site females usually carry bricks on their head, sometimes even to a several floor. This induces pain in the necks.

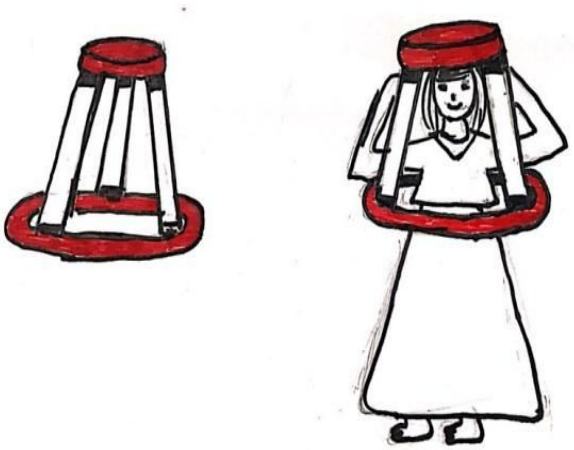
Solution**:** A pulley system must be set up which can be quickly dismantled and mantled. It should have a bucket at the bottom end to place the bricks in it.



Lency harshadbhal Patel (F), Patel Lay
Class-9th, 3rd
Place-Himmatnagar, Gujarat
School Name-Perfect School, Himmatnagar
Contact No-9429753325,9426994642
Area of Field Visit-: (EG: Aluva Village, Mubarakpur Potter shop, Grambharti Wood Shop)-Gandhinagar, Gandhinagar (industrial area)

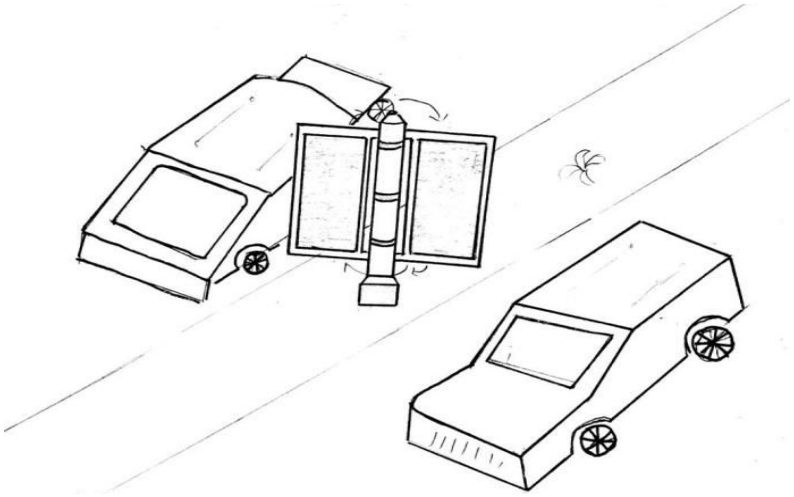
Problem**:** Females carry a lot of bricks n their head causing pain in the head and neck.

Solution: A stand should be made which distributes the load of the bricks over the whole body. It consists of two circular structure connected by 3 pillars. The upper structure supports the head and the lower structure rests on the waist. The head portion should have foam in to increase comfort.



Mahendra Hemani

Age: 15, Gender: M
Contact no: 9727899565
Place: M.B. Karnavat High School, Palanpur



Problems**:** He observed that a place in Gandhinagar had shortage of electricity.

Solution**:** He suggested that a device should be made which would have rectangular surface 180° to each other. It should be small enough to fit within the divider of the road. When cars pass from near it the force of the air will cause it to rotate and produce electricity.

Murnmai Chandrashekhar Funde ,Shreya Bawankar

Class-5th, 9th Pace: Pawan Public School.
Area of Field Visit (EG: Aluva Village, Mubarakpur Potter shop, Grambharti Wood Shop): Grambharti. Contact Number: 9766370959

Problem**:** Due to knee problems of elderly people and less height of small children they cannot sit comfortably on the commode.
Solution **:** Adjustable commode should be made

Problem**:** Toothbrushes made of plastics.using it for a long time can create health issues.

Solution**:** Solution is to make brush from organic plants such as tulsi, babool and neem.

Problem**:** Poor people have to frequently buy footwear due to change in foot size which is not affordable.

Solution**:** Adjustable footwear should be made.

Problem**:** percentage of charging not shown on tourch while we charge it.

Solution: There should be a charging indicator on it

Fig1

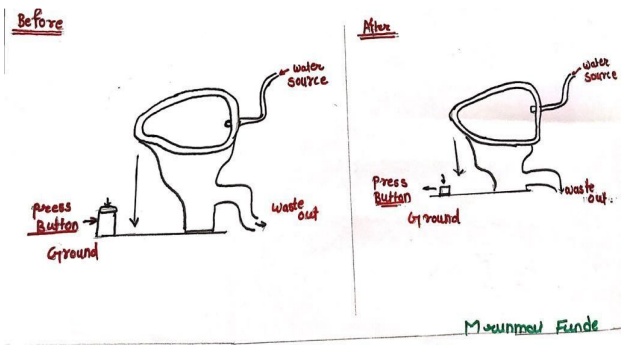


Fig2

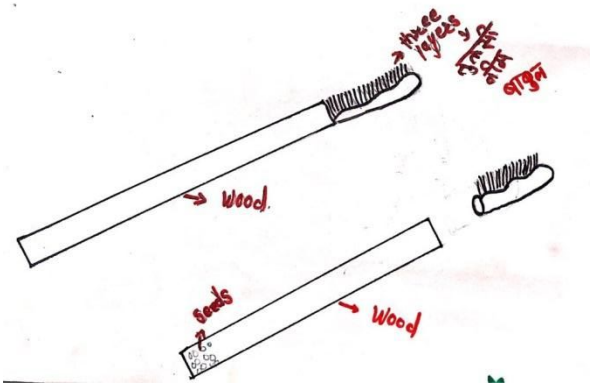
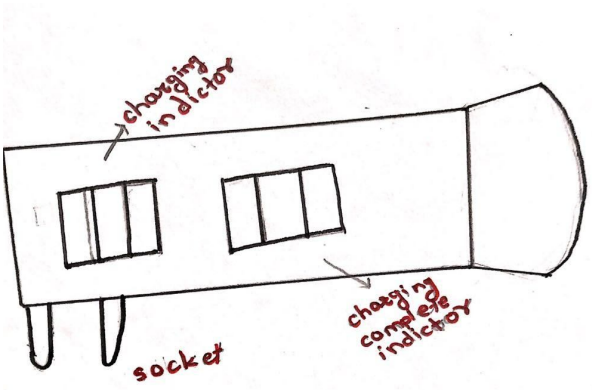


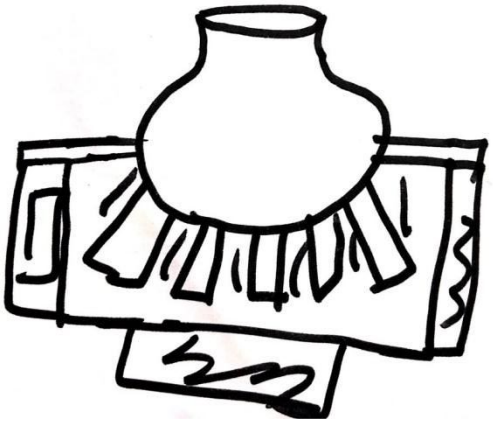
Fig3

Fig4



Pushparaj Singh
Age: 12
Gender: M
Place: Grambharti Prathmik Shala

Problem: In some chulha, more fuel is used in cooking.which can create a wood shortage.



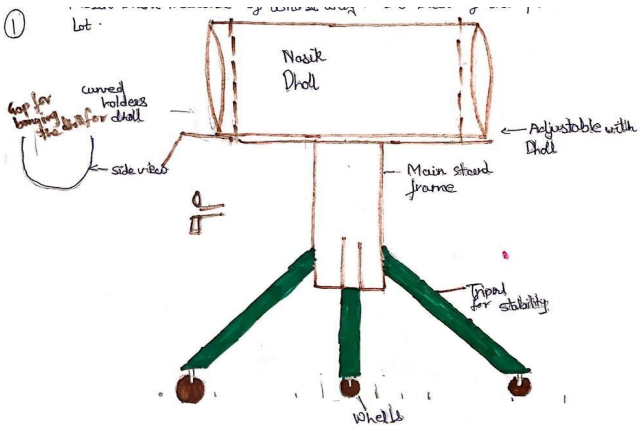
Solution: Efficient chulha should be prepare.

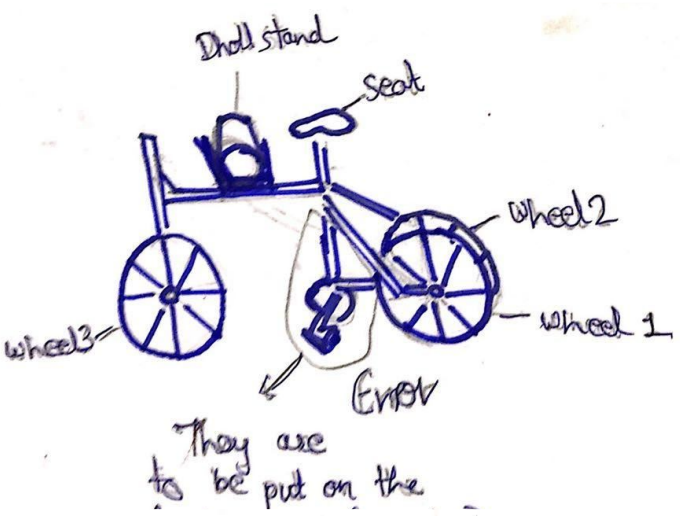
Sanchit Gupta,Vedant Gupta
School: Eklavya School, Ahmedabad
Gender: Male, Age: 14 yr .
Problem: Back pain due to nashik dhol.

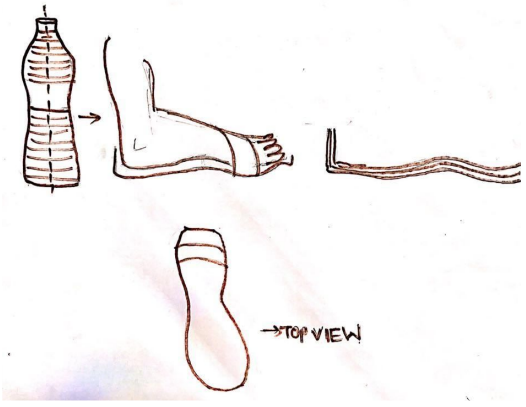
Solution: Stand should be prepared on which dhol should be kept.We can also use tricycle s a stand

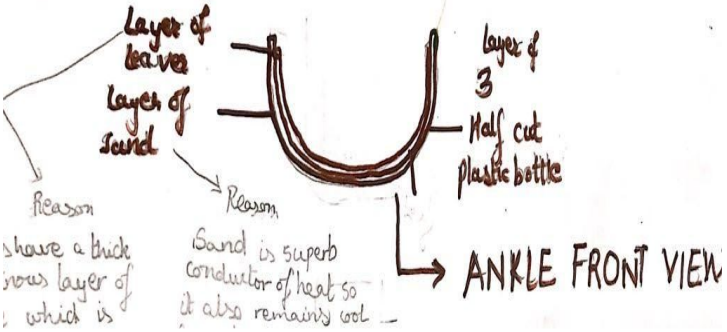
Problem:slippers for needy

Solution:leaves have a thick gelatinous layer of cuticle which is water resistance so this does not let water stay on the leaves.that same principle we can use for slippers.Sand is superb conductor of heat so it also remains cool for a long so when it absorbs water thus making the slippers cool.the sand will be kept in bottle by the leaf as leaf will stick with the bottle so the layers get bounded

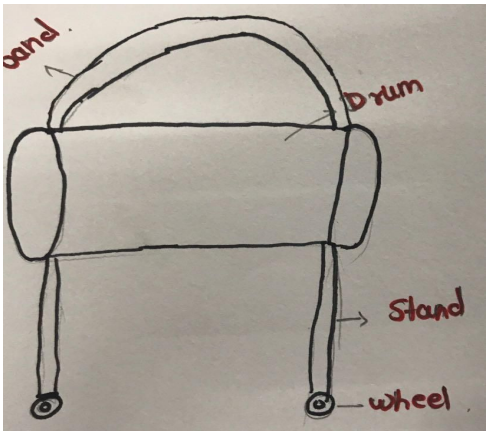








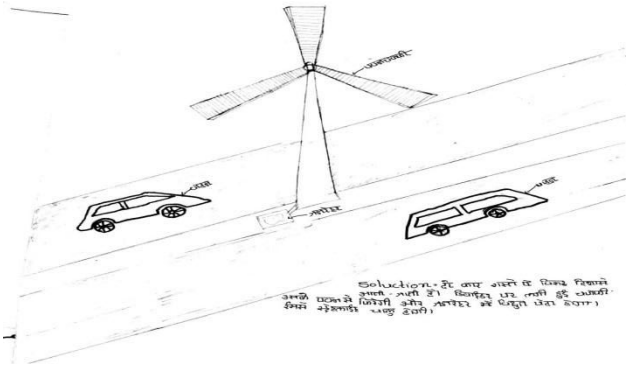
Shreya Premchand Bawankar (Female).
Age: 14.
Place: Pawan Public School.
Area of Field Visit (EG: Aluva Village, Mubarakpur Potter shop, Grambharti Wood Shop): Grambharti.



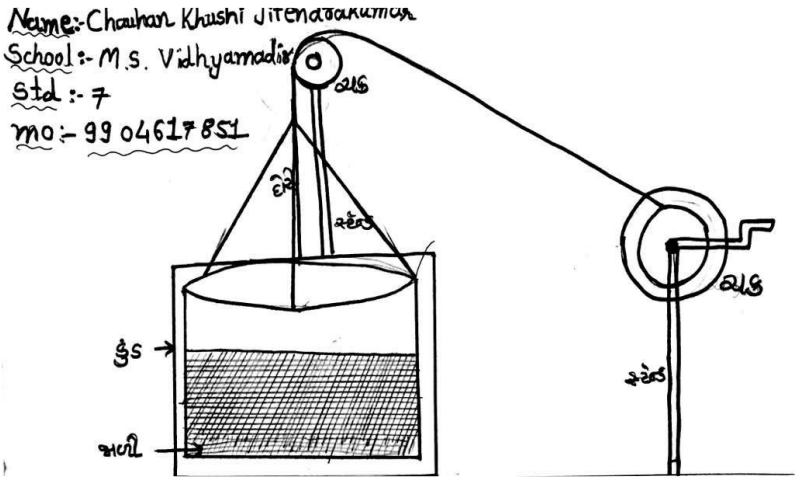
Contact Number: 9766370959.

Problem: due to weight of drum people suffer back pain
Solution: There should be a drum stand with wheels which is easily movable.

Patel Lay Harshad bhai
Class-3rd
School-Nachiket vidhyalay
Contact-9426994642
Idea: locate windmill on divider of road.when cars passes near the windmill generator will start and produce electricity.



Chauhan Khushi Jitendrabhai
Class-7th
School-M. S. Vidhyamandir
Contact-9904617851



Idea: Potters have a well in which they moisten the sand However the soil contains small stones and other foreign particles in it.The clay used to make must be free of this substances.So to clean the moist sand a wire mesh with varfine spaces should be kept below the sand and the mesh will be attached to a pulley and rotary handle via rope.by the help of the handle and the pulley the mesh will be pulled up separating foreign particles from the sand and in turn gives ready to use sand free of unwanted particles.

Patel Khushi R.
Class-6th
School-Dhaval Public School
Contact-9427859339
Problem: Old people have trouble with sitting down and getting up.

Solution: there should be a adjustable bed with remote control so aged people can easily move backward or forward.