

1) Synopsis Code:

Project Title: The New Technique To Find Out The Cube Root By Long Hand Method.

Name of the Participant(s): 1) Vakeel Ahmed  
2) Amardeep

Name of Principal: Shri Arun Kumar Tiwari

Name of School: Jawahar Navodaya Vidyalaya

Projects: Since a long era math's is considered a source of solution to plight of humanity. In contemporary days mathematics is going to be easier from complicated by new methods and techniques. Till day cube root is a problem as its simplest form is still complicated by complicated methods. After the hard work on it we have developed a new long hand method to solve this cube root problem. Our research is innovative and quite different from all available methods, which are in use today. We can find out the cube root of all real numbers (ex: -cube root of 1000 is 10 and cube root of 1331 is 11) by this innovative and simple technique.

The excellent thing in this method is that we can find out the cube root of big or small real number in decimals also. We can find out the cube root in as many decimal places as we want. This is an advanced technique. One better thing about it is that we can use this method in lower classes too. In higher academic classes we use differentiation and binomial at present, but these are long methods. Our method is more advanced and is easy from these methods. As it does not create the mental tension in the mind of the students and it is time saving too. Any one can find out the cube root independently, in without help of log or big tables if one uses our method. A formula developed by the researchers to make the calculation easy as following,

$3a+30a^2+(3A+V \text{ (carry)})(N-1) 10$

As this innovative method is based on researched methodology that is from hypothesis to conclusion. We hope and trust that this method of solving the root cube shall prove to be a boon to students and teacher in classroom teaching.

2) Synopsis Code: ENI029

Project Title: Glabenator – An Advanced Alternative And Augmentative Communication Device.

Name of the Participant(s): 1) Apurv Mishra

Name of Principal:

Name of School: D A V Public School

Projects: Glabenator stands for Glabella (area between two eyebrows) + communicator. It is an invention, which provides alternative method of human – machine hands – free and voice – free communication and control by analyzing a less useful voluntary muscular twitch for giving a binary signal.

After a comprehensive analysis of muscles that can be voluntarily contracted and has least use, Corrugator Supercili muscle (muscle behind the eyebrows) was found to be most productive as it is only used for frowning. It was found to form glabellar elevation in the glabella.

A low cost and sensitive sensor with LDR and micro-controllers is developed. The device has precise ability to differentiate the voluntary contraction. Thus, this device can be used for communication for people who are short of muscle, in need of muscle or those who want to adopt a new method of communication using a muscular movement. It has a wide range of applications:

- 1) Military alternative (Aircraft, tank, submarine) control.
- 2) Communication for paralyzed persons.
- 3) Low cost alternative to IVR for the handicapped persons.
- 4) For the advancement in the virtual reality device with advancement.
- 5) Operation of computers in space.
- 6) Controlling mouse cursor with the Corrugator Supercili muscle contraction

Thus this device can have a big Indian on the recently evolving field of alternative and augmentative communication. With low cost and simplicity it can revolutionize the alternative and augmentative communication in masses giving a new life to those paralyzed and severely handicapped people.

3) Synopsis Code: PHI031

Project Title: Analysis Of A Simple Prototype For Magnetic Levitation

Name of the Participant(s): 1) Hamsa Padmanabhan

Name of School: Kendriya Vidyalaya

Projects: This project aims at analyzing the stability and force balance of a simple prototype that demonstrates the principle of magnetic levitation. The prototype consists of a pencil suspended in mid-air essentially by the action of forces exerted by four ring magnets fixed in a sponge base on two similar magnets attached to the pencil (see Figure 1). The configuration is found to be in perfectly stable equilibrium; the pencil can perform small oscillations and also rotate about its long axis.

The six magnets used in the system can be arranged in a total of  $2(6) = 64$  different polarity configurations. We found, by direct experimentation, that only two independent configurations among can lead to stable levitation. The force balance in these configurations was studied.

We mapped the field lines of all the magnets using a compass. This was used to understand the various forces acting in the system. We found that an upward repulsive force exerted by the base magnets balances the weights of the pencil and a horizontal magnetic force along the pencil was balanced by a normal reaction force exerted by a thin plastic chip fitted on the sponge. To check these theoretical results, further experiments were conducted by tilting the system at various angles. The results confirmed the earlier findings.

Various practical applications of this concept are being explored. This project provides an understanding of magnetic levitation of static extended bodies and shows that a prototype can be built with inexpensive, everyday, materials.

4) Synopsis Code: EVIC002

Project Title: Fungal Biopesticide For Eco friendly Management Of Insect Pests

Name of the Participant(s): 1) Swati

Name of School: Christ Nagar Senior Secondary School

Project: PURPOSE OF THE EXPERIMENT –

- To study the effect of Fusarium pallidoroseum a biopesticide in controlling aphid population in cowpea plant as prolonged use of chemical pesticides causes environmental and health hazards.

PROCEDURE USED –

#### MATERIALS

- 1) Cowpea plant
- 2) Cowpea aphids
- 3) Fungal pathogen (Fusarium pallidoroseum)
- 4) P D A medium
- 5) Rice bran
- 6) Laboratory facilities (glass wares and equipments)
- 7) Insecticide (Quinal phos)
- 8) Test insects (lady bird beetle)

#### METHOD

STEP I: Raising the crop in potted plants.

STEP II: Isolation of fungus – collection of dead aphid from field.

STEP III: Isolation and purification of fungus in potato dextrose agar medium.

STEP IV: Mass multiplication in rice bran.

STEP V: Safety test in plants and natural enemies by application of spore suspension of fungus.

CONCLUSION –

- Biopesticide is an effective alternate solution to overcome the ill effects of chemical pesticides.
- Improves the yield and farm productivity.
- Large-scale production can be taken up with relatively less investment and indigenous technology.
- Mass multiplication of biopesticide is economically / commercially viable.

FURTHER SCOPE –

Since large scale multiplication is possible with indigenous materials like rice bran there is an ample scope for production by entrepreneurs in small-scale cottage industries, which can meet the demands of the farmers locally.

5) Synopses Code: ZOI001

Project Title: Effects of Chinaberry Fruit extract on feeding, growth and fecundity of diamond black moth (DBM) *Plutella xylostella*

Name of the Participant(s): 1) Kanishka Tiwary  
2) Varun Mittal

Name of Principal: Mrs. Anita Sharma

Name of School: Santan Dharam Public School

Project: The Diamond black moth, *Plutella xylostella* is the greatest threat to crucifers production in many parts of the world, sometimes causing more than 90% crop loss and estimates to cost of over us \$ 1 billion annually control (Talekar and Shelton, 1993) *Plutella xylostella* regarded as polyphagous with the larval feeding specially on members of the family cruciferae. Throughout the world pesticides have dominated attempts to control *P.xylostella* for more than 40 years (Syed 1992; Talekar and Shelton, 1993). The negative impacts of pesticides and increasing pesticide resistance have increased the interest in alternative control methods with emphasis being placed on biological control, Plant resistance cultural control and other non-polluting methods (Lim et al, 1996) therefore, the aim of our project is to investigate effects of chinaberry fruit extract on feeding growth and fecundity of diamond (DBM) black moth, *Plutella xylostella*, The effects were investigated by feeding DBM larval on the treated leaves.

These extracts were found to be toxic to DBM larva. The larva usually died from failure in moulting. The development growth rates and the food consumption were also reduced at concentrations of 2 and 4%. Chinaberry extracts reduce pupal weight, adult emergence and longevity in dose-dependent manner when newly hatched larval were continuously reared on treated rape seedling at concentration of 0.05 or above. Fecundity of the resulting females from the larval treated with 0.5% extract was reduced while the egg hatch was not affected. However, the extracts, significantly decreased eggs' hatch when the eggs were dipped directly into test solutions at 1.0% or above. Reduction in feeding was (40.9-54.3%), growth (23.5-25%) and fecundity (48-68%) was result of our.

Research details are enclosed in form of tables. Our research project provides an initiative to make chinaberry extract attractive for further investigation in DBM control.

6) Synopses Code: ENI080

Project Title: Multifunctional Therapeutic Cum Mobility System For Cerebral Palsied (Spastics) Children

Name of the Participant(s): 1) Mukund Tiwari

Projects: India has an estimated population of one million cerebral palsied (C.P) or spastics in the age group of 0-14 and 90% of them live with scarcity of personnel & resources.

The spasticity tightens the muscles of the body creating numerous physical and associated problems. They are unable to move anywhere on their own and virtually remain unattended due to lack of awareness, required therapist and suitable self transport system for their mobility, besides therapic trainings are costly and confined to urban areas & affluent classes, Resulting large population with multiple disability were put away & literally left in filth. This project is for development of suitable, economical multifunctional vehicle with easy to operate mechanical system serving duel purpose of providing mobility as well as therapic training simultaneously, which may do away their inabilities and solve their problems.

Various systems of exercise are incorporated in a mini-tri wheeler that can be operated by hand, feet or by push-drive by an attendant for this purpose a two-way steering and driving mechanism has been planned. The C P can also use it as a rollator.

A detachable special corner seat with head control, exerciser along with body belts and straps provides maximum support.

The system will gradually help to create balancing in different body positions and postures it will also help co-ordination of muscles, parts of the body development, strength, motor control eye, hand, leg co-ordination, minimizing stiffness and neurological deficiencies.

Thus this 'Vehicle-Device' will certainly serve the cause of suffering humanity and enable spastics to have a glimpse of world approachable to them.