Learning beyond Books, Learning for the Future

In 2021 when the covid induced study break necessitated mainstreaming of Oosc (Out of school) children UNICEF UP initiated a pilot program in government schools. It was to give pre-vocational training to student along with academic subject. Here students were to connect theory in the text book to real life by participating in various vocational tasks.

During implementation, the need of the intervention was found suitable for all children in the age group of 11 to 14 years, enrolled and attending schools. The scope of the intervention was increased to making teaching-learning process more effective and meaningful. Thereby focus become not only enrolling the children into school but making the school a happening place of education connected to their daily lives.

In ***January 2023, UNICEF re-conceptualized and re-positioned the pilot pre-vocational program 'Introduction to Basic Technology (IBT)' as a 'Learning by Doing (LBD)' program.*** *This LBD program aims at increasing STEM understanding among students.* ***This entire approach is career and future centric and integrated with curriculum.*** *Vigyan Ashram and STARS Forum were the implementing partners.*

Seeing the definite impact of the program, ***the UP Govt. with Samagra Shiksha, has created mechanisms to upscale this intervention in upper primary & composite government schools in the state of Uttar Pradesh.*** *This document covers this heartening journey.*

THE CONTENT BOARD

1. LBD HERALDS A NEW DAWN

The Context

The Knowledge Curve (i.e. available human knowledge) is doubling at an increasingly rapid pace.

Pre 1900, human knowledge doubled approximately every 100 years. By the end of World War II, it was getting doubled every 25 years, whereas now due to advancement of Information technology, AI and Machine learning, according to some estimates, human knowledge is getting doubled ***every 12 hours****!*

Machines are better than human in computing power, memory and speed. Hence only academic skills (such as reading, writing, arithmetic) will not be sufficient for our students to face the future challenges.

This overall scenario presents both ***opportunities and challenges*** *in* ***education systems*** *and it is necessary to focus on new skill sets****.***

What largely set humans apart from machines are their abilities of creativity, imagination, emotional intelligence, empathy and ethics*.*

Best ways to develop intelligence among our students is to give them diverse experiences in the childhood. We need to give them opportunities to 'Learn by Doing' things by hands.

In this backdrop, a landmark program, called the LBD (Learning by Doing) program was initiated in the state of Uttar Pradesh (UP), which addresses the education needs of the times.

Cooler Making in progress during LBD class at Basic School Aurangabad

UPS Model School Prem Nagar, Kanpur has a water purifier.

But this one is different.

It has been made by the students of the school during their Learning by Doing (LBD) class!

For the students such as Tanushka, Priyanshu, Lucky, Khushi and Sonal, who worked with tools like scissors, soldering iron and glue gun to make it, the hands-on method of learning was engaging. It stimulated their intellect.

While making it, they learnt curricular concepts on 'Water' in their text books and used H2S test to check potability of water.

They also became aware of the different types of water purification processes such as boiling, chlorination, UV treatment and reverse osmosis.

Last, but not the least, they learnt values like team work, communication and appreciation for work.

Today, students in numerous government schools in Uttar Pradesh are making such items in their LBD labs.

It is taking their life skills, career skills and creativity to a whole new level.

Students from Model School UPS Kanpur with the Water Purifier that they developed during their LBD class

The LBD Approach

The LBD or 'Learning by Doing' approach is a teaching learning approach that replaces passive and relatively theoretical learning with task-oriented, practical understanding and skills development. It underscores that the best way to develop creativity and intelligence in children is to give them diverse experiences and activity to hand stimulate intellect.

This LBD program is inter-twined with STEM, an interdisciplinary approach that integrates Science, Technology, Engineering and Mathematics. LBD covers the STEM subjects but also includes Agriculture and Arts. (Ref: Annexure 1 for 'STEM in LBD').

Why LBD?

LBD builds the capacity, creativity and empathy of a child in a rapidly changing world driven by swiftly evolving technology, AI and automation. Integrating LBD in teaching learning processes increases the learning competencies.

LBD ensures the applicability of various curricular subjects in real life skills and problem solving capacity.

Thus, LBD overall equips students better for their future with various skills, including 21st century skills.

2. THE EMERGENCE OF THE LBD INTERVENTION

*'As all kinds of things were done differently at Tomoe, its Sports Day too, was unique. ..The dwarf boy, Takahashi, won all the events he participated in...**The headmaster had thoughtfully planned the events so that Takahashi could participate and feel included.'***

From 'Totto-Chan: The Little Girl at the Window' by Tetsuko Kuroyanagi

The Beginning of the Journey and the IBT Program: In 2021 UNICEF UP conceived an 'Introduction to Basic Technology'/IBT program when the covid induced study break necessitated mainstreaming of out-of-school children (OoSCs) or those at high risk of dropping out. The program was initiated in 60 schools of 15 districts.

This IBT program was designed around the OoSCs. These children found the IBT program's hands-on approach familiar, inclusive and confidence boosting. Consequently, to them, the IBT classes were interesting and motivating. Diagram 1 shows the inception specifics and outreach of this IBT program at the initial stage.

Diagram 1

UNICEF and Samagra Shiksha, Uttar Pradesh

↓

Chose 60 government schools in high need pockets from 15 districts for the IBT program

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Partnered with Vigyan Ashram & STARS Forum to set-up Basic Technology Laboratories in these 60 schools and implement IBT program

The Evolution of LBD from IBT: However, it soon became clear that a re-designed program was needed for all children in the age group of 11 to 14 years, including children already enrolled and attending classes in schools.

These children had started taking interest in the IBT labs and coming there especially during recesses. So these classes were conducted for them too and were found effective in increasing their understanding about curricular concepts. It also helped in making school a more appealing place for them.

At this stage, it also seemed **logical to target the root causes of dropping out**, such as students' inability to learn through book centric nature of education owing to rote learning without understanding concepts. Here, an education approach that can start early and make education interesting, hands-on and connected to daily life through a STEM based approach was considered to be better poised to engage and retain students.

The IBT program was initially designed for slightly older children in grades VIII to X. But **the LBD program needed to be made suitable for children in grades VI to VIII.** Students of Grade 6-8 are younger. Hence power tools were to be avoided.

Cutting tools are limited to Paper cutter, hacksaw etc. and considered to cut material like cardboard and MDF sheets. Materials for conducting projects linking to curriculum of Grade 6-8 were selected for the LBD program.

A need to refine and re-position the existing program was also required owing to the **emerging need of the times,** wherein economic and professional progress is increasingly driven by technology and 21st century skills.

At the same time, convergence with **the recommendations of NEP 2020 and also with the National Curriculum Framework/NCF 2023** was needed. The NEP influenced LBD program sought to mainstream STEM learning and vocational education from the 6th Grade onwards. Also, LBD was developed (Ref: Diagram 2) in keeping with NCF that incorporates 'work' as a crucial component, categorized into three broad areas: work with life forms, work with machines and materials, and work in human services.

Hence the original IBT program was redesigned as the LBD program to better integrate with the NEP 2020 and NCF 2023, enhance curriculum interest among students through a STEM based hands-on approach and prepare them better for the emerging future.

Diagram 2

3. THE PROGRESS OF THE LBD INTERVENTION

In January 2023, the LBD program started in 60 schools of 15 districts. Content was developed and the model LBD program was demonstrated in these schools. The success of the program was evident from various reports and feedback and from the enthusiastic response from the students and teachers when visitors visited the schools.

However, it was under consideration at Education Dept. at this stage and UNICEF decided to *continue the program till the Govt. took it over. Considering funding availability, program was continued in 24 schools as model school with available resources for demonstrating its effectiveness and advocacy*. These 24 schools were selected from the 6 districts of Varanasi, Lucknow, Gorakhpur, Agra, Kanpur, and Ghaziabad. In these schools separately appointed LBD instructors took regular and systematic LBD classes in schools.

This was a temporary arrangement. In the textbook and teaching learning process, there are suggested activities that were expected to be taken up by the teachers to engage students in various projects. But initially teachers were not able to do this since there were no tools available in the school.

However, after visits by different levels of government officials from the state, district and block levels, who witnessed the usefulness of the program, LBD became part of PAB proposal. **LBD program was then adopted and up-scaled by the Govt. of UP to create a more extensive intervention,** wherein *school teachers were to be trained as LBD teachers.* Here Vigyan Ashram and STARS Forum as technical partners helped Samagra Shiksha to select tools for the LBD labs.

This was in keeping with the NEP 2020, wherein vocational education is one of the curricular areas and hence needs to be taught by school teachers.

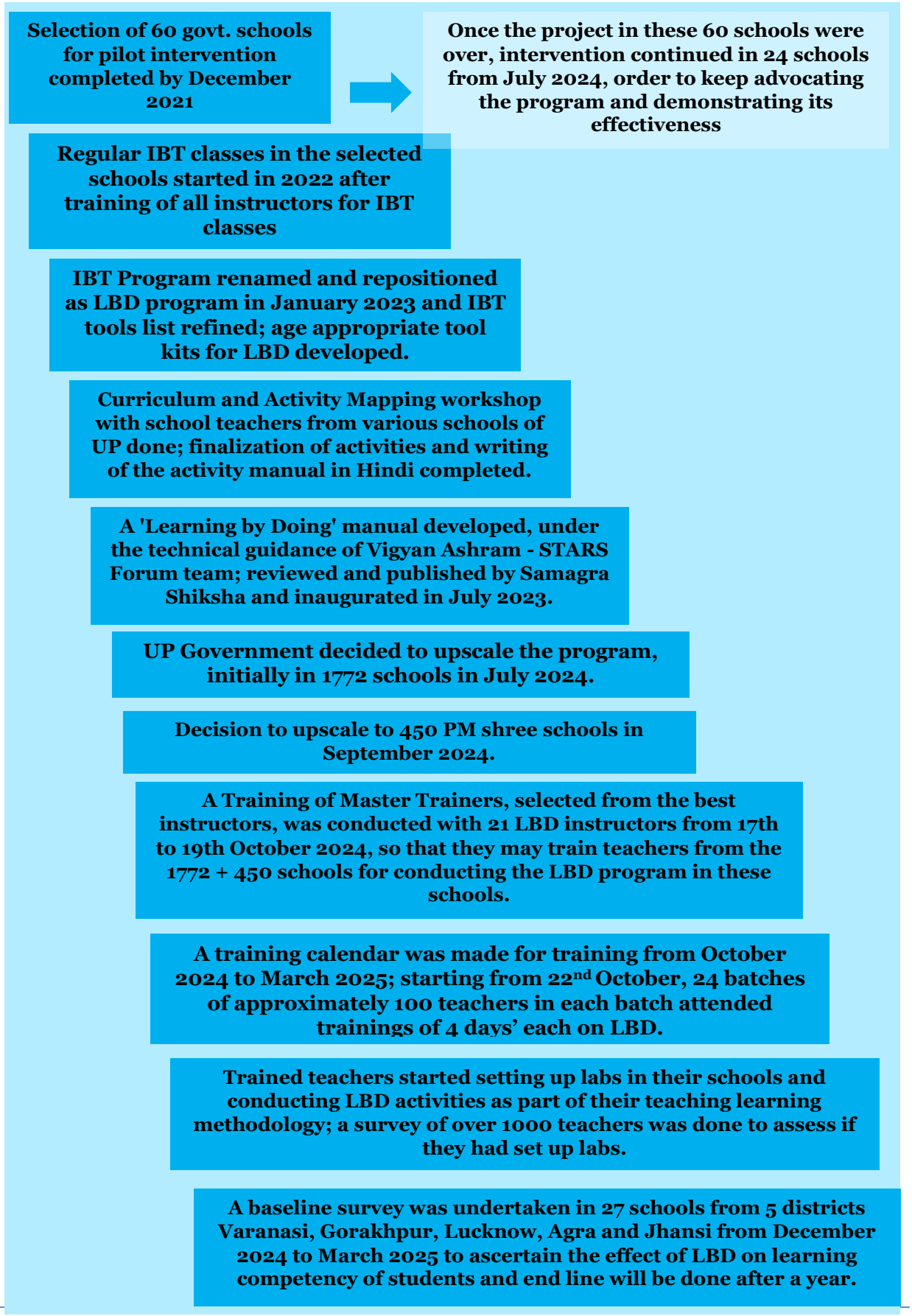
Thus, eventually, two approaches to the LBD program emerged – an initial intensive approach and an evolved extensive approach.

A GO was passed for training of one teacher each from 1172 Samagra Schools and 570 PMShri Schools. This was done after several rounds of visits to the model schools where the LBD program was on-going and also after going through case studies of the LBD program. Hands-on training of almost 2000 teachers was a big task. The training for each batch was to be completed in 4 days and training was also to be exciting and motivating for the teachers. Therefore Vigyan Ashram and STARs Forum did extensive preparation for training kit and for the training.

Before the training of these teachers on LBD, a Training of Master Trainers was conducted by STARS Forum and Vigyan Ashram. These Master Trainers were selected from the best LBD instructors. For the training of teachers, one science/mathematics teacher was selected from each school and trained on the LBD approach by STARS Forum. In schools where a science/mathematics teacher was unavailable, any other subject teacher available was included. Post training, LBD labs were set up with government support in each school from which a teacher had been trained. To monitor the progress, members of STARS Forum made feedback calls to 1000 plus teachers on the matter and data was collected and ascertained that most of the teachers had indeed set-up or initiated setting up of LBD labs.

The emergence and the progress timeline of the LBD program is shown in Diagram 4 below:

Diagram 4



4. THE LBD PROGRAM STRATEGIES

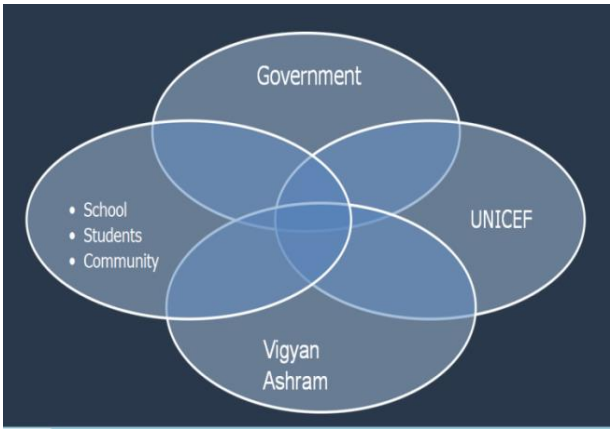
This growth of the LBD program was powered by certain **strategies,** as given below:

Experiment, Course Correct, Demonstration of Model, Advocacy	Initial OoSC program was for Grades VIII-X. But considering the number of schools in middle stage (i.e. VI-VIII), the intervention was modified to the LBD intervention. Its success was demonstrated and documented. The demonstration continued despite reduced funding till it become part of PAB of Samagra Shiksha.
Aligning Intervention with National Education Policy 2020	NEP 2020 recommended project based learning, emphasis on STEM education and vocational education from Grade 6 in all schools. The LBD program realigned itself with it.
Process evolved was designed to engage school teachers at every step	Its processes were designed to engage teachers. They were involved in designing LDB content. After the effectiveness of program was evident, implementation of LBD in 1772 schools was planned through regular teachers. Schools were given funds for purchasing consumables and even locally available capital items. Teachers were asked to setup lab after training.
Integrated with all Subjects	LBD activities include science, mathematics as well as art, craft, making map, using internet apps etc. It also involves engaging artisans from the community. So though LBD started with Science teachers, it relevant to engage other teachers as well.
Empathetic linkage with community persons with special skills	It was gradually conceived that different persons from the community with special skill sets and generational insight, such as cobbler, tailor etc. maybe engaged in some LBD classes with the students. This will foster the children's real life competencies and make them more empathetic to various traditional professions. This has been initiated.
Integrated with making school attractive	The children were encouraged to use their LBD equipment and enhance their school environment with painting and pictures. This strategy made the schools attractive and appealing to the children, while enhancing their artistic creativity.
Program's Visibility Enhanced to Engage Core Drivers	UNICEF ambassadors such as Priyanka Chopra and Pat Cummins as also important leaders such as the Chief Minister and Finance Minister came to the LBD programs. All this enhanced the program's visibility.

5. A FEW CORE DETAILS OF THE INTERVENTION

1. The Partners

The program was initiated by **UNICEF UP** in 60 upper primary schools of 15 cities of Uttar Pradesh from PRIMARK funded resources through Irish Natcom. As already mentioned, UNICEF established partnership with **Vigyan Ashram and STARS Forum** for implementation and **Samagra Shiksha** became an enabling and technical partner.



2. The Process Particulars

i. Setting up the LBD Labs

In the LBD labs, the children learn through **4 thematic areas**: W*orkshop & Engineering, Energy & Environment, Gardening & Agriculture and Home & Health.* Each lab is planned to have equipment to conduct activities and hands-on sessions on each of these thematic areas.

There are clear specifications about the schools and labs to ensure infrastructure uniformity and quality. *Each school should have library, science lab, sports ground and a 'Maker Space'. It is the space where the students can make projects, work with physical objects and bring their ideas into reality.*

Each LBD lab there should be no infrastructure glitches, such as leakage within the lab; the lab should be at least 350-400 sq. feet in size. (Ref: Annexure 2 for infrastructure specifications)

There is also a **list of tools or items,** from all spheres of life, with which every lab must be equipped.

For example, The '**Workshop and Engineering**' lab is equipped with items such as steel ruler, spirit level bottle, tenon saw, karvat, iron plane, farmer chisel etc.

The '**Energy and Environment'** lab is also equipped with a wide range of items such as wire gauge, voltmeter, linesman pliers, razor blade knife, hacksaw, hand drill machine etc.

Likewise, the '**Agriculture**' lab has a complete list of items that it needs like plastic jar, crate, buckets, lactometer, knapsack pump, soil testing kit etc.

The '**Home and Health'** lab equipment list has items such as stainless steel sieves, measuring mugs, digital blood pressure machine, aluminum foils etc.

COLLECTIVELY, THE LAB IS SUPPOSED TO HAVE 59, WELL SPECIFIED EQUIPMENT

Kanpur UPS, Kulgaon: LBD Lab Setup

Electro Magnet making at LBD Lab, Composite School Shivpur

In each lab, the students are to follow protocols, such as wearing gloves, during specific activities.

In each lab, the instruments have been set up as per instructions of the LBD manual.

Painting of flower pot activity at LBD Lab, Basic school Naubasta, Lucknow

Electric Cooler made at LBD Lab, Composite New Agra School, Agra

The activities are interesting, relevant to their lives and strengthen curriculum specific concepts. For example, while making the electric cooler, concepts like electric circuit, humidity, working of motor etc. are learned.

ii. Developing a LBD Manual

The 'Learning by Doing' Manual is an instruction guide or hand book for the teachers. It maps 59 LBD activities with the curriculum of classes VI to VIII and the teachers can use this to conduct LBD activities in schools. The manual is in Hindi language. It strengthens the program convergence with The New Education Policy 2020.

The **manual provides**:

- The relevance and pedagogy of the LBD principle
- An index which gives standard wise list of curricular concepts and activities
- Pedagogical instructions for the teachers to organize the activities in the classrooms
- Picture depictions and 'Do and Don't' instructions for the teachers to set up each LBD lab

Activities under each of the four thematic heads are linked to text chapters and curriculum to improve students' subject specific learning. Further the activities have illustrations and it is expected that teachers can design even their own activities using these examples.

LBD Manual: Cover Page

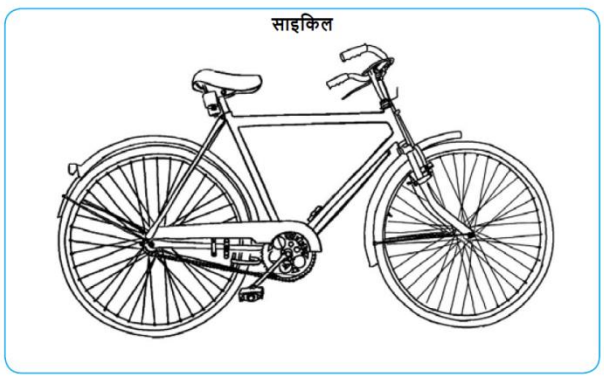
2. 'लर्निंग बाय डूइंग' इस कार्यक्रम/पहल के पीछे का सिद्धान्त :

I. **'हाथ से काम करके सीखना ' यह शिक्षा का एक प्राकृतिक तरीका है।** एक बच्चा अपनी मातृभाषा में 'काम करते हुए सीखता' है। हम खाना बनाना, तैरना, साइकिल चलाना, कंप्यूटर चलाना इत्यादि कार्य भी काम करते-करते सीखते हैं। हम जो भी काम आत्मविश्वास के साथ करते हैं, वह काम बार-बार करते-करते ही सीखते हैं।

II. हाथ से काम करना बुद्धि को विकसित करता हैं । हाथ, हृदय और दिमाग को प्रशिक्षण देने की प्रक्रिया ही शिक्षा है। कई महान अविष्कारक एवं उद्यमी जैसे - थॉमस एल्वा एडिसन, राइट ब्रदर्स अपने बचपन में मिले विभिन्न अनुभवों के कारण महान बन पाए। इस कार्यक्रम का उद्देश्य जीविका कमाने हेतु कौशल प्रशिक्षण प्रदान करने हेतु नहीं है, अपितु कार्यक्रम का उद्देश्य एक बच्चे के अनुभवजन्य ज्ञान की सीमा में वृद्धि करना है।

III. **विज्ञान, तकनीकी, इंजीनियरिंग, गणित (STEM) आदि शाखाओं द्वारा 'शिक्षा परियोजना (प्रोजेक्ट)' आधारित पद्धति सिखाई जा सकती है।** परियोजना (प्रोजेक्ट) कार्य के लिए विभिन्न विषयों के क्षेत्रों की जानकारी आवश्यक होती है। प्रत्यक्ष गतिविधियाँ करना विद्यार्थियों के लिए सरल होता है और उस के बाद उस गतिविधि के पीछे अवधारणा को वे समझ सकते हैं। इसे साइकिल रखरखाव के उदाहरण से और विभिन्न पाठ्यक्रम संबंधी अवधारणा से समझा जा सकता है।

LBD Manual: Pedagogy behind the LBD Principle



पूरक प्रश्न पूछें :
1. क्या होगा जब आप अचानक साइकिल में ब्रेक लगाते हैं? क्यों हमें ब्रेक धीरे-धीरे लगाना चाहिए?
2. ट्यूब से हवा बाहर क्यों नहीं आती है?
3. यदि आप पैडल को उल्टी दिशा में घुमाएंगे तो क्या होगा?
4. क्यों टायर पंचर होने के बाद साइकिल चलाना कठिन हो जाता है?

क्या करें और क्या न करें :
1. साइकिल चलाना आवश्यक कौशल है, यह सबको सीखना चाहिए।
2. साइकिल के चलते पहिये और चेन में अपना हाथ या उँगली न डालें।
3. साइकिल की बनावट (डिजाईन) एवं कार्य हमें कई वैज्ञानिक तथ्यों (सिद्धान्तों) से अवगत कराती है। शिक्षक इन तथ्यों की ओर छात्रों का ध्यान आकर्षित करें। इसमें कुछ मुख्य सिद्धान्त : सामी-सरल मशीन, घर्षण और तेल डालना (लुब्रिकेशन), दाब क्षेत्र, संतुलन, साइकिल चलाना पर्यावरण तथा स्वास्थ्य के लिए लाभदायी है आदि ।

सारांश/सिद्धान्त/ज्ञानार्जन:
विद्यार्थी साइकिल के भागों एवं उसके कार्यों को समझेंगे और अपनी साइकिल की देखभाल करना सीखेंगे।

Concepts and Instructions with Diagrammatic depictions in LBD Manual

iii. Training of Teachers

Teachers' training is designed to train teachers to initiate vocational education with students as recommended by NCF2023, integrate their subject specific curriculum with LBD activities and conduct practice exercises given at the end of each chapter with the students. The trainings were made exciting and engaging by following a 'hands-on' approach and integrating theoretical learning with activity based learning.

As already mentioned, the best of the instructors were chosen as Master/Resource Trainers for training the teachers. They were capacitated and hand held by STARS Forum team till they were not only experts in conducting the standardized training activities but also developed the capacity to innovate for any new activities required to be enacted in real-time. Experts and Senior Resource Persons from Vigyan Ashram and STARS Forum, Pune, were virtually engaged in the training process to address questions and answers as and when required. The training process and the tool kit were standardized. All this ensured that a **high quality** was maintained during the training.

As already mentioned, since the training had science/ mathematics concepts, effort was made to select teachers with a science/mathematics background for the training. This ensured a better grasp of the topics and activities being covered under the four themes during the training.

The **core activities** covered under the different themes were:

- **Energy & Environment -** Paper Electronics, Solar Toy Car Making and DC Torch Making etc.
- **Agriculture & Gardening -** Soil Testing, Hydroponics using plastic Bottles, Drip Irrigation, Seed Treatment and Germination of Seeds in Seedling Tray, Kitchen Garden using Vertical Bags etc.
- **Engineering & Workshop -** Simple Machines Robotic Arm, Catapult and Balloon Car Making, Article Making by use of PVC Pipes, Wood working Photo frame Making, Mobile Projector Making, Painting and Telescope Making etc.
- **Home & Health -** Non-Fire Cooking Lassi Making, Water Testing and Making first aid box etc.

The training included specific instructions related to setting up the LBD lab. It also included a quick introduction to the various tools being used under a theme, which were to be provided in the LBD lab.

The sessions were left open to queries and effort was made to understand the view of the trainee teachers and how they perceived putting their learning from this training into practice. The learning gave the teachers a hands-on training of converting their theoretical learning into practice. Each exercise used a different set of tools and helped build familiarity with the tools.

The teachers were introduced to new areas such as AI and modern life devices, such as mobiles, were used as lab tools.

In the 4-day training program, first day covered Energy & Environment; the second, Agriculture and Gardening; the third day, Engineering and Workshop; and the last day, Home and Health. The teachers were divided into groups. On the first and the fourth day, 3 activities were set for them. On the second and third day, 6 activities were set. (Ref: Annexure 3 – Training Time Table)

The master trainers were trained from 17th to 20th October 2024 and the teachers from 22nd October 2024 to 21st March 2025.

Total 21 Master trainers and 2159 teachers (573 female, 1586 male) were trained.

Energy & Environment, Paper Electronic Activity in Progress

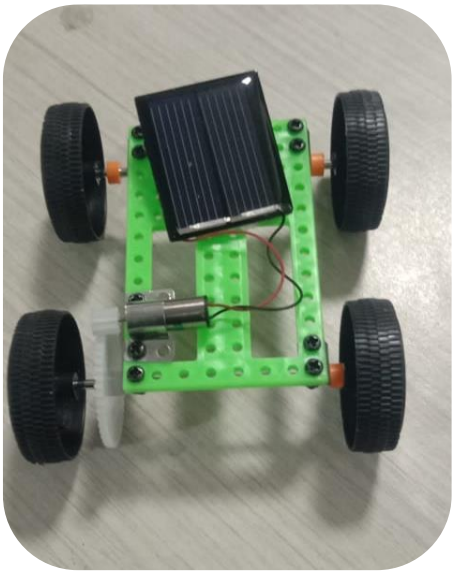
Each activity was conceived to cover very specific learning concepts, as depicted through examples here:

The robotic arm activity built concepts such as:

- **How simple machines work**
- **Types of levers**
- **Movements**
- **Axes, Joints, Fulcrum, Load, effort**

Building solar toy car activity built concepts such as:

- **Law of energy**
- **Light energy and energy conservation**
- **How a simple machine works**
- **The mechanisms of assembling-disassembling**



The photo frame activity built concepts such as:

- **Units and conversion of units of measurement**
- **Concept of carpentry and type of wood**
- **Structure and Design**

The DC torch activity built concepts such as:

- **Ohm's law**
- **Difference between AC and DC current**
- **Multimeter and its working**
- **Unit of electricity**

An activity that the trainees found interesting is the making of telescope through the use of concave and convex lenses.

Through this exercises, the teachers were expected to gain practical knowledge to integrate with specific chapters of UP Board syllabus such as Light and Shadow, Magnifying Glass, Focal Point, Light Ray Diagram etc. Other concepts covered through this activity included: concave and convex lenses, reflection, refraction etc.

The core feedback from the teachers at the end of the training was that the students will find LBD classes interesting and will have fun while also learning; LBD is well integrated with the students' curriculum and students will now be able to complete their curriculum largely through activities.

6. TEACHERS' PERSPECTIVE WHILE IMPLEMENTING LBD

Since it is the extensive approach implemented by trained teachers from government schools that is emerging as the scalable model, the perception of these teachers while implementing the LBD program is important and covered here.

Ms. Archana Jat and Ms. Harvider Kaur, LBD teachers at Composite School, Subhash Park Agra, and Basic School Naubasta, Lucknow **mentioned that they are the ONLY teachers in their understaffed schools. So finding time for the LBD classes is challenging. But they both believe that the LBD classes, when held, are add value to the learning process.**

"The students are finding these sessions interesting and will find the learning useful in future. But for one teacher to master all the LBD topics by attending a 4-days' training is difficult. If all the teachers of the school were trained at DIET, then each of them would take up LBD topics and activities according to their education background and chapters that they are teaching in school," *Dr. Hemnat Kumar, LBD Teacher, Composite School, Sirkoni*

"The LBD program will teach the students to be more self-sufficient as they are learning a lot of things from carpentry to agriculture. They are also taking more interest in these classes and learning concepts from their curriculum better. For example, agriculture classes tell them about cropping and improve their concept of measurement.

The only challenge is the safety of the LBD equipments. With the help of Pradhan ji, I've had iron doors put in LBD lab. These are now ensuring that the LBD lab equipments are safe and so I can now take LBD classes in the lab," *Ashok ji, LBD Teacher, UPS Patna, Shravasti district*

"We used to earlier hesitate doing activities such as kitchen gardening because a few villagers used to say we are growing these vegetables for ourselves.

But after this LBD program we feel free to encourage kitchen gardening, with the support of our students, while also teaching them various concepts while doing kitchen gardening.

At the same time, children are doing LBD activities on home and health at home too, since they find these interesting. Their parents are very happy about this.

But we are finding carpentry challenging. For that we need support of instructors." *Vishakha ji, LBD teacher, UPS Sadhouli Hariya composite, Saharanpur*

"I was trained in January on LBD and have been able to cover a few LBD classes. But even then I see definite benefits and progress.

In their agriculture LBD classes students are learning about PH factor, acidic & alkaline substances, environment, and medicinal plants & how they can be put to use etc. They find this activity based learning very interesting.

The entire LBD program has been very appealing for the children so far. They find it more interesting than the theoretical classes. They are going beyond the activities in the LBD manual. For example, with the help of the tools in the LBD lab, they have made the prayer session speakers in the school functional.

Together we have also constructed a 'sinduk', a wooden box that can be locked. While constructing this, the children learnt about carpentry, measurement and unit of measurement etc.

This LBD program also has the potential to interest the children and increase their attendance on the days that LBD classes are taken. And after that, they will gradually develop more interest in their curriculum and this will eventually ensure higher attendance in school.

I think I must mention that the support of other staff is important. Our headmaster helped me a lot in setting up the LBD lab and other teachers stay with me and support me.

I just wish that the LBD class was formally included in our teaching timetable and at least for the initial days, LBD instructors provided some support," Sushma ji, LBD teacher, upper primary school,

Chart, register and sports material storage wooden box making in progress in LBD class

Speaker Repair activity in progress in LBD class

7. VISIBLE RESULTS

1. Smart Shoe for People with Blindness

Student Zoya Fatima and Instructor Premlata in 'Innovate for Equality' event organized by UNICEF in New Delhi in 2023

LBD student, Zoya Fatima, of Basic school Naubasta, Lucknow, was a student of class VIII. She spoke to her LBD instructor, showing interest to design a pair of special shoes for people with blindness.

Both her instructor, Ms. Premlata and the teacher Ms. Harvindar Kaur, were supportive. With their support, she has made a smart shoe that can be put to good use by a person with blindness.

Using devices such as ultrasonic sensor, buzzer, jumper wire, ardiuno and cable, they set to work together.

The result was a sensor enabled shoe that can detect any object in the range of 45 centimeter and with the help of a buzzer, alert visually-impaired people about any impediment in their way.

2. Hydraulic Chandrayan Model

Excited by the new learning from her LBD classes, **Mahek Kasera**, a student of class VIII of Composite School Hazaripur, Gorakhpur, **decided to make something ambitious. She told her LBD instructor that she would like to make a hydraulic Chandrayan-3 model**.

Mehak comes from a small family in Gorakhpur district where girls' education is not given much attention but Mehak's passion overcame this hurdle.

With the help of her instructor and encouragement of her class teacher, Mehak set out to make a working model of Chandrayan 3. Items such as injection papers and injection syringes were put to use and gradually Mehak's vision took shape in reality.

Today Mehak's Chandrayan 3 model has been showcased for people like the Chief Minister of Uttar Pradesh and the Finance Minister of India, both of whom have motivated Mehak to aim high and move forward.

Mehak mentions that she learnt the concepts like DC motor, wiring and basic principles of hydraulic while developing it. She says her learning is also linked to chapters like 'Electric Current' from her syllabus.

Student Mehak with her Chandrayan 3 model in the school LBD lab

3. The Kitchen Garden way of learning New Things

The students of classes VI to VIII in UPS Kulgaon, Kanpur, have a new interest – their kitchen garden! These students attend LBD classes every week and are immensely motivated by it.

Through their passionate involvement, they have developed a vibrant kitchen garden in their school compound.

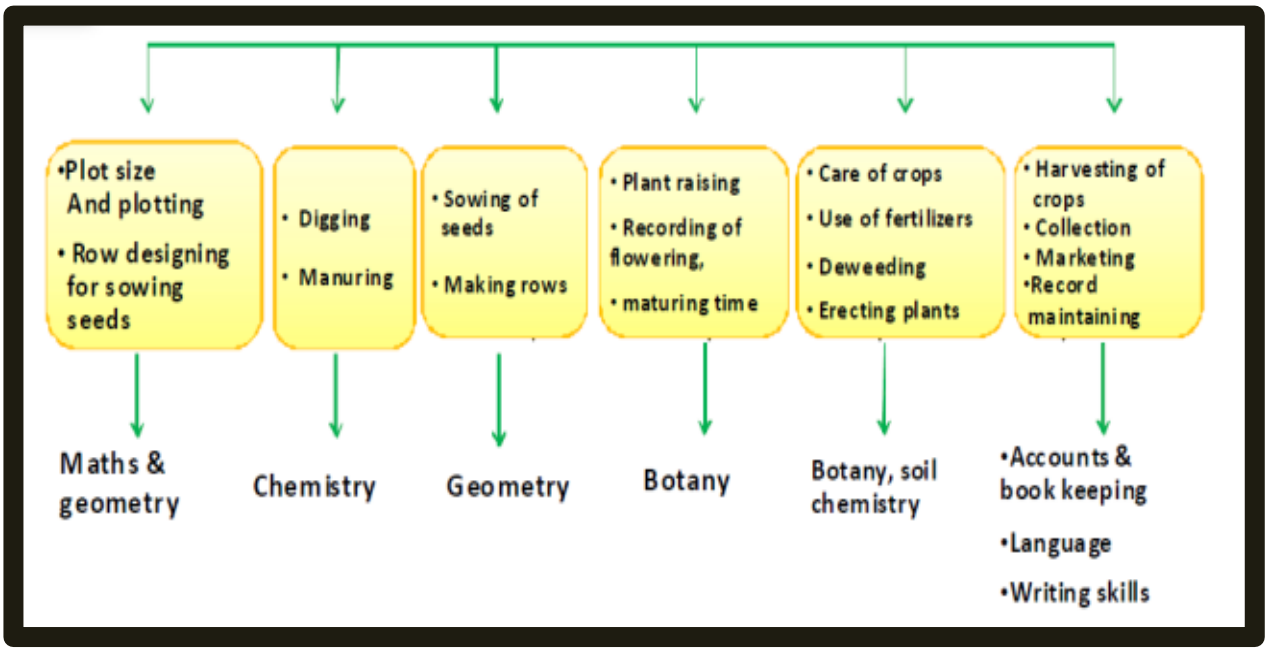
This began with land preparation, followed by the laying of bricks in horizontal rows. The students then added a dash of color by painting the bricks in yellow and green. Finally, they completed the boundary of the garden by using bamboo and rope and their garden was ready to go!

The children then sowed the seeds of tomato, chilly and brinjal in the kitchen garden.

LBD students planting saplings at the UPS Kulgaon, Kanpur kitchen garden

The school headmaster, teachers and all the visitors are appreciating the efforts of students. This kitchen garden initiative promotes hands-on learning, sustainability, and healthy eating habits.

In fact, the making of the kitchen garden as an interesting and relevant activity enables the students to learn a host of things, as shown in the **Diagram 2** below:



A diagrammatic synopsis of how the simple activity of kitchen gardening enables the students to enhance their curriculum based learning

4. Advancing Subject Specific Knowledge while learning Real-Life Skills

Children in Classes VI to VIII from Composite School Subhas Park, Agra were exposed to **pottery making** during an LBD session. A Potter from the community was invited to conduct this session. Students asked him questions about their work to learn the tricks in making pottery articles.

The children found the session interesting and learnt a new skill needed in the community. Also, through the pottery making class, the children gained greater clarity on curriculum related matters such as states of matter, the properties of different substances such as clay and ceramics, rotational motion, force and

Children in JHS Chalesar Agra made a bench from waste plastic bottles and cement. Through this activity they learnt about **waste management,** properties of plastic bottles' strength, flexibility, compressive strength, water resistance etc.

5. Chikki Making as a Way of Learning

Dr. Hemnat Kumar, LBD Teacher, Composite School, Sirkoni is slightly worried. "*We were introduced to 4 different themes and numerous tools during our LBD training. Recollecting so much, especially being able to handle so many tools without more practice, is a daunting task. Also, I have not done things that are taught in the home and health theme. But despite that, I was able to introduce the children to chikki making owing to the LBD training,*" he says with obvious relief and pride.

1. Cotton – First of all, large particles and impurities present in water are stopped.
Recollecting the class, he pointed out how the students received understanding on different topics related to their curriculum only through the process of chikki making.

He says that the children learn about nutrition, benefits of jaggery and peanuts and also additional aspects of a product such as costing, accounting and packaging, during this exercise.

Most importantly, he says, the children learnt these concepts in a way that they found very interesting. So it is likely that they will retain these learning for a long time to come. Their parents also felt that the children were learning useful things in school.

6. Four Stage Water Purifier

Students at Composite School, Subhas Park, Agra have developed a four-stage water purifier. It is based on the principle of cleaning water in a natural way and is linked to chapters in their syllabus.

This model has 4 stages of filtration:

2. Sand – Helps in removing small particles, dirt and dust.

3. Gravel & Pebbles – Filters large particles present in water and controls water flow.

4. Activated Charcoal – Absorbs impurities, odour and chemicals from water.

It helps the students to understand the chapters in their text books.

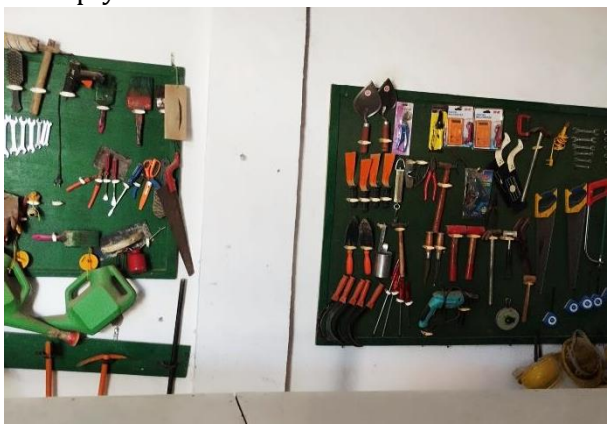
"This model is usually related to the Water Filtration & Purification chapter of Science subject of classes 6-8. It is interlinked to textbook chapters on water, waste water story and pollution of air and water. **Our students are able to correctly link the LBD class activities to these chapters,"** *Naval Kishore, LBD Instructor*

Students at Composite School, Subhas Park, Agra, working on the 4-stage water purification system

THE CREASES

UPS Chinhat has been one of the model schools for the LBD intervention. Accordingly, an LBD instructor was deployed to the school. The LBD class was set up as per infrastructure protocol and is still well kept.

But this piloting phase with an instructor was over in December 2024 and the LBD instructor was no longer available after that. The responsibility of using and mentoring the lab was handed over to school HM. However, the HM found it to be an additional task. As a result, today, sans for the tools and equipment, the class is empty.



Sunita ji, the HM, shared her reasons for this. "*We teachers already have a lot of activities to look into. LBD is an additional activity. We will find it difficult to complete syllabus with so many extra activities. Also, how can I do plumbing and carpentry even if we are trained? We need an LBD instructor in the school. Even if the LBD instructor supports us ones a week, we may still have weekly classes,*" she says.

No teacher from her school has attended the LBD training so far.

"*The children used to enjoy the regular LBD classes a lot,*" she signs off.

Students at UPS Chinhat happy to share how they made interesting items like a toy gun to frighten monkeys in their LBD classes

There were also other challenges such as:

i) In some schools there were few teachers and several of the schools from which teachers came to attend the LBD training, has only one teacher. For the single teachers, holding LBD classes, besides the other classes and tackling all other responsibilities in school, is challenging.

ii) Safety of LBD equipment is also a challenge and it is necessary for schools to create safety mechanisms to avoid theft of the LBD equipment.

iii) The initial attitude of parents' attitude towards LBD is sometimes lukewarm, and effort is required to have them as allies in the initiative.

iv) Agriculture and gardening is a core focus area of the LBD program. So there is a need to ensure protection of these agricultural beds in school gardens/compounds, through fencing.

v) The safety concern of the students while handling the tools and conducting the activities during the LBD classes, is also a challenge.

A CASE OF RISING ABOVE CREASES

प्रशिक्षण | परिषदीय स्कूलों में लर्निंग बाय डूइंग कार्यक्रम के तहत बच्चे सीखेंगे कई कलाएं

बच्चों को मिलेगी पंक्चर, पकौड़ा बनाने की ट्रेनिंग

■ साहिल राणा

सहारनपुर। जिले के परिषदीय स्कूलों में अब बच्चों को जूस बनाने से लेकर पकौड़ा बनाने की ट्रेनिंग दी जाएगी। लर्निंग बाय डूइंग अर्थात कर के सीखों कार्यक्रम के तहत बच्चों को आत्मनिर्भर बनाने की ओर शासन की ओर से यह कदम उठाया गया है।

करके सीखों कार्यक्रम को सफल करने के लिए परिषदीय स्कूलों में 50 प्रकार के उपकरण खरीदे गए है। इसके लिए हर ब्लॉक से दो ऐसे स्कूलों का चयन किया गया है, जिनमें बच्चों की संख्या सर्वाधिक है।

कर के सीखों कार्यक्रम के लिए जिले से कुल 24 स्कूलों का चयन किया है। इस कार्यक्रम के तहत कक्षा 6 से 8 तक के बच्चों को ट्रेनिंग दी जाएगी। कार्यक्रम के दौरान उपकरणों के उपयोग के लिए चिन्हित किए गए 24 स्कूलों को 28770 रुपये की ग्रांट राशि भेजी दी गई है।

ग्रांट राशि से स्कूलों में कृषि के लिए फावड़े, खुरपे के अलावा जूस बनाने के लिए मिक्सी और इंजीनियरिंग के लिए वेल्डिंग सामान व पंक्चर लगाने के उपकरणों के साथ अन्य उपकरण की खरीद की जाएगी।

24 स्कूल चिन्हित जिले के, हर ब्लॉक से हुआ दो स्कूलों का चयन

- जूस बनाने से लेकर पकौड़ा बनाने की दी जाएगी ट्रेनिंग
- कृषि व इंजीनियरिंग समेत कई कार्य सीखेंगे बच्चें
- प्रति स्कूल को भेजी गई 28,770 की ग्रांट राशि

हर ब्लॉक में दो स्कूल चिंहित

प्रशिक्षण के लिए हर ब्लॉक में दो स्कूलों का चयन किया गया है। जिले भर में कुल 24 स्कूलों में यह प्रशिक्षण कार्यक्रम चलाया जाएगा।

शासन ने भेजी ग्रांट

इस प्रशिक्षण के लिये हर स्कूलों को अलग से ग्रांट जारी की जा रही है। प्रति स्कूल के लिए 28,770 की ग्रांट राशि शासन ने जारी भी कर दी है। जिले में छह लाख से ज्यादा की ग्रांट आई है।

"शासन की ओर से परिषदीय स्कूलों के बच्चों को आत्मनिर्भर बनाने के लिए लर्निंग बाय डूइंग कार्यक्रम शुरू किया गया है। ब्लॉकवार सर्वाधिक संख्या वाले दो-दो स्कूलों का चिन्हित किए है। जिले से कुल 24 स्कूलों में कर के सीखों कार्यक्रम के तहत बच्चों को ट्रेनिंग दी जाएगी। -कोमल, बीएसए, सहारनपुर

There were **initial misconceptions** about the LBD program in the mind of some. This manifested, among others, in the form of a news article in Saharanpur district.

The article reported that the children under the 'Learning by Doing' program will learn how to make potato fritters and juice, as part of their training to be self-sufficient.

1

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However, after communication with DC Saharanpur and **sensitization** of the reporter on LBD, a news article, with a positive and **more realistic perspective** of LBD was published.

खेती, शेक बनाना और इंजीनियरिंग सीखेंगे परिषदीय विद्यालयों के छात्र

संवाद न्यूज एजेंसी

सहारनपुर। परिषदीय विद्यालयों के विद्यार्थियों को अब इंजीनियरिंग भी सिखाई जाएगी। दरअसल, विद्यालयों में लर्निंग बाय डूइंग कार्यक्रम शुरू हो रहा है। इसके तहत प्रत्येक ब्लॉक से अधिकतम संख्या वाले दो-दो यानी पूरे जनपद के 24 विद्यालयों का चयन किया गया है। कार्यक्रम के तहत प्रत्येक को 28,770 रुपये दिए जाएंगे।

जिला समन्वयक कृपाल मलिक ने बताया कि उच्च प्राथमिक विद्यालय में लर्निंग बाय डूइंग कार्यक्रम के तहत विद्यार्थियों को दैनिक जीवन में उपयोगी गतिविधियों को सिखाया जाएगा। कुल 50 प्रकार की निर्धारित सामग्री को विद्यार्थियों के हित में उपयोग में लाया जाएगा। करके सीखने से संबंधित सामग्री से विद्यार्थी विद्यालयों में बागवानी, सिलाई, विभिन्न व्यंजन बनाने की कला, इंजीनियरिंग की कई विधाओं का प्रशिक्षण प्राप्त करेंगे।

इसके अलावा उन्हें कृषि संबंधी, अभियांत्रिकी या ऊर्जा के क्षेत्र संबंधी, कोडिंग के क्षेत्र संबंधी और खाद्य पदार्थ प्रक्रिया के बारे में भी बताया और सिखाया जाएगा।

उन्होंने बताया कि बीते दो साल में पायलट प्रोजेक्ट के रूप में लर्निंग बाय डूइंग कार्यक्रम प्रदेश के केवल 15 जिलों के 60 विद्यालयों में चलाया गया।

नई शिक्षा नीति में शिक्षा पर विशेष महत्व दिया गया है। छठी कक्षा से विद्यार्थियों में व्यावसायिक रुचि पैदा करना है।

कार्यक्रम का मकसद सिर्फ गतिविधि सिखाना नहीं है, बल्कि बागवानी, कोडिंग, शेक बनाने का प्रकल्प अगर कोई छात्र लेता है तो छात्र को उक्त से संबंधित वैज्ञानिक जानकारी के साथ तैयार किया जाएगा।

लर्निंग बाय डूइंग कार्यक्रम के तहत 24 विद्यालय चयनित

प्रत्येक विद्यालय को मिलेंगे 28,770 रुपये

8. MILESTONES & ACHIEVEMENTS

01. **The LBD intervention** (initially conceived as IBT intervention) **started in 60 schools in 2021**, initiated by UNCIEF through resource support from PRIMARK

The **state upscaled** and established LBD centers in **1,772** upper primary and composite **schools and 570 PM Shri Schools in 2024-25**

02. Till March 2024-25, **UNICEF invested USD 477,556** in the LBD intervention

This investment **generated investment** of **USD 20,988,786** from the **UP Government**.

This is a financial leveraging of 43 times!

03. The state government is considering **upscaling the program to all 45,656** upper primary and composite **schools.**

This is **760 times the initial number of schools** in which it was conceived by UNICEF and implemented with the ground support of Vigyan Ashram/STARS Forum.

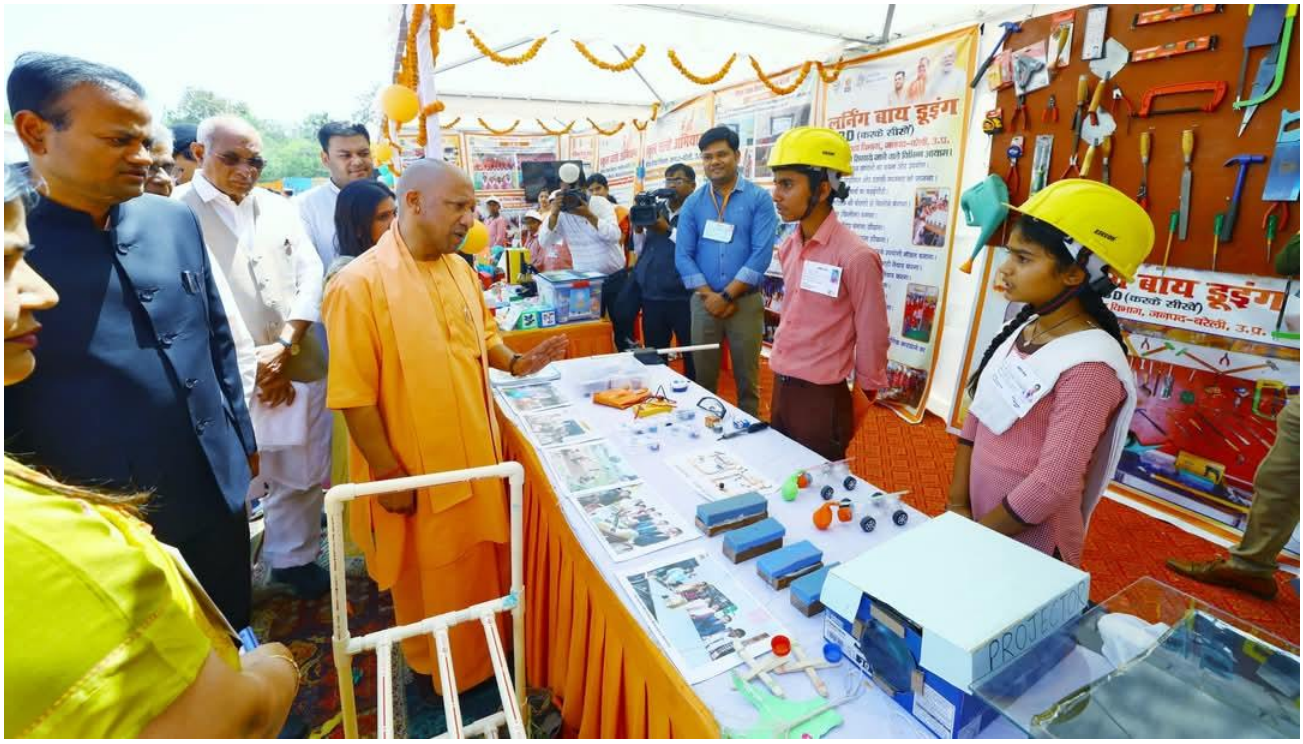
04.

The number of students that benefitted from it **till April 2024 is 10,681 boys, 6,100 girls.**

But every year in the coming years, it has the potential to benefit more than 45,00, 000 students.

Thus the intervention gained recognition and proved to be replicable and sustainable. It was vastly up-scaled, with the UP Govt. establishing LBD labs in 1772 schools.

04. The LBD Program gained high visibility and attention owing to visits from prominent personalities



The Chief Minister of Uttar Pradesh/UP has been pleased with the program and has highlighted it through his presence. Here he is seen with the Education Minister of the state at the LBD stall in Bareilly, UP, during a 'School Chalo' event on the 1st of April 2025.

Ms. Kanchan Varma, IAS, DG Education, also provided very succinct insights and thoughts of the LBD program during a valedictory session at teachers' training. She said that although the plan of the LBD program started with trying to integrate the OoSCs into the schooling framework, an important aspect of it now is to ensure that the children retain their interest in STEM and particularly, Science.

She said, "*Often children's interest in science wanes as they find it theoretical. But LBD will be practical and related to syllabus as it is like a lab and every exercise is linked to specific content of the syllabus of specific classes.*"

UNICEF Goodwill Ambassador, Ms. Priyanka Chopra with solar toy car in an LBD lab

Pat Cummins, Australia team Cricket Captain and UNICEF Australia Ambassador at LBD lab Basic School Aurangabad Lucknow

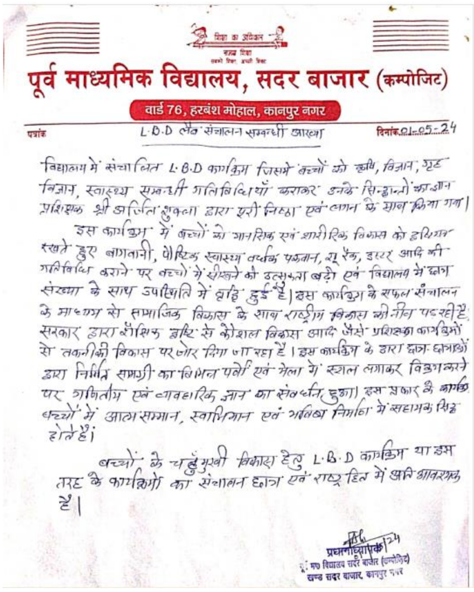
"***This is a fantastic recycled car made of products that would otherwise be rubbish…LBD is showing the children how to make sustainable change***," Pat Cummins

DC Samgra Shiksha, DC – Girls Education and DC Training, visited the LBD Lab Composite School Didora, Moradabad

Mr. Yogesh Kulkarni - Director Vigyan Ashram meeting with Madhav Sir and Ranjeet Sir - SSA at SPO, Lucknow

These visits not only gave the visitors insights about the LBD program and its effectiveness, it also lent the program visibility and motivated the students, teachers and the LBD team.

05.



शिक्षा का अधिकार

पूर्व माध्यमिक विद्यालय, सदर बाजार (कम्पोजिट)

वार्ड 76, हरबंश मोहाल, कानपुर नगर

पत्रांक L.B.D लैब संचालन सम्बन्धी आख्या दिनांक 01-05-24

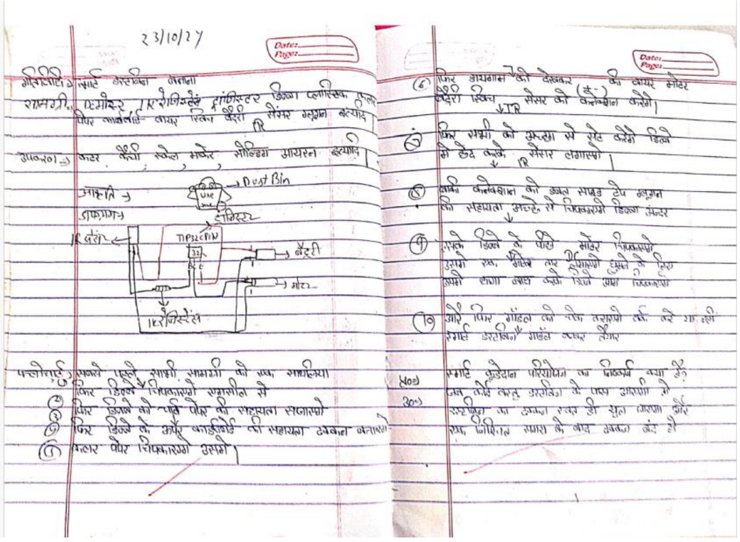
विद्यालय में संचालित L.B.D कार्यक्रम जिसमे बच्चों को कृषि, विज्ञान, गृह विज्ञान, स्वास्थ्य सम्बन्धी गतिविधियाँ कराकर उनके सिद्धान्तों का ज्ञान प्रशिक्षक श्री अजित शुक्ला द्वारा पूरी निष्ठा एवं लगन के साथ किया गया।

इस कार्यक्रम में बच्चों को मानसिक एवं शारीरिक विकास को ध्यान रखते हुए बागवानी, पौष्टिक स्वास्थ्य वर्धक पकवान, सू रैक, इस्टर आदि की गतिविधि कराने पर बच्चो में सीखने की उत्सुकता बढ़ी एवं विद्यालय में छात्र संख्या के साथ उपस्थिति में वृद्धि हुई है। इस कार्यक्रम के सफल संचालन के माध्यम से सामाजिक विकास के साथ राष्ट्रीय विकास की नींव पड़ रही है। सरकार द्वारा शैक्षिक दृष्टि से कौशल विकास आदि जैसे प्रशिक्षण कार्यक्रमों से तकनीकी विकास पर जोर दिया जा रहा है। इस कार्यक्रम के द्वारा छात्र-छात्राओं द्वारा निर्मित सामग्री का विभिन्न पर्वों एवं मेला में स्टाल लगाकर विक्रय करने पर गणितीय एवं व्यावहारिक ज्ञान का संवर्धन हुआ। इस प्रकार के कार्यक्रम बच्चों में आत्मसम्मान, स्वाभिमान एवं भविष्य निर्माण में सहायक सिद्ध होते हैं।

बच्चों के चहुँमुखी विकास हेतु L.B.D कार्यक्रम या इस तरह के कार्यक्रमों का संचालन छात्र एवं राष्ट्र हित में अति आवश्यक है।

प्रधानाध्यापक
पू० मा० विद्यालय सदर बाजार (कम्पोजिट)
खण्ड सदर बाजार, कानपुर नगर

Feedback from HM, Sadarbazar Composite School, Kanpur



Notes made by students Alshifa on making smart dustbin during LBD class at UPS Machariya, Kanpur

LBD indirectly enhancing language competencies: Language competency, including reading and writing skills, continues to be a challenge for students of government schools in Uttar Pradesh. This is despite the fact, that the state has been able to take definite positive strides forward in the recent years.

As per ASER report 2024, despite an improvement in reading skills for Class 8 students in UP government schools, 67.5% of the sampled students were able to read Class 2 level text.

The LBD intervention can be impactful from this aspect. Students learn language in their classes. It includes reading, writing and expression skills. LBD program teaches students skills of documentation, recording observation, reflecting on the work done by them and often expressing the same through drawing/sketching. In this way LBD is positively contributing towards developing competencies expected in NIPUN Bharat mission.

06.

On being asked, the children are also able to explain the concepts that they have learnt from each LBD exercise and mention the specific chapter in their textbooks to which it is linked. Thus they are learning to connect the dots between theory and its practical implementation.

07.

The intervention proved to be child-friendly and has been playing a definite role in increasing attendance in schools

Discussions with the teachers and LBD instructors have revealed that the intervention is child friendly and is enhancing students' interest and attendance in schools.

Feedback from various teachers in the model schools have revealed that attendance of children have gone up over a period of time, owing to the children's interest in academics, triggered through their participation in the LBD classes.

Even in the government schools where the teachers have received training between October 2024 and January 2025, and only a few LBD activities were done till March, teachers are reporting that the students are taking active interest in the classes. They feel this may eventually enhance their interest in the curriculum and improve school attendance.

08.

Parents see enhanced utility in the schooling of their children owing to the intervention

Both teachers and LBD instructors have pointed out that the LBD intervention has increased the parents' faith in the benefits of schooling. Children tend to share their LBD experiences at home and also carry out activities based on their 'home and health' and 'agriculture' LBD classes, at home. For example, growing plants in grow-bags and making 'chikki' are some of the activities that the children did at home.

The parents are finding these activities relevant and useful. **This is gradually enhancing their faith in the benefits of school education in equipping their children for the future and real life.**

09.

LBD has created an action oriented impact on the teachers that it has trained: Approximately 2 months after they received LBD training, a review of teachers trained in LBD activities was taken.

Out of the 1287 teachers contacted during this review, it was found that in approximately 62% cases, LBD labs had been established in the schools. Thus, more than 800 labs had already been established.

Out of the 1287 teachers contacted during this review, it was found that in approximately 81% cases, the teachers had conducted LBD activities in schools. A total of 1052 teachers mentioned that they had conducted LBD activities in their schools.

LBD Lab setup in UPS Kulgaon, Kanpur

LBD class in progress (at school Mankua, Maksoodpur, Block Dilari, Moradabad), **facilitated by Mr. Vipendra Kumar, the school teacher trained by STARS Forum and Vigyan Ashram on LBD**

9. THE WAY FORWARD

The various stakeholders across the board in the LBD intervention appear to be enthusiastic about its appeal, relevance and usefulness. However, discussion with them has also brought forward some challenges and insights. It is based on these insights that a way forward is being suggested:

- As of now, there appears to be mixed reaction from the trained LBD teachers on the level of support that they are getting from other teachers in school in running LBD classes. This could be for various reasons, such as skill sets, workload etc. of other teachers. However, creating a **formal mechanism** (such as through a Government Order) to **engage other teachers for LBD classes** may ensure this is a cooperative and collaborative affair in schools, enhancing the quality of the LBD classes and their linkage to various subjects in the students' curriculum.

- As already mentioned, the system of maintaining a dairy by the students on the LBD classes, has gradually **enhanced their language competency and skills of expression**. To make full utilization of this emerging benefit, **it is necessary that the language teachers in schools also get an orientation of the LBD approach.** This will help them to leverage the spill-off of improved language competency among the students through LBD classes. An integrative approach will be able to make strong contribution to 'Foundational Literacy and Numeracy' and build further on it in senior classes.

- **Refresher training of teachers** may be useful in refreshing their learning updating their learning and bridging learning gaps that are almost sure to emerge.

- A **time table/lesson plan of LBD classes** may be developed and formally inbuilt into the teaching-learning mechanism in schools. Already, as per NCF-SE 2023 and NCERT syllabus, 5 school periods per week from Grade 6 onwards has been allotted to vocational education. UP needs to make decision regarding the same.

- Most teachers from the selected government schools, who have been trained on LBD, appear to be making efforts to hold LBD classes. However, they also appear to feel the need of LBD instructors. Given that a lot of new activities, familiarity to tools and learning processes were covered in a relatively short duration of LBD training, their need for hand-holding support appears justified and **a transitional hand-holding mechanism maybe relevant**.

  Here creating clusters of schools, with **one LBD instructor for each cluster to hand hold the teachers on LBD classes for a short-run period only** may enable a better transition to the LBD approach. It will also gradually help convert the teachers from government schools into skilled LBD instructors.

  Different structures may be experimented with. For example, it may be in the form of virtual support to teachers through whatsapp groups, firmed up with a monthly cluster meeting and impromptu visits during LBD classes.

  Alternatively, we can keep provision for a group of skilled persons, who can come to school on an honorarium basis.

- Sessions on **perspective building and motivation** may be added to the training content. Building **teachers' perspective that the LBD classes will facilitate completion of the students' syllabus** rather than impeding it by taking time away from 'normal' classes is important. Likewise, for teachers who do not feel self-motivated to adopt the LBD program, a motivation session could be useful.

- Discussion on **whether and how to engage the DIETs** in the LBD program and strengthen them with resources and capacity building may be topic of brain storming sessions among core stakeholders and experts. This may ultimately enhance the program's sustainability.

- Various aspects of the intervention infrastructure such as room size, room condition, tools list etc. have been structured and **standardized**. Enhancing this list and making arrangements for **security specifications** may be relevant and helpful for the initiative.

10. CONCLUDING REMARKS

The LBD program started as a pilot initiative with the IBT program. Since then it has been refined and re-defined as the LBD program that focuses on STEM concepts in schools, also making the students more future ready. Overall, LBD has shown potential of increased attendance, reduced dropout, increased grade specific competency among the children in Mathematics, Science, and Languages. It is also skilling them to be future-ready. This is particularly visible in the model schools but is showing promise in the other government schools where it is being up-scaled through training of teachers.

The success of the model has been pivotal in motivating the state to consider expanding this across approximately 2500 schools in the state, starting from a pilot phase with only 60 schools. This has not only resulted in the training of 2160 teachers but also the government is already setting up 1772 LBD labs in upper primary and composite schools.

A landmark program has thus been initiated unlocking tremendous potential for the current learning competency and future readiness of the children.

The heartening success of the effort so far has triggered the state government to consider up-scaling the program to all 45,656 upper primary and composite schools in the state of UP in the future. Thus the LBD intervention is building the children's future, brick by brick.

List of Abbreviations

DIET – District Institute of Education and Training

IBT – Introduction to Basic Technology

ITI – Industrial Training Institute

LBD – Learning by Doing

NCF – National Curriculum Framework

OoSC – Out of School Children

PAB – Project Approval Board

SMC – School Management Committee

STEM – Science, Technology, Engineering and Mathematics

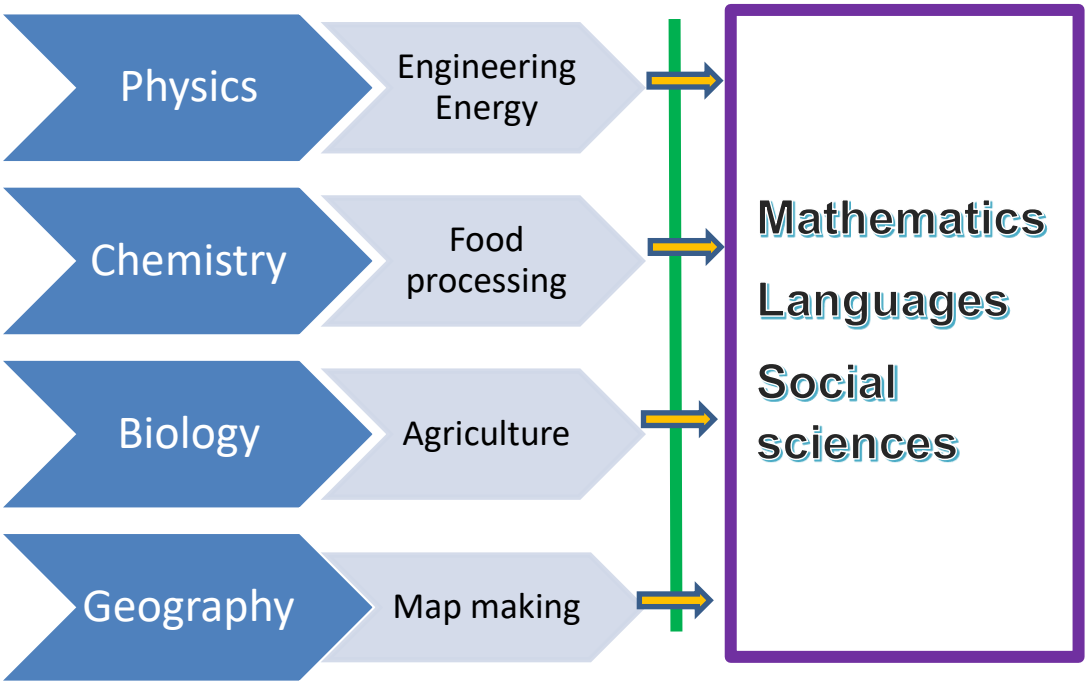
UP – Uttar Pradesh

UPS – Upper Primary School

Annexure 1: STEM in LBD

LBD is combination of STEM plus agriculture, Arts and activities related to human services.

Learning By Doing = STEM + Art & Craft + Agriculture + Human Service



Annexure 2: LBD Lab – Area and Infrastructure Specifications

- An ideal 400 sq ft of area is required to set up LBD LAB.
- There must be electricity connection and water facility available in LBD LAB.
- There must be an electric switch board available near the kitchen table and the working table in LAB.
- Gardening Area: Adequate space for gardening activities within the school premises
- Tool box (Size 6x4 feet size of wooden plywood of thickness 12mm) - 1
- Electrical fitting (1 MCB, 4 switch boards with 2 plugs in and 2 buttons/ 2 Fans/ 3 LED bulb lights)
- Working table-(Height 2.5 Ft, width 3ft, length 5ft) use 1-inch square tube and 12mm plywood with sunmica at the top) - 2
- Small Kitchen table with sink- Stainless steel (Height 2.5 Ft, width 2ft, length 4ft) - 1
- Cupboard (metal sheet- 6 ft height and 3 ft width) - 1
- Cupboard (metal sheet- 4 ft height and 3 ft width) - 1
- Stools for students - 20
- Green Board - 1
- Floor Mat Plastic Chatai (6x4 feet)

Annexure 3: Training Time Table and Plan

Learning by Doing 4 days Teachers Training Programme			
DAY	**Time**	**Session / Activity**	**R.P**
Day 1	10 - 10:10	Welcome	**Miss Premlata**
	10:10 - 10:30	Inauguration	**Mr. Prashant Dubey**
	10:30 - 11:00	About LBD, Best examples of LBD	**Mr. Prashant Dubey**
	11:11 - 11:15	Tea Break	
	11:15 - 11:30	energizer2 -	**Mr Prashant Dubey**
	11:30 - 01:00	What is NCF or NEP?	**Dr. Yogesh Kulkarni (Online)**
		what is project? With examples and project methodology - templates	**Mr. Prashant Dubey**
	1:00 - 2:00	Lunch	
	2:00 - 2:30	PPT Presentation	**Mr Harshit**
	2:30 - 4:00	Hands-on activity 1 Energy Environment - LED torch , Paper Electronics , Solar car	
		Group 1 - LED Torch	Room No = 4 - Mr Harshit -50 Mr Abhay - Group-1 - 17
		Group 2 - Paper Electronics	Room No = 4 - Mr Harshit -50 Mr Vinod- Group-2 - 17
		Group 3 - Solar Car	Room No = 4 - Mr Harshit -50 Miss Premlata/Mr Naval Group-3 - 17
		Group 4 - LED Torch	Room No = 5 - Mr Raghavendra- 50 Mr Rajendra - Group -4 - 17
		Group 5 - Paper Electronics	Room No = 5 - Mr Ragahvendra - 50 Mr Akash - Group-5 - 17

		Group 6 - Solar Car	Room No = 5 - Mr Raghvendra - 50 Mr Tushar - Group-6 - 17
	4:00 - 4:15	Break	
	4:15 - 5:30	Hands-on activity 1	
	5:30 - 6:00	Energizer 4	Mr Raghvendra
	6:00 - 6:10	Reflection	Mr Prashant Dubey
	Time		
Day 2	9:00 - 9:45	Breakfast	
	9:50 - 11:15	Common session - Mobile as a lab tool	Mr Raghav
	11:15 - 11:30	Tea Break	
	11:30 - 12:00	PPT Presentation	Mr Ranjit Shanbagh
	12:10 - 1:00	Hands-on activity 2 - Agriculture - Soil Testing, Vertical Bag, Seedling Tray	
		Group 1 - Soil Testing	Room No = 4 - Mr Harshit -50 Mr Abhay/ Mr Akash - Group-1 - 17
		Group 2 - Vertical Bag	Room No = 4 - Mr Harshit -50 Mr Tushar - Group-2 - 17
		Group 3 - Seedling Tray	Room No = 4 - Mr Harshit -50 Miss Premlata Group-3 - 17
		Group 4 - Soil Testing	Room No = 5 - Mr Raghvendra - 50 Mr Rajendra - Group -4 - 17
		Group 5 - Vertical Bag	Room No = 5 - Mr Raghvendra - 50 Mr Naval - Group-5 - 17
		Group 6 - Seedling Tray	Room No = 5 - Mr Raghvena - 50 Mr Vinod - Group-6 - 17
	1:00 - 2:00	Lunch	

	2:00 - 3:00	**Lab Setup / Time table / Academic**	Mr Prashant Dubey
	3:00 - 3:30	Common session - Resources for new activity on internet - instructables/wikihow/DIY/AI-chatgpt	Mr Prashant Dubey
	3:30 - 4:15	Hands-on activity 3	
		Group 1 - hydroponics using plastic bottles	Room No = 4 - Mr Harshit -50 Mr Abhay/ Mr Akash - Group-1 - 17
		Group 2 - Soil Testing	Room No = 4 - Mr Harshit -50 Mr Tushar - Group-2 - 17
		Group 3 - drip using plastic bottle	Room No = 4 - Mr Harshit -50 Miss Premlata Group-3 - 17
		Group 4 - hydroponics using plastic bottles	Room No = 5 - Mr Raghvendra - 50 Mr Rajendra - Group -4 - 17
		Group 5 - Soil Testing	Room No = 5 - Mr Raghvendra - 50 Mr Naval - Group-5 - 17
		Group 6 - drip using plastic bottle	Room No = 5 - Mr Raghvendra - 50 Mr Vinod - Group-6 - 17
	4:15-4:30	Break	
	4:30 - 5:30	Hands-on activity 3	
	5:30 - 6:00	Reflection and discussion	**Dr. Yogesh Kulkarni (Online)**

	Time		
Day 3	9:00 - 9:45	Breakfast	
	9:50 - 10:00	Energizer 1	Mr Raghavendra
	10:00 - 11:00	Common session - Safety, record keeping	Mr Prashant Dubey
	11:00 - 11:15	Tea Break	
	11:15 - 11:30	PPT Presentation	Mr Raghavendra

		Hands-on activity 4 - Simple machines, Wood work	
	11:30 - 1:00	Group 1 - Simple machines - robotic arm using paper, catapult	Room No = 4 - Mr Harshit -50 Mr Abhay/ Mr Akash - Group-1 - 17
		Group 2 - Woodworking - photoframe	Room No = 4 - Mr Harshit -50 Mr Tushar - Group-2 - 17
		Group 3 - PVC pipe Model	Room No = 4 - Mr Harshit -50 Miss Premlata Group-3 - 17
		Group 4 - Simple machines - robotic arm using paper, catapult	Room No = 5 - Mr Raghvendra - 50 Mr Rajendra - Group -4 - 17
		Group 5 - Woodworking - photoframe	Room No = 5 - Mr Raghvendra - 50 Mr Ranjeet - Group-5 - 17
		Group 6 - PVC pipe Model	Room No = 5 - Mr Raghvendra - 50 Mr Vinod/ Mr Naval - Group-6 - 17
	1:00 - 2:00	Lunch	
		Energizer3	Mr Prashant Dubey
	2:00 - 2:30	Common session - How to Make reels/video/poster/photos	Mr. Harshit
	2:30 - 3:00	PPT Presentation	Mr Raghavendra
	3:00 - 4:00	**Hands-on activity 3**	
		Group 1 - Painting	Room No = 4 - Mr Harshit -50 Mr Abhay/ Mr Akash - Group-1 - 17
		Group 2 - Telescope	Room No = 4 - Mr Harshit -50 Mr Tushar - Group-2 - 17
		Group 3 - Mobile Projector	Room No = 4 - Mr Harshit -50 Miss Premlata Group-3 - 17
		Group 4 - Simple machines - Making toys (baloon car)	Room No = 5 - Mr Raghvendra - 50 Mr Rajendra -

			Group -4 - 17
		Group 5 - Mobile Projector	Room No = 5 - Mr Raghvendra - 50 Mr Ranjeet - Group-5 - 17
		Group 6 - telescope	Room No = 5 - Mr Raghvendra - 50 Mr Vinod/ Mr Naval - Group-6 - 17
	4:00 - 4:15	Break	
	4:15 - 5:30	Hands-on activity 3	
	5:30 - 6:00	Reflection	Mr Prashant Dubey

	Time		
Day 4	9:00 - 9:45	Breakfast	
	9:50 - 10:00	Energizer 1	Mr Harshit
	10:00 - 11:00	Common session -Evaluation, assessment - NCF Curricular goals How to conduct activities in school? How to use LBD book? Implementation plan for school, budget, format, reporting / case studies	Mr Prashant
	11:00 - 11:15	Tea Break	
	11:15 - 1:00	**Hands-on activity 4 - Food processing - First Aid Box Making, Water Testing, Lassi Making**	
		Group 1 - First Aid Box Making, water testing	**Room No = 4 - Mr Harshit -50** Mr Abhay/Mr Akash - Group-1 - 17
		Group 2 - First Aid Box Making, water testing	**Room No = 4 - Mr Harshit -50** Mr Tushar - Group-2 - 17
		Group 3 - Lassi Making, Water Testing	**Room No = 4 - Mr Harshit -50** Miss Premlata Group-3 - 17
		Group 4 - First Aid Box Making, water testing	Room No = 5 - Mr Raghvendra - 50 Mr Rajendra - Group -4 - 17

		Group 5 - First Aid Box Making, water testing	Room No = 5 - Mr Raghvendra - 50 Mr Ranjeet - Group-5 - 17
		Group 6 - Lassi Making, Water Testing	Room No = 5 - Mr Raghvendra - 50 Mr Vinod/ Mr Naval - Group-6 - 17
	1:00 - 2:00	Lunch	
	2:10 - 2:30	Feedback Form	Mr Prashant
	2:30 - 3:00	Training journey video display	Mr Harshit
	3:00 - 3:30	Concluding Session - kaushal mela - valedictory	Dr Yogesh Kulkarni **(Online)**