

Section 1: [Our Background in STEM Learning & Design Thinking through Maker Spaces:](#)

Creya Learning & Research (*est.* 2011) with its vision of equipping students with 21st century skills is India's pioneer of STEAM Learning and Design Thinking. It is an established leader with schools from CBSE / ICSE / CIE / IB / US/ UK National Curriculum schools across India and UAE implementing its STEM Labs and Maker Spaces. With an uninterrupted implementation for 13+ years in schools, it has won the trust of educator leaders *inspiring* **500,000+ students** to become *innovators*. Creya STEM Labs & Maker Spaces have been in existence even before the 1st ATL rolled out in schools. Many students have built strong powerful portfolios of impactful projects laying strong foundations for their college and careers ahead.

The sound pedagogical foundations of the company are built on credentials of the founding team members that have held leadership roles in a very large company that worked in the space of Experiential learning, Marzano's taxonomy, Design thinking and 21st century skills for the highly competitive and mature K12 education markets of USA and India before distilling all that experience to start Creya.

Creya provides the industry's widest range of STEAM and Maker modules that include Engineering Design, Robotics, 3D Printing, Internet of things (IoT), Digital Media, Drones Coding, Artificial Intelligence (AI) & App Development, Laser Engravers, DIY tools and more. However, the focus is on the learning outcomes making sure the engagement and enrichment are relevant for the whole class of students who in future may become a lawyer, doctor, artist, economist, activist and not just an Engineer.

The unique pedagogical design with Bootcamps, Guided Projects, and Capstones that drive design thinking coupled with 360 Degree Assessments of the skills ensure learning outcomes are delivered. The end-to-end implementation with Lab setup, Lesson Plan Resources, and Training & Support along with an online portal access to curriculum with printed logbooks ensures schools have a seamless implementation and makes Creya one of the very few programs to be implemented continuously in schools for over 13 years.

Section 2: Technical Resources : STEM Lab & Maker Space Equipment & Installation:

We have a complete in-house team with expertise to set-up a fully functional STEM Lab & Maker Space. Our curriculum and resources are also built inhouse as well as our training and implementation support is done by highly qualified in-house employees engaged with us full time on permanent rolls.

There are 3 elements to the establishment of a Creya STEM Lab and implementation of Program which are the 1) Equipment & Installation 2) Curriculum & Resources 3) Training & Implementation Support.

Equipment & Installation

The physical equipment that the STEM Lab & Maker Space will be equipped across different technologies and the diversity of parts will allow a grade level progress in terms of the projects they work with change from grade Pre-K to Grade 12. The precision of the parts and diversity allows students own designs to be realized as working prototypes thus nurturing innovation. The robustness of these equipment of the highest quality also means their longer shelf life. The materials equipped in the lab allow modules across different technologies:

- **Internet of Things (IoT) :** This exhaustive kit of sensors and Wi-Fi- controller systems allows design and prototyping of internet enabled and controlled automations
- **Engineering Design :** This consists of gears, pinions, wheels, etc which are the building blocks for constructing bridge, building, cranes and even Robotics
- **Robotics:** This consists of the Key Robotic Brain, the controller, actuators, motors and host of sensors that detect motion, infrared etc to combine with the Engineering design and create automations to pick things in a supermarket or draw alphabets whatever the student designs. We have robotics modules built around open-source Arduino, Micro Bit as well as more sophisticated proprietary TXT controllers.
- **3D Printer, Scanners & Laser Engravers:** This Rapid Prototyping tool that uses additive technology prints in 3D any of the complex designs that the students design in software like Tinkercad. The 3D scanner and laser engraver provides additional DIY functionality of a maker space for creative the ones to be used in special / specific projects
- **Datobot :** This cool, compact and robust cube loaded with sensors making it mobile to fly high attached to a drone or balloon or a rover and provide continuous data and analysis for project diversity
- **Soldering Stations:** This provides opportunity for design and build of custom circuits and connections
- **Woodworking Tools:** It's an interesting maker tool that provides opportunity for the Arts to be integrated into the STEM Lab
- **Drone:** A working model of a Drone is provided for demonstrative purposes of the possibilities, learn the theory and different parts of that go into a Drone and its applications
- **DIY Material:** The are typical miscellaneous equipment of any DIY activity like scissors, cutting pliers, scotch tapes, screw drivers, hammers, drills and others
- **Chromebooks or Computers:** These are integral part of the Lab for accessing the curriculum as well providing access to the software's used in every module like Robotics, 3D Design , IoT
- **Software Tools & Technologies:** Students get to learn fundamentals like Computational Thinking, the foundation for AI to languages like Python and tools like MIT App Inventor as part of this Maker Space
- **Digital Media Tools:** Digital Story telling tools are essential skills that students will use such the cameras video and audio and its editing tools for visual communication and digital portfolios
- **Storages:** These are specialized racks to hold equipment like Robotics, Engineering, IoT both providing security, visibility and access in an organized manner
- **Design Elements:** These are various like calendar, placards, posters, etc contribute to reinforcing and rewarding innovation behaviors or towards creating an inspiring ambience

Section 3: Technical Resources : Curriculum & Resources

Our emphasis is as much on the pedagogy and curriculum to ensure learning outcomes as it is on the diversity of the equipment (kits). While for some core technology modules like Engineering Design, IoT and Robotics, we have a structured curriculum, for some of the Maker Space equipment, by design it is more Do-it-Yourself and will just have bootcamps and initial trainings.

The Creya program approach is designed to take the child through progressive levels of learning from zero awareness to being able to apply the knowledge. Creya curriculum is geared to provide opportunities for students to practice, demonstrate and get assessed on the 3 aspects of 21st century skills : *Thinking Skills* (Creative Thinking, Critical Thinking, Collaboration and Communication), *Digital Skills* and *Life Skills*.

At each grade level, there are multiple modules across different technologies that can be chosen for implementation. Typically, in an academic year, 3 modules can be done for each grade as each module runs for about 8 sessions. Each session is 70-90 minutes, typically a 2 period Block. Students work in groups of 3 with each member in a group assuming different roles with different responsibilities and these group members and roles are interchanged as they move from module to module ensuring students are exposed methodically to various aspects of collaboration and communication.

As for the Maker Space equipment like the 3D Scanner, Laser Engraver, Soldering Stations and DIY Tools, their need is on a case to case based on special needs of the activity / project or student. For these free-wheeling, special purpose, occasional use tools, Creya provides bootcamps and one-off training to teachers so they can help students on when to use these maker tools and how to use them.

Key elements of Creya approach:

- *Grade aligned:* Appropriate and separate at each grade level and provides technical and conceptual progression from Pre-K to Grade 12
- *Technology Diversity:* Provides a choice of 8-10 different technologies to choose from such as Robotics, IoT, Engineering, Coding, App Development, Arduino, 3D Design, Databots and more
- *Pedagogical Structure:* Every Module begins with a Bootcamp ensuring every child becomes familiar with the technology. The subsequent 2 sessions are guided projects which ensure that familiarity with the technology is built. The next 2 sessions are an open-ended capstone problem statement. This one helps children to ideate, design and prototype solutions for the capstone through the help of the Design Thinking Cycle.

The final session is 'How did I Do', an articulation and presentation of the learning journey by each of the 3-member student. The Module also ends with a 360-degree assessment (self, peer, teacher) on the 21st century skills using a rubric for skills such as creative thinking and problem solving. Each module also produces a digital artifact (video of the prototypes) and the physical journal that can go into the child's portfolio.

- *Journalling :* The unique feature of Creya program are its well-designed journals that make sure reflection happens for learning to become concrete and for projects to be documented well enough for them to become part of the portfolios

Section 4: Technical Resources: Installation, Training & Support

There is a 3-step process for setting up Creya STEM Labs & Maker Spaces in Schools.

The 1st step is 'Awareness and Assessment' where Creya makes the school leadership aware of our program and then also through a series of questions and visits, assesses the school environment, student numbers and any specific requirements.

This sets stage for the 2nd which is 'Planning and Procuring' whereby the school is made aware of its obligations and preparations such as teacher allocation and timetable creation materials as appropriate are procured for school, transported and the physical lab is set-up.

This 3rd and final stage is the 'Training and Implementing' whereby the Creya creates student logins for the curriculum and trains the teachers and hand holds them as they facilitate the student in the STEM Lab & Maker Space. Creya team regular visits the school for observation and training as required and provides the school leadership and sponsors with the reports on the progress of the school.

Creya has a very well defined and robust teacher **Training and Support** mechanisms. The below is the typical schedule for the Training and Support over the academic year that is hands-on:

- 3 days of on-site training before start of the program on tools, pedagogies and resources
- Every week check with teachers on phone or google meet for clarifications
- 1 Day on-site visit for observation once every 4 weeks and remediation
- 1 Day support for STEM Showcase by Students on Annual Day or Science Day
- Online support via Google meet on all working days all through the year

Resources include *Lesson Plans, Video Solutions, Progress Reports, Program Coffee Table Book Templates, Material maintenance best practices* and *Material Audit trainings*.

Just to give an idea of the training rigor, here is some of the agenda covered in initial training:

Overview of 21 st Century Skills	Introduction to Experiential Learning	Understanding STEM
Introduction to Design Thinking	Curriculum Structure & Resources	1 st Module Tool Training
STEM Classroom Practices	Student Roles & Responsibilities	360-degree Assessment
Self-Training Videos & Practice	Logbook & Answering questions	Driving 'How did I do'
Delivering Mock Class	Taking Advantage of Creya Support	Creya Teacher Network

Creya provides a comprehensive range of **resources** that complement the physical equipment:

1. Online portal account to each child to access the curriculum grade wise, module wise
2. Printed Logbook to each child one per module to journal the learnings as they work
3. Lesson plans for teachers that are very detailed to the level what to observe, instruct, explain
4. Tool and Module specific trainings for teachers as well as Design Thinking Workshops
5. Video resources that help set the context for the class or drive engagement
6. Capstone solution & design briefs to ensure teachers have solutions to the capstone problems
7. Training to teachers on-site and as well as online at regular intervals
8. Teacher observation and remedial measure report to the school leadership
9. Monthly, End of Module and Annual reports to give progress of the program
10. Material Audit templates & training to teachers to do end-of year material loss report
11. Teacher Exchange, a WhatsApp group of teachers of all Creya school teachers
12. Access to Creya partner programs for teachers and students such as IIT Madras JMT & #i3R2

Section 5: Unique Differentiators of Creya

Some of the differentiators of Creya that sets it apart from the rest of the robotic kit sellers are

- End to End service provider : *Equipment, Curriculum & Training and Resources*
- Pioneer of STEM Learning, Design Thinking, Maker Spaces in K12: *13+ years continuous presence*
- Credibility established across curriculums: *CBSE, ICSE, IB, CAIE, US, UK National Curriculum*
- Ahead of the Curve in Innovation: *In built design for Portfolio Artifacts and 360-degree Assessments*
- One stop Solution: *Robotics, IoT, 3D, Arduino, Coding, AI, App Dev, Digital Media, Drones, DIY, ,,,*
- Best Return on Investment (RoI): *Accountable Engagement and Enrichment for every rupee invested*

Section 6: References and Testimonials

Few References from schools with Creya STEM Labs:

School Name	Location	Contact Person	Designation	Contacts
Lakshmi School (TVS)	Madurai	Ms Selvi Santosham	Head - Projects	selvisantosham@tvslvs.com
Santanam Vidyalaya	Trichy	Mr Chandrasekhar	Managing Trustee	ceo@sigc.edu
Gitanjali Sr School	Hyderabad	Ms Maya Sukumaran	Principal	mayasukumaran@gitanjaliseniorschool.com
Vidyaniketan Public School	Bangalore	Mr Vijai Krishna	Director	vijai.rajagopal@vidyaniketan.edu.in
Mothers Public School	Bhubaneswar	Ms Sreejeet Patnaik	Director	Sreejeet@mothers.edu.in
GEMS Our Own School	Dubai	Ms Lalitha Suresh	Principal	lalitha.s_ois@gemsedu.com
Shining Star International	Abu Dhabi	Ms Abhilasha Singh	Principal	principal@ssis.ae
Ashoka Schools	Nashik	Mr Pramod	Principal	pramod.tripathi@ausindia.org
GEMS International	Gurgaon	Dr Amrita Vohra	Director	amrita.vohra@gemseducation.com

Section 7: Video Links to our Programs

Item	Website Link
i3 Program: High Schoolers Innovation Program	https://youtu.be/6l510omWxPM
Creya XEL: STEAM Lab & Maker Space Program	https://youtu.be/nQwwn0YQUOY?si=4noKRtxTewaMIA76
Meerkats & Mean Machines : Summer Camps	https://youtu.be/ONz_P_MwIxs?si=8MGiBjW2jqIKDcAU
IIT Madras Junior Make-a-thon Contest	https://youtu.be/BCriiKbnm3E?si=ES6yPeA5_Q0cjHeA
Company Website	https://creyalearning.com/
LinkedIn	https://www.linkedin.com/company/creya-learning/
Instagram	https://www.instagram.com/creyalearning/
Youtube	https://www.youtube.com/@Creyalearning

