## 21K School
Where Every Learner Finds Their Path

STEM LEARNING: AGE 9–12

OVERVIEW

At this stage, learners transition from guided exploration to independent innovation. They begin to work with electronics, sensors, and 3D design tools to understand how technology solves real-world problems. Through hands-on experimentation, they develop analytical skills, creativity, and teamwork while applying STEM concepts practically.

ELECTRONICS PROJECTS
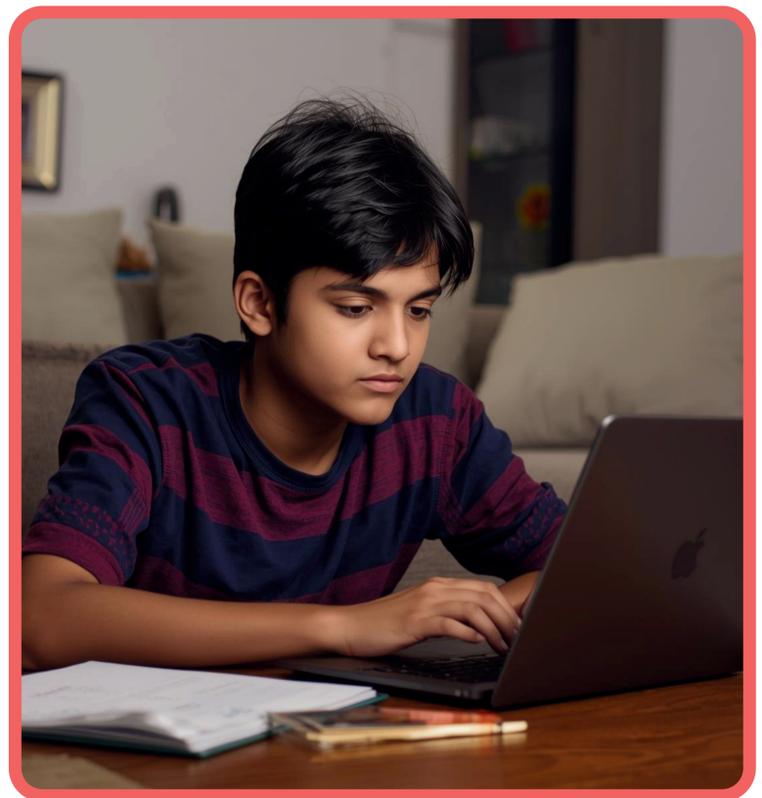
WHAT STUDENTS DO

Students design and build small electronic circuits using sensors, buzzers, and LEDs to understand how automation works.

WHY WE USE IT

Electronics kits help students visualize invisible concepts like current flow, sensors, and logic-based responses.

HOW IT RELATES TO STEM

- **Science :** Circuit and energy flow
- **Technology :** Sensors and automation
- **Engineering :** Building functional prototypes
- **Math :** Measuring and comparing voltage and timing

IMPACT ON CHILDREN

Fosters curiosity, problem-solving, and hands-on understanding of technology.

LEARNING OUTCOMES

- Identify how sensors like LDR and PIR work.
- Design simple alarm or lighting circuits.
- Explain automation through sensor feedback.
- Collaborate to test and improve circuit designs.

NOVEMBER PROJECTS

- Automatic Street Light (Nov 2): Learning about Light sensor and Light theory
- Theft Alarm (Nov 4): Learning about how detection works and light rays works
- Clap Switch (Nov 5): learning about how sound waves work
- Sound Alarm (Nov 6): Learning about sound sensor works
- Baby Crying Detection (Nov 8): learning about baby crying detection using sensors.
- Water Overflow Alert (Nov 9): learning How waterflow can be detected.
- Movement Detection Alarm (Nov 11): learning about how movement detected using sensor.
- Moisture Detection Alarm (Nov 12): How water sensor works.
- Sound Detection Alarm (Nov 13): how sound can be detected.
- Night-Activated Fan (Nov 26): learning about how light ray's work.
- Rain Alert (Nov 28): learn how can we predict rains and changes.
- Smart Fan (Nov 29): learning how motor works and fan rotate.
- Doorbell (Nov 30): learning about how a doorbell works in reality.

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3D PRINTING PROJECTS

WHAT STUDENTS DO
Students learn 3D design using beginner-friendly CAD tools and bring their creations to life using 3D printers.

WHY WE USE IT
3D printing transforms imagination into reality, teaching spatial reasoning and iterative design thinking.

HOW IT RELATES TO STEM
- **Science :** Understanding material properties
- **Technology :** Digital modeling
- **Engineering :** Product design and fabrication
- **Math :** Geometry and dimensions

IMPACT ON CHILDREN
Enhances creativity, precision, and hands-on design skills for real-world applications.

LEARNING OUTCOMES
- Use CAD tools to create simple 3D models.
- Understand design-to-print workflows.
- Apply creative thinking to practical challenges.
- Develop patience and fine motor coordination through model building.

NOVEMBER PROJECTS
- 3D Printing – Keychain (Nov 14)
- 3D Printing – Ring (Nov 15)
- 3D Printing – Diya (Nov 16)
- 3D Printing – Coffee Mug (Nov 18)
- 3D Printing – Bag Strap (Nov 19)
- 3D Printing – Phone Stand (Nov 20)
- 3D Printing – Animal Faces (Nov 21)
- 3D Printing – Gear Toy (Nov 22)
- 3D Printing – Robot (Nov 23)
- 3D Printing – Bag Strap (Nov 25)