केन्द्रीय विद्यालय संगठन

KENDRIYA VIDYALAYA SANGATHAN

आंचलिक शिक्षा एवं प्रशिक्षण संस्थान, मैसूर

ZONAL INSTITUTE OF EDUCATION AND TRAINING, MYSURU

SKILL ENRICHMENT IN VOCATIONAL EDUCATIONN

PRACTICAL LEARNING WITH ATL AND STEAM FOR TGT(WE) – BENGALURU REGION

11.08.2025 TO 15.08.2025

DIY
AI Applications
Kaushal Bodh
IoT & Robotics

ESP 32
Games and Storytelling using Scratch
Arduino Projects
Hydroponics

COURSE DIRECTOR

MS MENAXI JAIN

DEPUTY COMMISSIONER KVS &
DIRECTOR ZIET MYSURU

ASSOCIATE COURSE DIRECTOR

SH. DAVINDER SINGH

PRINCIPAL
KV CHAMARAJANAGAR

RESOURCE PERSONS

SHRI S. A. BHENDE
TGT (WE), PM SHRI KV NO-2 BELAGAVI

SHRI PRASHANT KUMAR
TGT (WE), K V KRISHNARAJAPURAM

COURSE COORDINATOR

D. SREENIVASULU
TA MATHS, ZIET MYSURU

DIRECTOR'S MESSAGE

It is with great pleasure that I present the e-Manual for the 5-Day Offline Workshop on "Skill Enrichment in Vocational Education: Practical Learning with ATL & STEAM" designed for TGTs (Work Education). This workshop reflects our continued commitment to fostering skill-based, innovative, and experiential learning in alignment with the goals of the National Education Policy (NEP) 2020 and the National Curriculum Framework for School Education (NCF-SE).

In today's rapidly evolving educational landscape, integrating Vocational Education with platforms like Atal Tinkering Labs (ATL) and STEAM (Science, Technology, Engineering, Arts, and Mathematics) is critical for equipping students with real-world competencies, problem-solving abilities, and a spirit of innovation. This workshop aims to empower Work Education teachers with hands-on tools, interdisciplinary strategies, and practical methodologies to transform classrooms into dynamic spaces of creativity and applied learning.

I extend my heartfelt appreciation to the Associate Course Director, expert Resource Persons, participants, Training Associates, and the Workshop Coordinator for their enthusiastic participation and thoughtful contributions. Their collective efforts have made this initiative a rich and meaningful professional learning experience.

Wishing you all an enriching and transformative journey ahead!

MENAXI JAIN
DIRECTOR
ZIET MYSURU

LIST OF THE PARTICIPANTS

S.No	Name of the Teacher	Designation	Name of the KV	Region
1	PALLAVI SINGH	TGT(WE)	KV DRDO	BENGALURU
2	A ANJANEYULU	TGT(WE)	PM SHRI KV HEBBAL	BENGALURU
3	ANJALI KUMARI	TGT(WE)	KV IISC	BENGALURU
4	K H SHIVAKUMAR	TGT(WE)	PM SHRI KV NO 1 AFS JALAHALLI WEST	BENGALURU
5	ABHISHEK PRAJAPAT	TGT(WE)	PM SHRI KV NO. 2 JALAHALLI EAST	BENGALURU
6	DIKSHA	TGT(WE)	KV MEG & CENTRE	BENGALURU
7	ANUJ KUMAR	TGT(WE)	PM SHRI KV MG RAILWAY	BENGALURU
8	HARIKUMAR A	TGT(WE)	KV NAL	BENGALURU
9	JOYCE SEBASTIAN	TGT(WE)	KV AFS YELAHANKA	BENGALURU
10	GUNARI VEERA PRASAD	TGT(WE)	PM SHRI KV CRPF YELAHANKA	BENGALURU
11	D MANOHAR	TGT(WE)	KV RAIL WHEEL FACTORY, YELAHANKA	BENGALURU
12	SUDHAN KUMAR	TGT(WE)	KV RAILWAY YESHWANTHPUR	BENGALURU
13	SHIVAPPA KALLIMANI	TGT(WE)	PM SHRI KV NO.3 BELAGAVI	BENGALURU
14	BENTIPALLI SEKAR	TGT(WE)	PM SHRI KV K. BALLARI	BENGALURU
15	KISTAIAH AUSALI	TGT(WE)	AFS BIDAR	BENGALURU
16	MANJUNATH Y	TGT(WE)	KV DONIMALAI	BENGALURU
17	ROHIT DARIYA	TGT(WE)	PM SHRI KV CHAMARAJANGAR	BENGALURU
18	ANNAPURNA S PATTAR	TGT(WE)	PM SHRI KV DAVANGERE	BENGALURU
19	PANGA GANGADHAR	TGT(WE)	PM SHRI KV GANGAVATHI	BENGALURU
20	GUGULOTHU RAMU	TGT(WE)	KV GAURIBIDANUR	BENGALURU
21	CHANDRA R. K.	TGT(WE)	PM SHRI KV KALABURAGI	BENGALURU

22	VAMSHA DEEPA N	TGT(WE)	PM SHRI KV MYSURU	BENGALURU
23	NEHA PAL	TGT(WE)	PM SHRI KV SHIVAMOGGA	BENGALURU
24	SARITA	TGT(WE)	KV VIJAYAPURA	BENGALURU
25	VANDANADÁ AGARWAL	TGT(WE)	PM SHRI KV ASC CENTRE	BENGALURU

GROUPS

SL	NAME OF TEAM	CAPTAIN	MEMBERS
1	SKILLFORCE	SUDHAN KUMAR	1. ANUJ KUMAR 2. A ANJANEYULU 3. ANJALI KUMARI 4. K H SHIVAKUMAR
2	INNOVATORS	GUNARI VEERA PRASAD	1. ABHISHEK PRAJAPAT 2. DIKSHA 3. NEHA PAL 4. PALLAVI SINGH 5. HARIKUMAR A
3	THINKMAKERS	JOYCE SEBASTIAN	1. SHIVAPPA KALLIMANI, 2. BENTIPALLI SEKAR, 3. KISTAIAH AUSALI, 4. MANJUNATH Y
4	TECHBUILDERS	ROHIT DARIYA	1. VANDANA AGGARWAL 2. ANNAPURNA S PATTAR, 3. PANGA GANGADHAR, 4. GUGULOTHU RAMU
5	VISIONCRAFTERS	D MANOHAR	1. MANTESH GUDIMANI, 2. CHANDRA R. K., 3. VAMSHA DEEPA N 4. SARITA

Time Table

DATE	9.00-9.45 am	9.30 am -11.15 am	11.15am - 11.30am	11.30am- 1.15pm	1.15pm - 2.15pm	2.15pm - 3.45pm	3.45pm- 4.00pm	4.00pm - 5.30 pm
11.08.25	Inauguration	Understanding Vocational Skills for Work Education, Importance of vocational skills in Modern education and sample Portfolio- By Mr Prashant Kumar	TEA BREAK	Kaushal Bodh: Vocational Education & Assesment - By Mr G V Prasad	LUNCH BREAK	Integrating 21st centuary skills in vocational education - By Mr. Harikumar A	TEA BREAK	Hands on Generative AI Tools - By Mr. Joyce Sabestian
12.08.25	Assembly	Tools and Equipments for Vocational Lab- By Mr S A Bhende		Overview of ATL and Project Demonstration- By Mr Manohar		Home Automation through retrofit wiring - By A Anjaneyulu		ESP 32 and Hands on Activities - By Mr. Joyce Sabestian
13.08.25	Assembly	Hands on activities - line follower rover, Bluetooth controlled car and IOT applications using Node MCU. By - Rohit Daria and Abhishek Prajapat		Effective Implementation, Documentation, and Evaluation of Projects and Portfolios under the NCERT Kaushal Bodh Book - By *Dr. C. S. Anupama*		Hydroponics - By Mr D Manohar		Projects with aurdino uno- By Mr. Panga Gangadhar
14.08.25	Assembly	Working with Scratch- Game and Story telling through Animation - By Prashant Kumar		Hands on Game development on Scrach. By Prashant Kumar		Traffic Signal Project based on aurdino uno- Mr Panga Gangadhar - By Mr. Panga Gangadhar		Kitchen Garden and Plant Nursery. By - Sh S. A Bhende/ Sh Kishtaiya Ausali
15.08.25	Assembly	"Gardening Tools & Kitchen garden" By Sh. SA Bhende / Plant Nursery - By Sh Kishtaiya Ausali		"Vocational lab and lab activities" - By Mr G V Prasad		AI, AI Agents and Agentic AI - By Prashant Kumar		Closing Session

INTRODUCTION:

A five-day offline workshop titled *"Skill Enrichment in Vocational Education: Practical Learning with ATL & STEAM"* was conducted from 11th to 15th August 2025 for TGT (Work Experience) teachers. The workshop aimed to strengthen participants' pedagogical approaches, enhance hands-on skills, and integrate Atal Tinkering Lab (ATL) and STEAM-based learning methodologies into vocational education. In alignment with the National Education Policy (NEP) 2020, the programme emphasized practical, experiential, and interdisciplinary learning to improve classroom engagement and foster skill development.

During the workshop, participants explored innovative teaching strategies, activity-based learning modules, and effective assessment techniques designed to cultivate creativity, problem-solving, and 21st-century competencies among students. The programme was meticulously planned and executed under the guidance of esteemed leadership, with Ms. Menaxi Jain, Director of ZIET News, serving as Course Director, Sh. Davinder Singh, Principal of KV Chamrajnagar, as Associate Course Director, and Sh. D. Sreenivasulu, TA (Mathematics) at ZIET Mysuru, as Course Coordinator. The resource persons, Sh. S. A. Bhende, TGT (WE), KV Belagavi Cantt, and Sh. Prashant Kumar, TGT (WE), KV Krishnarajapuram, facilitated the sessions.

The workshop was attended by twenty-five participants from the region, bringing the total number of attendees, including organizers, to twenty-seven (Annexure 1). The programme focused on fostering a standardized and optimized approach to integrating ATL and STEAM-based practical learning into vocational education. To ensure active collaboration and effective utilization of time, participants were evenly divided into five groups. Each group was pre-assigned specific pedagogical themes and practical demonstration activities aligned with ATL and STEAM concepts, which enabled hands-on engagement, peer learning, and the development of innovative classroom strategies.

Objectives of the Workshop

The primary objectives of the workshop were centered on enhancing teachers' understanding of vocational education, developing practical competence with tools and technology, and integrating STEAM and project-based learning into classroom teaching. Firstly, the workshop aimed to strengthen participants' conceptual clarity regarding vocational education, including its aims, scope, and its role in nurturing 21st-century skills among students. Teachers were equipped with knowledge of diverse pedagogical methodologies, activity-based learning strategies, and effective assessment

techniques tailored specifically for vocational subjects. Participants were also familiarized with the *Kaushal Bodh Vocational Education Book*, gaining insights into its structure, content, and practical ways to integrate it effectively into classroom teaching for Classes VI–VIII. The sessions promoted innovative teaching practices that encourage creativity, critical thinking, and problem-solving skills in students.

Secondly, the workshop focused on developing hands-on competence with tools, machines, and Atal Tinkering Lab (ATL) equipment. Participants received experiential training in the safe operation and practical use of essential tools, machines, and laboratory equipment required for vocational education. The programme aimed to build participants' confidence in guiding students through hands-on activities and technical demonstrations. Modern technological resources, such as IoT devices, sensors, microcontrollers (Arduino, ESP32), and AI-enabled tools, were introduced to enable teachers to mentor students in designing and executing innovative projects. Emphasis was placed on safety standards, troubleshooting techniques, and sustainable practices while working with equipment.

Finally, the workshop emphasized the integration of STEAM (Science, Technology, Engineering, Arts, and Mathematics) and project-based learning into teaching practices. Strategies were demonstrated to meaningfully connect STEAM concepts with vocational education to enhance interdisciplinary learning. Teachers were encouraged to design and implement project-based learning activities that bridge theoretical knowledge with practical applications. Real-life examples, including smart home automation, hydroponics-based farming, coding for problem-solving, and creative design projects, were showcased to reflect sustainable and future-ready solutions. The workshop aimed to foster a classroom environment where students actively participate, collaborate, and innovate through hands-on projects that mirror real-world challenges.

DAY WISE REPORTS

Day 1 : 11.08.2025

The first day of the workshop commenced with a prayer, creating a serene and harmonious atmosphere for the programme. Mr. D. Sreenivasulu, TA (Mathematics) and Course Coordinator, extended a warm welcome to all participants and formally introduced the dignitaries and resource persons.

The inaugural session was graced by the esteemed presence of Hon'ble Deputy Commissioner, Madam Ms. Menaxi Jain; Sh. Davinder Singh, Principal of KV Chamarajanagar and Associate Course Director; Mr. S. A. Bhende, Resource Person; and Mr. Prashant Kumar, Resource Person. Sh. Davinder Singh provided a brief overview of the workshop, highlighting its objectives, schedule, and anticipated learning outcomes.

Following this, Hon'ble Deputy Commissioner, Madam Ms. Menaxi Jain, addressed the gathering and engaged participants in an interactive session. She shared her vision for the effective implementation of vocational education in Kendriya Vidyalayas, emphasizing the importance of blending innovation with practicality in classroom teaching. In her inspiring remarks, Madam Jain encouraged participants to adopt creative and experiential teaching practices, integrate skill-based learning into regular classroom activities, and focus on nurturing problem-solving abilities among students. She highlighted that vocational education, when implemented effectively, can play a pivotal role in fostering creativity, hands-on competence, and holistic development, thereby preparing learners to meet the demands of a rapidly evolving world.

The morning session was conducted by Mr. Prashant Kumar, Resource Person, on "Understanding Vocational Skills for Work Education: Importance of Vocational Skills in Modern Education and Sample Portfolio". The session provided participants with insights into the significance of vocational education in the contemporary learning environment. Mr. Kumar emphasized the development of practical competencies, hands-on skills, and the preparation of student portfolios to document learning outcomes effectively.

Mr. G. V. Prasad conducted a session on "Kaushal Bodh: Vocational Education & Assessment". This session familiarized participants with the structure and content of the Kaushal Bodh Vocational Education Book and highlighted effective methods for integrating it into classroom instruction.

Emphasis was given to assessment techniques, documentation of learning, and strategies to track students' skill development.
The afternoon session was led by Mr. Harikumar A and focused on "Integrating 21st Century Skills in Vocational Education". Participants were guided on incorporating critical thinking, creativity, collaboration, and problem-solving skills into vocational learning activities. Real-life examples and interactive discussions encouraged participants to design lessons that bridge theoretical knowledge with practical application.
The final session of the day provided a hands-on experience with Generative AI Tools, facilitated by Mr. Joyce Sabestian. Teachers explored modern AI-based tools and applications relevant to vocational education, gaining practical skills in leveraging technology to enhance student engagement and learning outcomes.
Overall, Day 1 combined conceptual understanding, practical training, and technology integration, setting a strong foundation for the subsequent workshop days. Participants actively engaged in discussions, asked questions, and reflected on ways to implement innovative teaching practices in their respective schools.

Day 2 (12.08.2025) Report

The second day of the workshop began with the morning assembly presented by Group 1. The programme included a prayer, thought for the day, news updates, a special item, and a recap of the previous day's proceedings. This was followed by an orientation by Sh. D. Sreenivasulu, TA (Mathematics), ZIET Mysuru, who outlined the day's schedule and training expectations.
Sh. Davinder Singh, Principal and Associate Course Director, addressed the participants and highlighted the vital role of Work Education teachers in vocational learning. He emphasized the need to align vocational education with the formal education system, particularly through the effective implementation of Kaushal Bodh.

Mr. S. A. Bhende, TGT WE, KV No.2 Belagavi, conducted a detailed session on the systematic arrangement and display of tools and equipment in vocational labs. He covered materials across diverse domains such as gardening, carpentry, electrical, plumbing, electronics, Arduino, ESP32, and robotics. His insights provided participants with a clear roadmap to organize and optimize vocational labs effectively.
Special Glimpse: Mega Tinkering Day
Participants witnessed live glimpses of the nationwide Mega Tinkering Day programme. This exposure to large-scale innovation practices offered fresh ideas and inspiration for fostering creativity in schools.

Mr. D. Manohar explained the establishment of ATL facilities and the opportunities they provide through projects and competitions. He also demonstrated a PIR Motion Sensor project, highlighting its practical applications within ATL activities.
Mr. Anjaneyulu, TGT WE, PM SHRI KV Hebbal, delivered an engaging session on retrofit wiring techniques using sensors and Google Assistant. His project integrated IR and PIR sensors into a

home automation system. The demonstration received appreciation from participants, resource persons, and the Associate Course Director.

Mr. Joyce Sebastian, TGT WE, PM SHRI KV AFS, introduced the ESP32 microcontroller and showcased IoT-based applications. Participants engaged in coding and circuit simulation to control LEDs, explored the WOKWI Simulator, and observed a weather monitoring project using DHT11 and ESP32. The hands-on session enhanced teachers' confidence in IoT integration.

Conclusion
The day's proceedings were coordinated by Mr. Prashant Kumar, Resource Person and TGT WE, KV Krishnarajapuram. Day 2 concluded successfully, blending theoretical knowledge, practical demonstrations, and live project experiences. Participants gained comprehensive exposure to vocational lab practices, ATL innovations, home automation systems, and IoT applications, leaving them motivated to implement similar projects in their schools.

Day 3 (13.08.2025)

The third day of the workshop began with the morning assembly presented by Group 2. The team led the proceedings with a prayer, thought for the day, news updates, and a recap of the previous sessions, setting a positive and enthusiastic tone for the day.
The session was graced by the presence of Ms. Menaxi Jain, Deputy Commissioner & Director, ZIET Mysuru, who interacted warmly with the participants. She enquired about their well-being, the quality of stay and food arrangements, and their overall learning experience from the previous two days. She further motivated the participants to implement the Smart Home Automation Retrofit Project in their schools and encouraged them to actively engage students and teachers in exploring opportunities provided by ATL, Vocational Education (VE), and Work Education (WE) labs.

Hands-on Activities- Line Follower Rover, Bluetooth-Controlled Car, and IoT Applications using NodeMcu
The session, conducted by Mr. Abhishek Prajapath (KV No. 2 Jalahalli) and Mr. Rohit Dariya (KV Chamarajanagar), began with step-by-step guidance on installing USB drivers and understanding the HC-05 Bluetooth Module. Participants explored its configuration, pin connections, and working principles. The hands-on wiring and coding activities enabled them to successfully build Bluetooth-controlled cars—an engaging project that highlighted the impact of project-based learning.

Effective Implementation, Documentation, and Evaluation of Projects and Portfolios under the NCERT Kaushal Bodh Book
Dr. C. S. Anupama (WE Art & Crafts, DMS RIE Mysuru) emphasized the philosophy of Learning by Doing and the role of experiential learning in the NCERT Kaushal Bodh programme. Through a vibrant, activity-based session, participants engaged in block printing and tie & dye making. The session not only promoted creativity but also demonstrated how vocational education can be integrated with art and craft.

Hydroponics

Mr. D. Manohar (TGT WE, KV RWF Yelahanka, Bengaluru) delivered a detailed presentation on hydroponics, explaining its fundamental concepts, cultivation systems, and significance in sustainable agriculture. His session encouraged participants to explore eco-friendly alternatives that can be effectively implemented in schools as part of vocational projects.

Projects with Arduino Uno

The session on Arduino Uno, conducted by **Mr. Panga Gangadhar**, offered participants an in-depth, hands-on learning experience with microcontroller-based applications. Beginning with the basics of Arduino, he explained the hardware components, pin configurations, and coding environment. Participants were guided step by step through simple circuits such as controlling LEDs, followed by more advanced applications that integrated sensors and real-world problem-solving. The practical demonstrations highlighted how Arduino can be effectively used to teach programming, electronics, and automation in schools. By the end of the session, participants gained greater confidence in designing and implementing Arduino-based projects, making the session both highly informative and inspiring for classroom use..

Bluetooth Car Practical and Competition

The concluding activity allowed participants to refine their Bluetooth-controlled car projects, culminating in a lively Car Race Competition. The event fostered teamwork, innovation, and healthy competition. It was witnessed by Ms. Menaxi Jain along with the faculty members of ZIET Mysuru, who appreciated the creativity and enthusiasm displayed by the participants.

Conclusion

The third day concluded on a high note with remarks from Sh. Davinder Singh, Principal, KV Chamarajanagar & Associate Course Director, who commended the participants for their active engagement and dedication. The sessions offered a balanced blend of technical skills, creative expression, and practical applications, ensuring that participants not only gained knowledge but also experienced the joy of hands-on learning.

Day 4 (14.08.2025)

The fourth day of the workshop commenced with a morning assembly conducted by Group 3, which set a positive and energetic tone for the day's proceedings.

Special Address by Director, ZIET Mysuru

Following the assembly, Smt. Menaxi Jain, Director, ZIET Mysuru, delivered an insightful talk on implementing hands-on activities in schools. Referring to projects such as the Bluetooth-controlled car, she emphasized strategies for guiding students in exploring practical learning and integrating innovative activities into classroom practices.

Subsequently, Sh. D. Sreenivasulu, TA (Mathematics), ZIET Mysuru, engaged the participants with a mathematical anecdote, illustrating how Aryabhata referenced his own date of birth in relation to the Kalyuga timeline—adding both historical depth and intellectual curiosity to the audience.

The day's technical journey began with Sh. Prashant Kumar, TGT (WE), KV KR Puram, who introduced participants to Scratch, a block-based visual programming platform. He clarified essential programming concepts and demonstrated how Scratch can be used to nurture logic, problem-solving, and creativity among students.

Continuing with Scratch, Sh. Prashant Kumar guided participants through hands-on game development. They designed interactive projects step by step, discovering how game-based learning can foster computational thinking and actively engage learners in classrooms.
In another engaging session, Sh. Panga Gangadhar demonstrated the creation of a traffic light system using Arduino Uno. Teachers practiced coding for LEDs, sequencing traffic signals, and simulating real-world traffic control. The activity highlighted how electronics and coding can be seamlessly integrated into STEM-based vocational projects.

The focus then shifted to sustainability, with Sh. S. A. Bhende, TGT (WE), KV No. 2 Belagavi, and Sh. Kistaiah Ausali leading a session on kitchen gardens and plant nurseries. They emphasized eco-friendly practices, explaining objectives, soil preparation, vermicomposting, seed sowing, necessary tools, and techniques for effective nursery management.
Complementing these discussions, participants presented their own innovative projects:

- Ms. Pallavi Singh showcased an IR sensor–based laser beam project.
- Ms. Vandana Agarwal displayed a decorative LED lighting project.
- Sh. Shiv Kumar presented eco-friendly plates crafted from paper.

These participant-led demonstrations highlighted creativity, sustainability, and the integration of vocational skills into practical contexts.

Conclusion
Day 4 offered participants a diverse blend of experiences—ranging from digital creativity through Scratch programming and electronic applications with Arduino to sustainable practices in gardening and innovative participant-led projects. These sessions reflected the multifaceted scope of vocational education, where technology, sustainability, and creativity converge.
The day concluded with closing remarks by Sh. Davinder Singh, Principal, PM Shri KV Chamarajanagar & Associate Course Director, who encouraged participants to adopt these practices in their schools and ensure vocational education remains hands-on, innovative, and impactful in shaping students' holistic development.

Day 5 (15.08.2025)

Independence Day Celebration and Workshop – Day 5
Since the final day of the workshop coincided with Independence Day, all organizers of ZIET and participants gathered at 8:30 a.m. to celebrate the occasion. Ms. Menaxi Jain, Director, ZIET Mysuru, and Mr. Davinder Singh, Principal, KV Chamarajanagar & Associate Course Director, graced the event and addressed the gathering.

The celebration featured a solo patriotic song by Mr. Anuj Kumar, followed by a group song performed by the women participants. The programme concluded with a vote of thanks delivered by Mr. Prashant Kumar, TGT WE, KV KR Puram, Bengaluru.

Assembly Session

The morning assembly was conducted by Group 4 (Tech Builders). The group presented a special item dedicated to Independence Day and shared highlights from the previous day's sessions.

School Kitchen Garden

Sh. S. A. Bhende, TGT WE, KV No.2 Belagavi, discussed the objectives of a school kitchen garden, the tools and equipment required, soil preparation, and vermicomposting. He also explained seed sowing, transplanting seedlings, and planning techniques. The session closely followed the Kaushal Bodh textbook for Class VI and offered practical strategies for implementing kitchen gardens in schools.

Plant Nursery

Sh. Kistaiah Ausali explained the process of establishing and managing a plant nursery. He highlighted the steps for nursery management, suitable plant examples, and methods to maintain eco-friendly nurseries in limited spaces. The session concluded with practical insights into plant propagation.

Recycling Plastic – Making a Rotating Bird

KV No.1 Jalahalli, Bengaluru, demonstrated how to make a rotating bird using old pens and refills. The activity emphasized creative reuse of discarded plastic waste to create decorative, wind-driven models, promoting environmental awareness and innovation.

LCD Interfacing with Arduino and Vocational Lab Setup

Sh. G. V. Prasad, KV CRPF Yelahanka, Bengaluru, conducted a practical session on interfacing a 16x2 Liquid Crystal Display (LCD) with Arduino to display text and data. He also guided participants on establishing vocational labs, outlining required equipment and applications of various tools.

AI Frameworks and Applications (AI, AI Agents, and Agentic AI)

Mr. Prashant Kumar, TGT WE, KV KR Puram, Bengaluru, introduced participants to AI frameworks, including voice-based ChatGPT interactions. A practical exercise demonstrated adding names to photos using HTML coding, highlighting simple yet effective ways to integrate AI and digital tools into teaching practices.

SESSIONS

UNDERSTANDING VOCATIONAL SKILLS FOR WORK EDUCATION

Mr. PRASHANT KUMAR
TGT(WE)
KV KR PURAM

➢ Understanding Vocational Skills in Work Education

Vocational skills form the foundation of Work Education (WE), equipping learners with practical abilities, technical know-how, and problem-solving competencies. These skills help students connect theoretical knowledge with real-life applications and prepare them for the world of work.
Work Education emphasizes:

- Hands-on learning through tools, machines, and projects.
- Skill-building that supports employability, entrepreneurship, and life-long learning.
- Values of dignity of labour, teamwork, and responsibility.

➢ Importance of Vocational Skills in Modern Education

In the rapidly evolving 21st century, vocational skills have become a crucial pillar of holistic education. They:

- Bridge the gap between education and employability.
- Promote experiential learning and enhance creativity.
- Foster self-reliance, problem-solving, and innovation among learners.
- Support integration of STEAM (Science, Technology, Engineering, Arts, Mathematics) with real-life applications.
- Enable students to appreciate the value of physical work and sustainable practices.

Vocational skills not only empower students to pursue diverse career pathways but also develop their capacity to contribute meaningfully at home, in society, and in the workplace.

➢ Curricular Goals as per Kaushal Bodh

The NCERT's *Kaushal Bodh* framework identifies four Curricular Goals (CGs):

- CG-1: Develop in-depth basic skills and allied knowledge of work and associated materials/procedures.
- CG-2: Understand the place and usefulness of vocational skills and vocations in the world of work.
- CG-3: Develop essential values while working across areas.
- CG-4: Develop basic skills and allied knowledge to run and contribute to a home.

4. Learning Outcomes (Sample)
CG-1: Skills and Procedures

- Selects tools appropriate for a specific task.
- Uses tools correctly to complete a task.
- Demonstrates stepwise processes for task completion.
- Develops time-based plans for tasks.
- Prepares materials and equipment for use.
- Follows safety protocols.

CG-2: Understanding Vocation

- Explains the importance of vocations in the world of work.
- Identifies personal interests in vocational areas.
- Demonstrates how prior knowledge supports tasks.
- Identifies quality and quantity criteria for evaluating products.

CG-3: Values in Work

- Observes and asks relevant questions during demonstrations.
- Shows respect for people engaged in physical labour, irrespective of gender.
- Collaborates with peers and helps during difficulties.
- Revisits/reworks tasks for improvement.
- Explores alternative uses of tools and materials.
- Shows willingness and enthusiasm for physical work.

CG-4: Contribution at Home

- Identifies vocational skills relevant to home settings.
- Applies basic skills for daily life tasks (gardening, repairs, cooking, etc.).

➢ Mnemonic for Easy Recall

Perfect Actions Make Everyone Appreciate Every Work's Value

- Perfect → Performs procedures (CG1)
- Actions → Approaches tasks (CG1)
- Make → Maintains and handles (CG1)
- Everyone → Explains contribution (CG2)
- Appreciate → Applies skills (CG2)
- Every → Evaluates and quantifies (CG2)
- Work's → Work values (CG3)
- Value → Vocational skills at home (CG4)

➢ Portfolio Development (Sample Framework)

A student portfolio in vocational education is a systematic record of learning, demonstrating progress in skills, creativity, and reflection. A sample portfolio may include:

1. Personal Profile – Name, class, school, vocational interest.
2. Learning Goals – Skills to be developed during the year.
3. Task Records – Stepwise documentation of hands-on projects with photos/sketches.
4. Reflection Notes – What was learned, challenges faced, improvements made.
5. Assessment Rubrics – Based on curricular goals and learning outcomes.
6. Feedback – From teachers and peers.

7. Showcase of Work – Completed products, models, or project outcomes.

This portfolio encourages self-assessment, creativity, and ownership of learning while serving as an evaluation tool for teachers.

- Assessment and Evaluation (as per NCERT Guidelines)

- Weightage Distribution:
  - *Practical Work / Hands-on Activities:* 60%
  - *Portfolio / Project Records:* 20%
  - *Viva-Voce / Oral Reflection:* 20%
- Evaluation Focus Areas:
  - Correct use of tools and processes.
  - Creativity and problem-solving.
  - Collaboration and teamwork.
  - Safety and responsible handling.
  - Reflection on learning and values acquired.

Mode of Assessment	Weightage
Written Test	10%
Oral Presentation/Viva Voce	30%
Activity Book	30%
Portfolio	10%
Teachers' Observations during Activities	20%

Development	Demonstrates exceptional mastery of vocational skills, with consistent improvement and a high level of proficiency.	Shows strong hands-on skills, completes practical projects with precision and creativity.	Good foundational skills, completes practical projects with some creativity.	Demonstrates basic skills, completes projects with assistance.	Struggles with hands-on tasks and needs significant assistance.
Project-Based Assessment	Independently completes complex projects with creativity, quality, and timeliness. Demonstrates critical thinking and problem-solving.	Completes projects from planning to execution with a clear, structured presentation.	Completes projects with some organization, presentation is mostly clear.	Requires guidance in project planning and execution, presentation is basic.	Struggles with project completion and organization.
Career Awareness	Demonstrates excellent understanding of various career paths related to their vocational skills. Actively seeks opportunities for career exploration.	Demonstrates a well-rounded understanding of career options related to vocational skills.	Shows a good awareness of career options, with basic understanding of skill applications.	Limited awareness of career paths, lacks insight into real-world applications.	Minimal understanding of career options and vocational skills applications.
Teamwork, Collaboration, and Social Skills	Actively contributes to group work, communicates effectively, resolves conflicts, and supports others in achieving goals.	Actively participates in group activities, showing excellent teamwork and social, ethical & interaction skills.	Participates well in group activities with some teamwork skills.	Limited participation in group activities, shows basic social skills.	Avoids group activities, struggles with social interaction.
Self and Peer Reflection	Consistently demonstrates insightful self-reflection, identifies strengths and areas for improvement, and sets goals for growth. Actively provides constructive feedback to peers.	Provides insightful and constructive feedback on their own and peers' work; shows a strong understanding of artistic intent and quality.	Offers thoughtful feedback but may lack depth; reflects on their own work with some guidance.	Provides basic feedback; may need prompts to reflect on their work or the work of others.	Rarely reflects on their work or others'; provides minimal or no feedback and shows limited understanding of artistic intent.

Criteria	Excellent (3)	Good (2)	Needs Improvement (1)
Safety	Wears safety gear & follows all safety rules	Minor safety lapse	Unsafe practices

Tool Use	**Handles soldering iron correctly**	**Minor mistakes**	**Poor handling**
Joint Quality	Strong, clean joints	Works but messy	Weak/faulty joints
Component Placement	Correct & neat	Slightly off	Wrong placement
Cleanup	Cleans tools & area	Partial cleanup	No cleanup

Sample Project Assessment Rubric

Project Details

Project Name:	
Class:	
Date:	

Learning Outcomes

Assessment Rubric

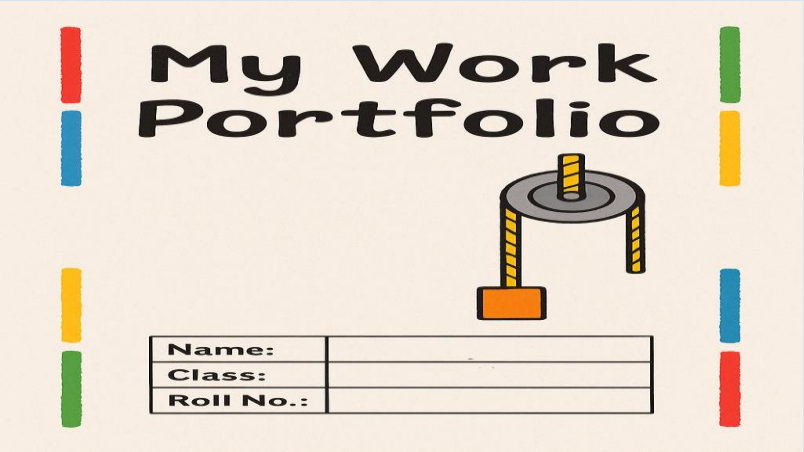
Criteria	Excellent (3)	Good (2)	Needs Improvement (1)	Score
Criterion 1				
Criterion 2				
Criterion 3				
Criterion 4				

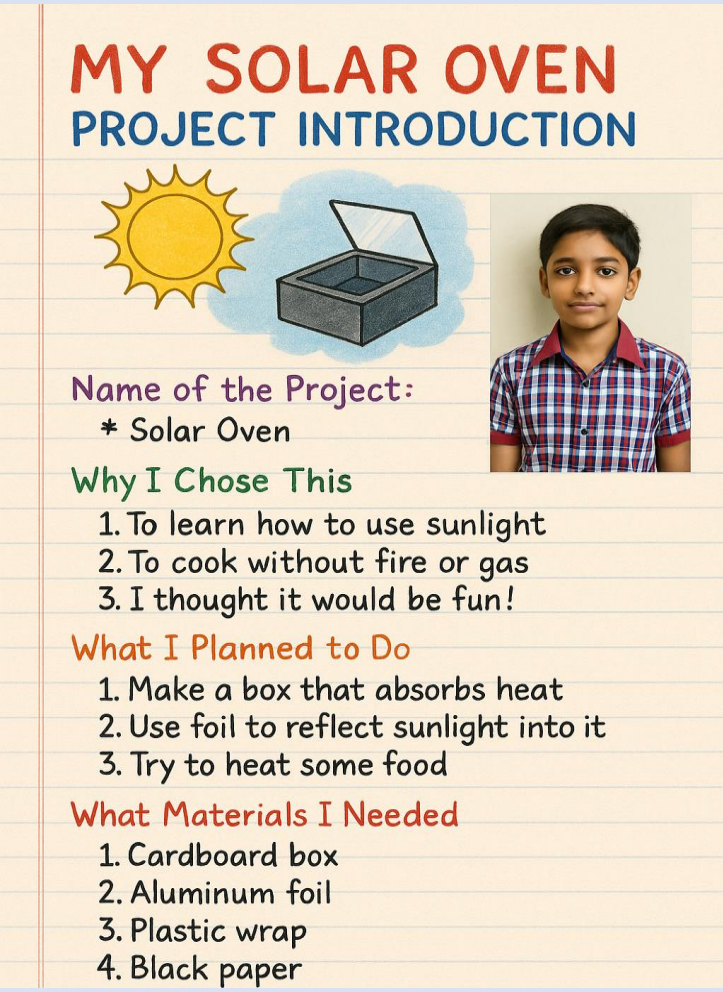
Total Score:

Teacher Comments

Suggestive Components of Portfolio :-

- 📄 Cover page with student details and title
- 📸 Step-by-step actions with photos/sketches
- 🗣️ Reflections, learning, challenges
- ⭐ Peer and teacher feedback with remarks
- 🧺 Optional add-ons: poems, sketches, certificates





STEPS I FOLLOWED

Wrapped aluminum foil inside box

Covered top with plastic wrap

Opened lid, found melted cheese

Any help taken

Dad held plastic wrap in place while I taped it down

Any mistakes and how they were fixed

Plastic came loose. Taped it again more carefully

Melted cheese

Photo Evidence

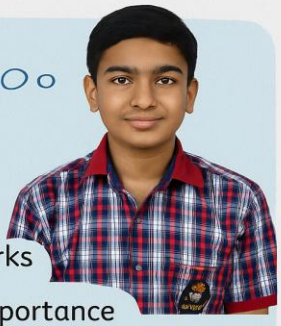
Fixing the base

Attaching the reflector

Testing the solar oven

What I Learned

My reflection



- I learned how a solar oven works
- I learned the importance of insulation
- I learned to be patient and careful
- I solved the problem of finding the right angle for the oven

What I'd do better next time

I'd adjust the oven more frequently

I'd adjust the oven more frequently

Peer 1: Riya

I liked your creative design.

Peer 2: Aman:

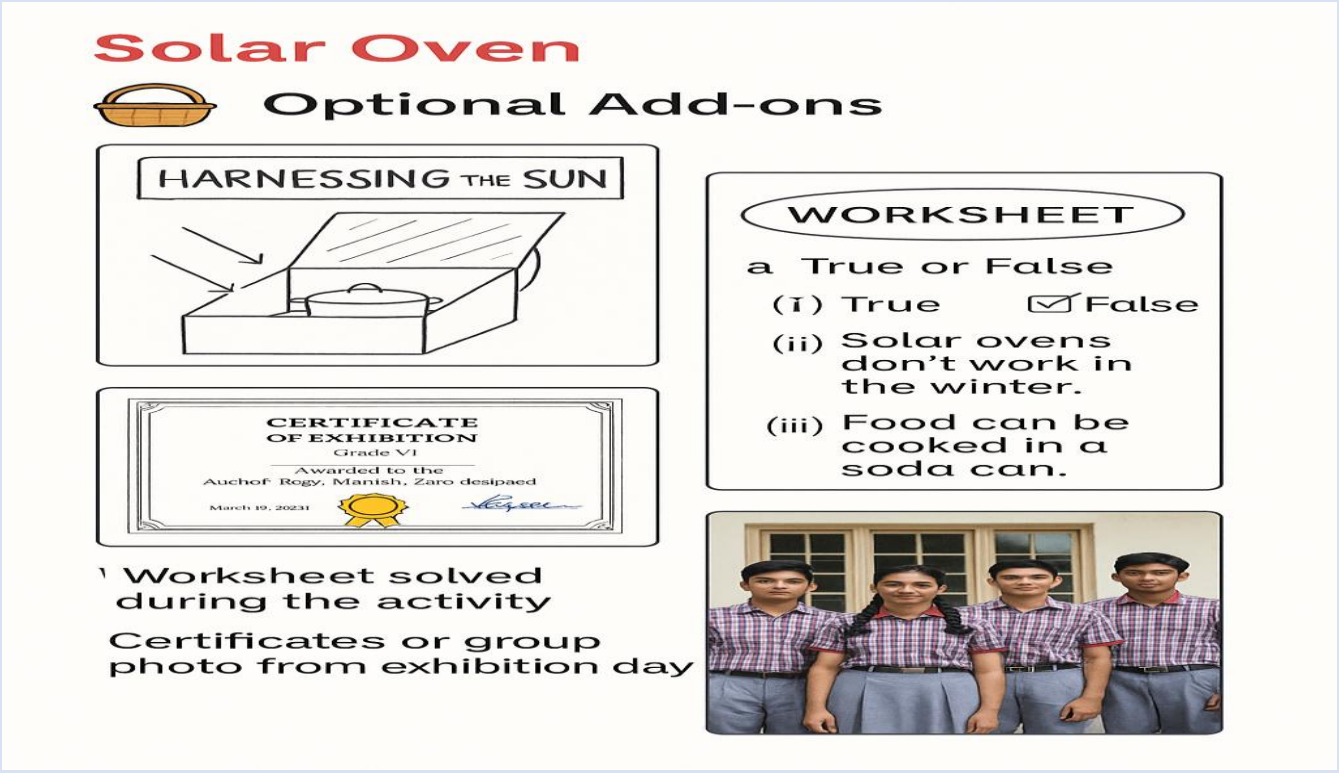
You can improve the insulation.

Teacher Feedback

Well done on constructing the oven! Research more on sustainable energy solutions.

STAR OF THE DAY

Creativity ★★★★★



Learning Outcome (LO)	**Evidenced In Portfolio**	**Assessed in Sheet**	**Teacher Observation/Feedback**
LO1: Understand heat absorption and insulation	Diagrams, explanation in reflection	Understanding (5)	Explains concepts confidently
LO2: Use low-cost materials creatively	Material list, step-by-step photos	Creativity (5)	Demonstrates innovation with materials
LO3: Construct a working model	Photo evidence, final demo	Presentation (5)	Builds model correctly
LO4: Reflect on learning process	Reflection page, speech bubbles	Understanding (5), Remarks	Shares thoughtful insights
LO5: Collaborate with peers/family	Step log mentions peer/family help	Participation (5)	Engages actively in group work
LO6: Value sustainability	Discussion, reflection comments	Understanding (5), Remarks	Mentions environmental benefits
LO7: Maintain process documentation	Neatly completed portfolio pages	Presentation (5), Remarks	Keeps work organized & complete
LO8: Receive and act on feedback	Changes based on peer/teacher comments	Participation (5), Remarks	Responds well to suggestions

KAUSHAL BODH – VOCATIONAL EDUCATION & ASSESSMENT

Mr. G. V. PRASAD
TGT(WE)
PM SHRI KV CRPF YELAHANKA

➢ Introduction: The Need for Vocational Education

Vocational education plays a crucial role in preparing students for future challenges by:

- Enhancing employability and skill readiness.
- Bridging the gap between theory and practice.
- Promoting self-reliance, innovation, and entrepreneurship.
- Cultivating the dignity of labour and value-based learning.

➢ Goals of Kaushal Bodh

The *Kaushal Bodh* initiative is aligned with NEP 2020 and NCF-SE 2023, and aims to:

- Develop life skills through work education.
- Introduce students to workplace culture and professional ethics.
- Provide competency-based, value-oriented education.
- Strengthen the link between education and employability.

➢ Structure for Class VI (Foundation Level)

At the middle school level, the programme emphasizes hands-on experiential learning with focus areas such as:

- Agriculture & Gardening
- Health & Hygiene
- IT & Digital Literacy
- Local Crafts & Trades

Activities include group projects, practical tasks, and community-supported initiatives. Parents and local experts actively contribute, ensuring contextual and sustainable learning.

➢ Methodology and Competency-Based Learning

- Focus: Practical application over rote theory.
- Integrated Competencies: Teamwork, critical thinking, creativity, and responsibility.
- Pedagogy: Teachers act as facilitators; learning extends beyond classrooms with community participation.

- Integration: Skills are linked with core subjects like Science, Mathematics, and Art to create holistic learning experiences.

➢ Assessment Practices

Assessment follows a 20% theory and 80% practical model, with both formative and summative approaches:

- Formative Assessment: Observations, portfolios, group discussions.
- Summative Assessment: Viva voce, role plays, demonstrations.
- Rubrics: Used to ensure fairness and transparency.
- Recognition: Special emphasis on creativity, innovation, and problem-solving.

➢ Project Work (Three Mandatory Annual Projects)

1. Work with Life Forms: e.g., gardening, animal care.
2. Work with Materials/Machines: e.g., carpentry, tool handling.
3. Work in Human Services: e.g., community welfare activities.

These projects help students apply knowledge, build confidence, and experience the dignity of labour.

➢ Skill Modules and Subjects (NCERT)

- Middle School: 30+ modules (e.g., AI, Coding, Mass Media).
- Secondary & Senior Secondary: Diverse skill subjects (e.g., Retail, IT, Agriculture, Healthcare).
- Modules are flexible and encourage hands-on, competency-driven learning.

➢ Challenges and Solutions

- Infrastructure Gaps: Addressed through optimal use of vocational labs.
- Teacher Training: Enhanced by capacity-building workshops.
- Resource Availability: Supported by community partnerships and local networks.

➢ Conclusion

Kaushal Bodh nurtures future-ready citizens by integrating skills, values, and academics. By fostering innovation, collaboration, and self-reliance, the initiative prepares learners to thrive in real-life situations with confidence and dignity.

SKILL ENRICHMENT IN VOCATIONAL EDUCATION

Mr. Hari Kumar A.
TGT (WE)
KV NAL Bengaluru

Introduction

The 21st century has brought rapid technological change and evolving job markets, transforming schools from centers of academic instruction into hubs of skill development. Vocational education, when integrated with 21st-century skills, empowers learners to adapt, innovate, and succeed in a dynamic world.

Importance of 21st-Century Skills in Schools

Modern workplaces demand more than theoretical knowledge. Skills like critical thinking, collaboration, digital literacy, and problem-solving are now foundational to professional success.

"Skills cannot merely be taught—they must be acquired through practice, application, and real-world engagement."

Technological Revolutions: A Timeline

1. 18th Century: Steam engine – powering industrial growth.
2. 19th Century: Electricity and telegraph – revolutionizing industry and communication.
3. 20th Century: Internet – enabling global connectivity.
4. 21st Century: AI, Robotics, IoT, Drones, and Big Data – driving transformative change.

Impact on Job Roles

Technological shifts redefine professions:

- Automated kiosks replacing ticket clerks.
- Self-driving vehicles transforming transport jobs.
- AI diagnostics reshaping medical imaging roles.

NEP 2020 and 21st-Century Skills

The National Education Policy (NEP) emphasizes:

- Networking with peers and professionals.
- Access to career-oriented courses (e.g., Coursera, edX).
- Integrating emerging technologies into classrooms.

Core 21st-Century Skills

1. Language & Communication Skills – foundation of collaboration.
2. Artificial Intelligence (AI):
    - *Supervised Learning* – predictions from labeled data.
    - *Unsupervised Learning* – pattern recognition.
    - *Reinforcement Learning* – feedback-driven improvement.
3. Robotics – design and programming of autonomous machines.
4. Internet of Things (IoT): sensors, connectivity, data processing, and interfaces.
5. Drones (UAVs): applications in agriculture, logistics, and disaster relief.

Why Integrate These Skills?

Traditional education often falls short in preparing students for:

- Jobs that didn't exist a decade ago.
- Fast-paced technological change.
- Complex, interdisciplinary challenges.

Benefits:

- Better adaptability.
- Higher employability.
- Innovative approaches in education and industry.

Jobs at Risk (Next 5 Years – WEF)

Roles involving repetitive tasks (street vendors, data entry clerks, postal workers, bookkeepers, cashiers). Nearly 39% of current jobs may be automated.

Emerging Opportunities (WEF)

- Nursing & healthcare.
- Agricultural consulting.
- AI/ML engineering.
- Big Data analysis.
- Digital automation & graphic design.
- Skilled modern construction.

Strategies to Integrate 21st-Century Skills in Vocational Education

1. Encourage collaboration through group projects.
2. Promote curiosity and questioning in classrooms.
3. Leverage digital tools for learning.
4. Integrate arts for creativity.
5. Apply inquiry-based learning.
6. Foster innovation labs and design challenges.
7. Strengthen communication through debates and presentations.
8. Build resilience and adaptability.

The 21st-Century Teacher

A modern educator acts as a facilitator, mentor, and lifelong learner, who:

- Adapts pedagogy to changing needs.
- Seamlessly integrates technology.
- Prepares students for jobs of the future.

Conclusion

The integration of 21st-century skills with vocational education is not optional but essential. By fostering adaptability, creativity, and technical proficiency, educators can prepare students for a future defined by change, innovation, and limitless opportunity.

HANDS ON GENERATIVE AI TOOLS

MR. JOYCE SABASTIAN
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Part A — Train your model (Mobile vs Mic) in Teachable Machine

1. Open Teachable Machine → Image Project → Standard image model. Teachable Machine
2. Make two classes:
   - Mobile (phone)
   - Mic (microphone)
3. Add training images (webcam or upload): ~30–50 varied images per class (angles, lighting, background).
4. Click Train Model.
5. When done, click Export Model → TensorFlow.js → Upload (hosted) → Copy the Share/Model URL.
   - We'll paste this URL inside the RAISE Playground so your blocks can use the model.

Tip: Include some "negative" images in each class (e.g., hands, desk) to reduce false positives.

Part B — Set up the RAISE Playground (blocks)

1. Open RAISE Playground and click Open playground. playground.raise.mit.edu
2. Add the Teachable Machine extension (bottom-left "Add extension"). You'll see new blocks like load model, get prediction, label, confidence. (RAISE describes Teachable Machine blocks as part of its AI extensions.) MIT Media Lab
3. Also add the Text-to-Speech extension (same place). (Many RAISE tutorials use TTS alongside AI blocks.) Medium
4. Add the Video/Camera extension if prompted so the model can "see".

Part C — Wire the blocks (predict + speak)

Below is a clear, minimal script. You'll create one sprite (the Cat is fine) and put this code on it.

Setup (run once)

- when green flag clicked
  → turn video on (set to "on" / "0 transparency")
  → Teachable Machine → load model from URL (paste the model URL you

copied)
→ set language (Text to Speech) to a voice you like (e.g., “en-US”).

Loop (predict continuously)

- forever
  → Teachable Machine → get prediction (from video)
  → set [detected v] to (label)
  → set [conf v] to (confidence)
  → if <(conf) > 0.75> then
  → say (join "I see " (detected)) for 1 sec
  → Text to Speech → speak (detected)

That’s it. The sprite will say and speak “Mobile” when it sees a phone and “Mic” when it sees a microphone.

Why a 0.75 threshold? It avoids jittery predictions; tune if your model is confident/uncertain.

Part D — Make it only speak when the label changes (optional but recommended)

Add a variable lastLabel. Replace the “if” part with:

- if <(detected) ≠ (lastLabel) and (conf > 0.80)> then
  → set [lastLabel v] to (detected)
  → speak (detected) and say it on screen.

This prevents the sprite from talking nonstop while the same object stays in view.

Part E — Quick UI/UX polish

- Show confidence on stage:
  → **set [display v] to (join (detected) (join " (" (join (round ((conf)100)) "%)")))*
  → say (display)
- Hotkeys: add:
  - when [space] key pressed → toggle video on/off
  - when [c] key pressed → clear lastLabel (forces a new announcement)

Part F — Troubleshooting

- Model won’t load
  - Double-check you exported TensorFlow.js → Upload (hosted) and copied the hosted model URL, not the download zip. Teachable Machine
- Predictions flicker
  - Add a confidence threshold (0.7–0.9) and the lastLabel check.
  - Add more/better training images; balance both classes (Mobile vs Mic).
- No camera

    - Browser permission: allow camera for playground.raise.mit.edu.
- No voice output
    - Make sure Text-to-Speech extension is added and your browser tab isn't muted. (RAISE projects commonly pair AI blocks with TTS for feedback.) Medium

Bonus — Create a scoreboard
Count correct detections for a timed demo:

- Variables: timer, score
- when green flag clicked → set [timer] to 30 → repeat 30 (wait 1 sec, change timer by −1)
- Inside your "if label changed & conf>0.8" block, add change [score] by 1 and play sound.

Where this comes from

- RAISE Playground: block environment with AI extensions (incl. Teachable Machine). playground.raise.mit.eduMIT Media Lab
- Teachable Machine: quick, no-code training for image models; export to web (TensorFlow.js). Teachable Machine
- TTS with RAISE/Scratch-style projects: commonly used alongside AI blocks to give spoken feedback. Mediu

ATAL TINKERING LAB

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ATL or Atal Tinkering Lab is an initiative by NITI Aayog under the stewardship of Atal Innovation Mission (AIM) to give a boost to the innovation ecosystem in the country. The objective behind setting up an ATL to create an ecosystem fueled by curiosity, creativity, and imagination in India.

What is the introduction of ATL lab?

It is a lab to encourage people to explore alternatives and create options that did not exist before. MORE ABOUT ATAL TINKERING LABS - by National Institution for Atal Tinkering Labs is a national level program Transforming India (NITI Aayog) - the premier policy 'Think Tank' of the Government of India.

The applicant school would have to provide at least 1,500 Sq. Ft. of built up space. Applicant schools from hilly / Himalayan and island states, UTs would have to provide at least 1,000 Sq.

An Atal Tinkering Lab provides activity-based learning in the identified schools across the country where young minds can give shape to their ideas for societal problems.

One time establishment cost of up to Rs. 10.0 lakh has been provided for each ATL.

Atal Tinkering Lab [ATL]

1. Design and set-up a tinkering facility with state of the art electronics and machinery.
2. Provide an experiential learning syllabus based on topics from regular academics.
3. A team of experienced engineers to train students in ideation, design thinking, computational thinking and physical thinking.

Tinkerly provides a set of four packages for schools that are created as per the guidelines of NITI Aayog.

The objective of this scheme is to foster curiosity, creativity, and imagination in young minds; and inculcate skills such as design mindset, computational thinking, adaptive learning, physical computing etc. Read More about ATL.

The objective of this scheme is to foster curiosity, creativity, and imagination in young minds; and inculcate skills such as design mindset, computational thinking, adaptive learning, physical computing etc. Read More about ATL.

1. Go to the AIM website https://www.aim.gov.in/, the link (https://www.aim.gov.in/atl/) for the My ATL dashboard is available under the Atal Tinkering Labs drop-down.
2. Log onto the system using your existing user credentials, "ATL Application ID" and "Password".

Atal Tinker Lab(ATL) is a workspace where young minds can give shape to their ideas through hands on do-it-yourself mode, and learn innovation skills. Young children will get a chance to work with tools and equipment to understand the concepts of STEM (Science, Technology, Engineering and Math).
https://aim.gov.in/atl-curriculum.php
For ATL Packages the link can be used to download the reference document-

Tools and Accessoies:-

- **Tools:** Garden trowels (10), hand cultivators (10), gardening shears (5), hedge shears (5), spades small/big (5), pickaxes small/big (5), hammers (5), cutting pliers (5), crowbars (5), hand saw/hack saw (5), cutters (5).
- **Materials & Accessories:** Watering cans/hose pipes (10), rubber gloves (10 pairs), plant labels (20), spray bottles (10), wheelbarrows (2), bins/tarpaulin (5), old PVC pipes/sticks/poles/strings (sufficient), potting soil (50 kg), seeds/seedlings (5 packets/50 seedlings), neem leaves (2 kg), manure (10 kg), organic mulch (2 kg).

2. Carpentry & Mechanical Tools

- **Hand Tools:** Chisels (5), measuring tapes (5), jack planes (5), carpenter vice (2), clamps (2), sharpening stones (5), hammers (5), try squares (5), poker (5), pincer (5).
- **Power Tools:** Hand drilling machines (5), cordless screwdriver sets (2), power drilling machines (2), wood cutting machines (2).
- **Other Equipment:** Spanner set (1), file set (1), hang guides (5), sandpaper (25), hack saws (5).

3. Electrical Tools & Equipment

- **Basic Tools:** Multimeters (5), cutting pliers (5), testers (10), screwdrivers star/flat (5 each), continuity testers (5), wire cutters (5), nose pliers (5), wire gauges (5), test lamps (5).
- **Appliances & Testing Boards:** Appliance testing boards (5), switch boards/extension boards (5), wiring boards (10), electric irons (5), mixer grinder (1), immersion heaters (5), water purifier (1), refrigerator (1), washing machine (1), induction cooker (1).
- **Plumbing & Safety:** Pipe wrenches (2), adjustable wrenches (2), hacksaw frame with blade (1), goggles (5), sealing tape (1), threader set (1), high insulation gloves (2 pairs), cold chisels (2), DE spanner set (1).

4. Soldering & Electronics Kits

- **Soldering Tools:** Soldering irons 25W (5), soldering wire (5), flux (5), stands (5), tweezers (5), soldering boards (5), de-soldering pumps (5), PCBs (5).
- **Basic Components:** 555 Timer IC (5), breadboards (small/full size) (5 each), LED matrix modules (5), 7-segment displays (5), LEDs (20 each in red, green, yellow, white), capacitor boxes (5), resistor boxes (5), servo motors (5), buzzers (5), rechargeable batteries (5), jumper cables (various types).
- **Sensors & Modules:** LDR, gas sensors (5 each), Arduino Uno (5), DHT11 sensors (5), sound playback modules (5), soil moisture sensors (5), DC motors (5), propellers (5).

5. Robotics & IoT Kits

- **IoT Kit Components:** ESP32 board (1), raindrop sensor (1), voice recognition module (1), laser module (1), temperature & humidity sensor (1), PIR sensor (1), RFID module (1), photoresistor sensor (1), LCD module (1), servo motor (1), RGB LED module (1), battery holder (1), jumper cables.
- **Robotics Kits:** Smart Robot Car Kit, Rover Kit, DIY Moisture & Temperature Detection Robot.

6. Pottery Tools

- **Pottery Wheel:** Mini electric pottery wheel (1) with detachable basins, shaping tools, clay.
- **Professional Pottery Tools Kit:** For sculpting, scraping, cutting, detailing, shaping, trimming.

Smart Home Automation – Retrofit Method

Introduction

Retrofit home automation allows adding smart control to existing electrical systems without changing the old wiring. This approach is cost-effective, quick to set up, and ideal for upgrading homes, offices, or classrooms in stages without wall-breaking or heavy rewiring.

What is Retrofit Wiring?

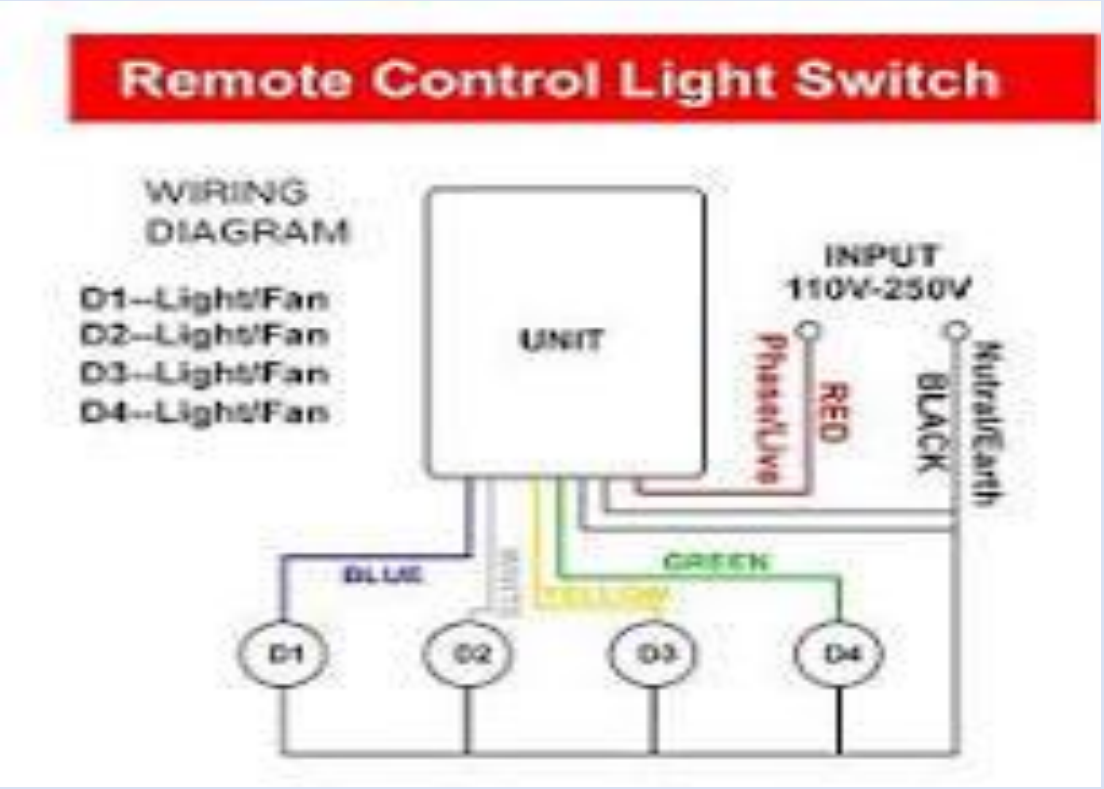
Retrofit wiring means integrating smart devices into the current electrical setup using the existing wiring for power while enabling wireless control through mobile apps or voice assistants.

Advantages:

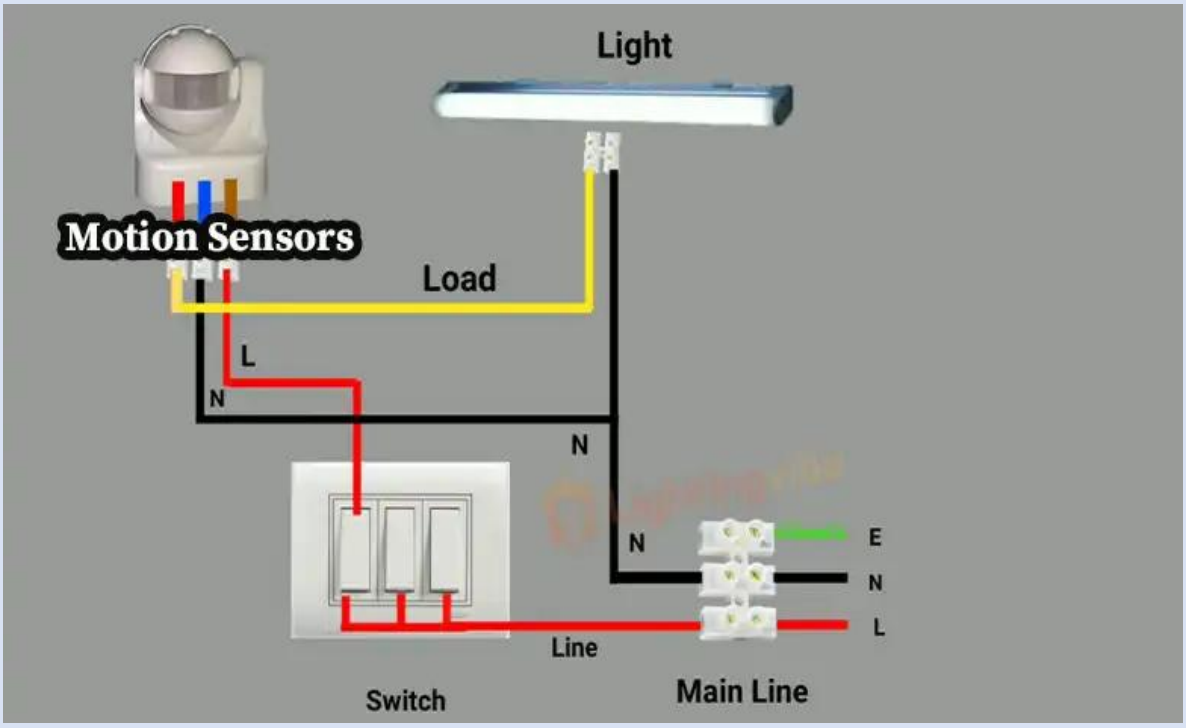
- No wall breaking or major rewiring
- Lower installation cost
- Quick and easy setup
- Works with existing wiring
- Can be upgraded step-by-step

Types of Retrofit Devices

1. **Smart Switches** – Replace traditional wall switches and add wireless control.



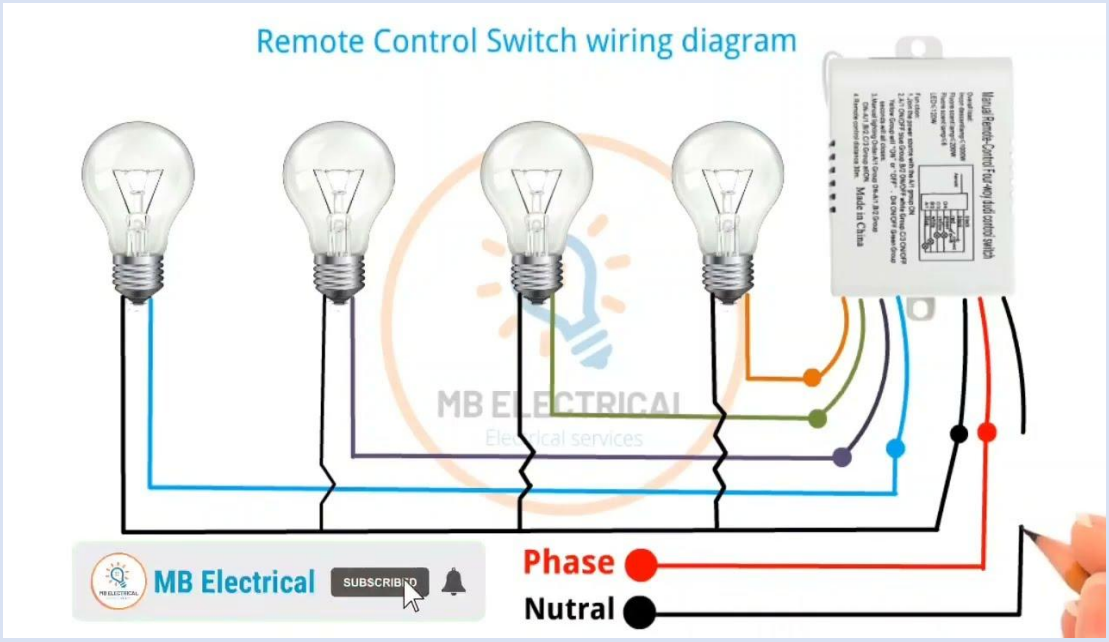
2. **Smart Plug Adapters** – Plug-and-play devices for remote control of appliances.
3. **In-Wall Retrofit Modules** – Installed behind existing switches to add smart features without changing the switch.
4. **Smart Bulbs** – Wi-Fi-enabled bulbs controlled via app or voice command.
5. **IR/RF Controllers** – Control devices like TV or AC remotely.
6. **Sensor Lights** – Automatic lighting based on motion detection.



Basic Working Principle

Mobile App / Voice Command → Wireless Signal → Smart Device → Electrical Load

- No extra wiring is needed for control; only existing wires supply power.



Examples of Retrofit Automation Devices

1. Smart Switch Retrofit Wiring

- **Before:** Live → Switch → Load → Neutral
- **After:** Live → Smart Switch → Load → Neutral (with wireless control built-in)

2. Motion Sensor Light

- Uses PIR (Passive Infrared) sensor to detect movement.
- Lights turn on when motion is detected and turn off after a set time.
- Ideal for corridors, restrooms, and classrooms to save energy.

3. Smart Plug

- Plugs into a standard socket; appliance plugs into the smart plug.
- Connects via Wi-Fi for remote control, scheduling, and automation.
- Can monitor energy consumption.
- Works with Alexa, Google Assistant, Siri for voice control.

Safety Precautions

- Switch off main power before installation.
- Ensure devices are compatible with India's 230V AC supply.
- Avoid handling devices with wet hands.
- Internal wiring should be done only by trained personnel.

Educational and Practical Benefits

- Demonstrates IoT concepts, coding, and automation principles.
- Helps students understand real-world electrical integration.
- Can be scaled from single-room setups to entire buildings.

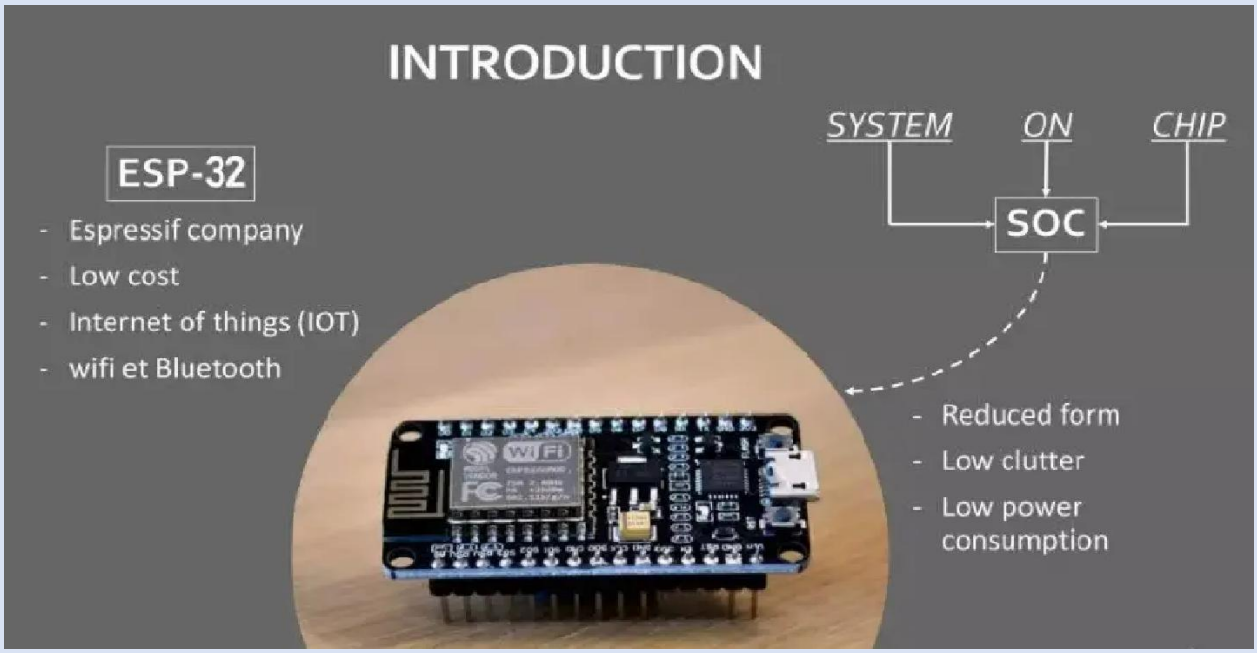
Summary

Retrofit home automation offers a **fast, easy, and low-cost** method to turn any traditional setup into a smart, connected system. It blends practical electrical knowledge with modern IoT skills, making it an excellent project for vocational education and future-ready learning.

ESP 32 HANDS ON ACTIVITIES

Mr. JOYCE SABASTIAN
TGT(WE)
KV AFS YELAHANKA

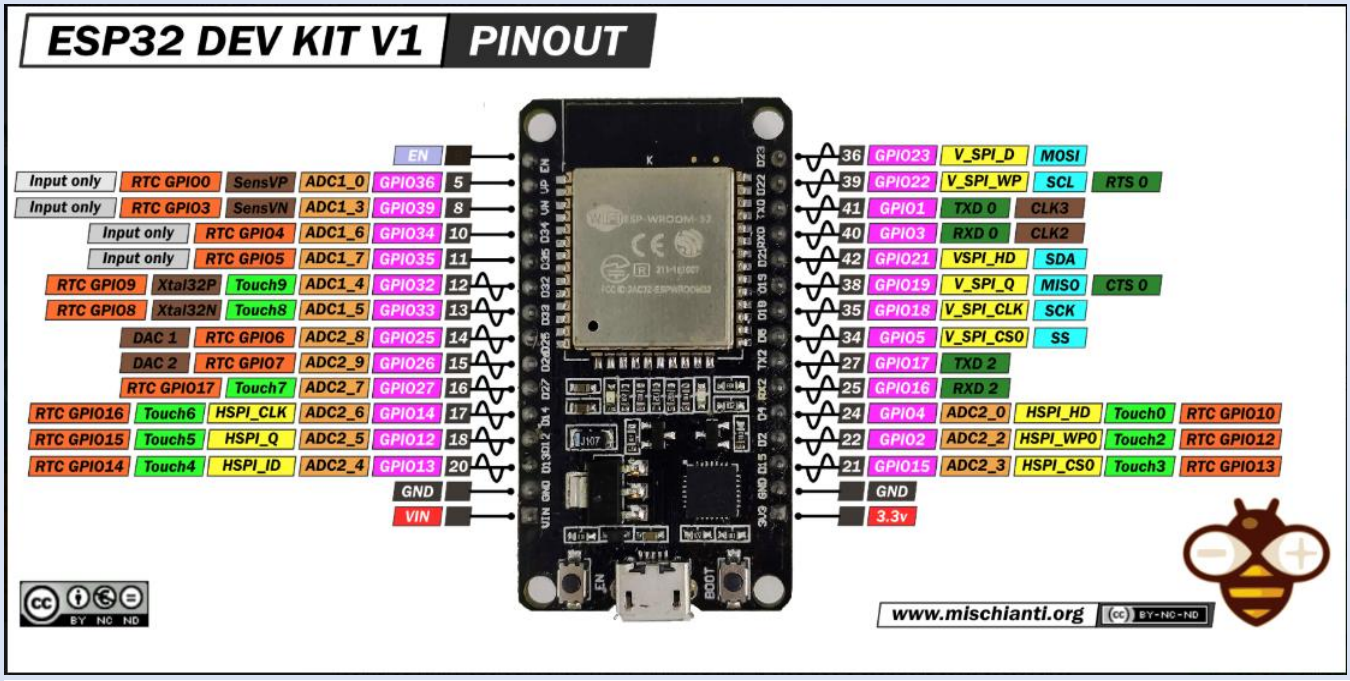
ESP32 and Its IoT Applications

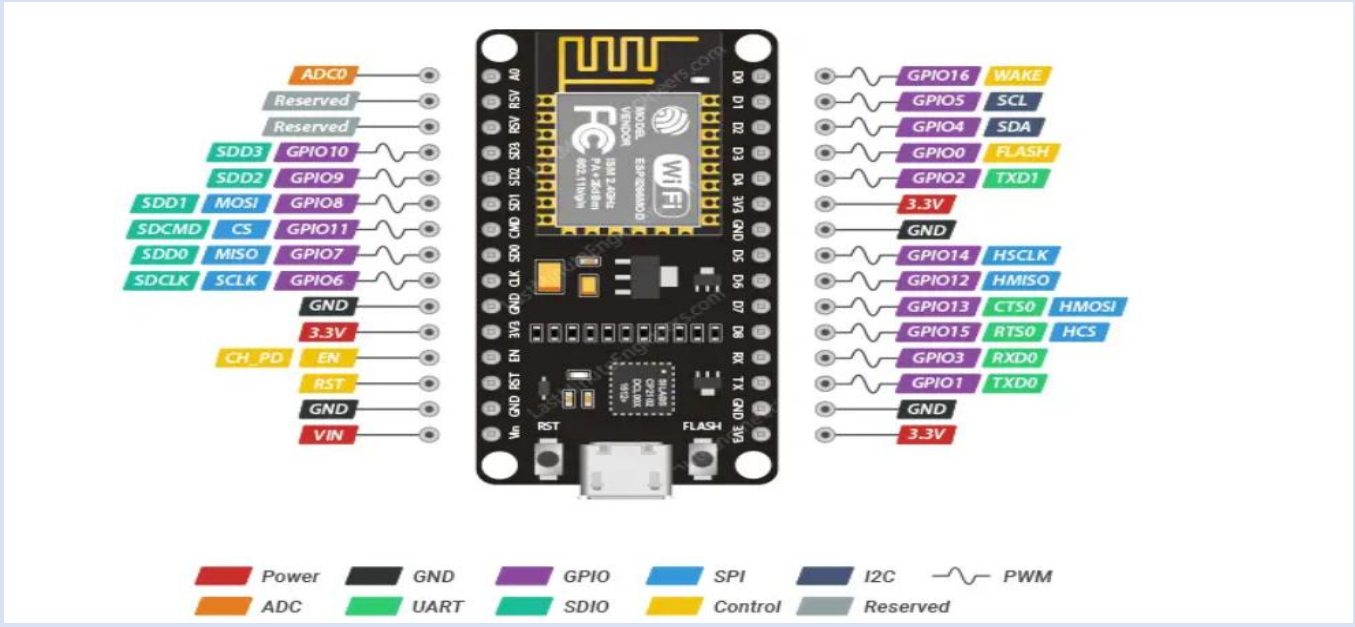


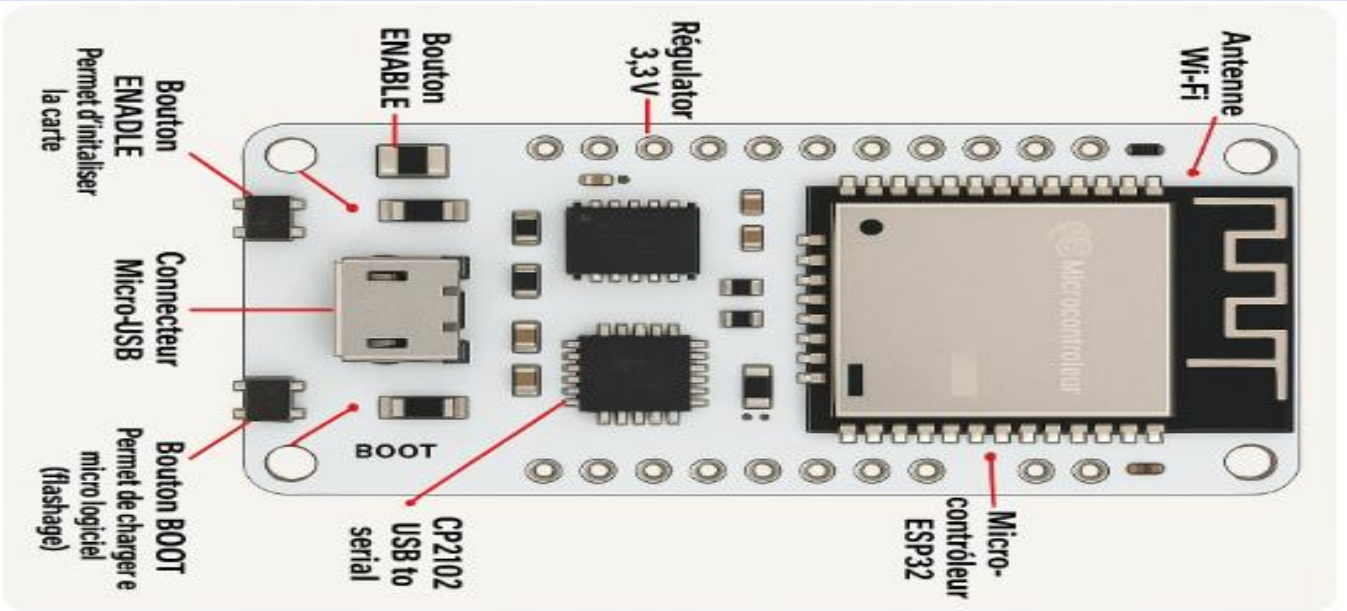
Overview

The ESP32 is a powerful microcontroller with Tensilica Xtensa 32-bit dual-core CPU (up to 240 MHz, 600 DMIPS), operating at 3.3V with built-in Wi-Fi (802.11 b/g/n/e/i) and Bluetooth v4.2 (BR/EDR & BLE). It comes with 448 KB ROM, 520 KB SRAM, additional RTC memory, and supports peripherals like GPIO, PWM, ADC, DAC, UART, SPI, I²C, CAN, and touch sensors.

	ESP32	ESP8266	Arduino UNO
Number of Cores	2	1	1
Architecture	32 Bit	32 Bit	8 Bit
CPU Frequency	160 MHz	80 MHz	16 MHz
WiFi	YES	YES	NO
Bluetooth	YES	NO	NO
RAM	512 KB	160 KB	2 KB
Flash	16 MB	16 MB	32 KB
GPIO Pins	36	17	14
Busses	SPI, I2C, UART, I2S, CAN	SPI, I2C, UART, I2S	SPI, I2C, UART
ADC Pins	18	1	6
DAC Pins	2	0	0

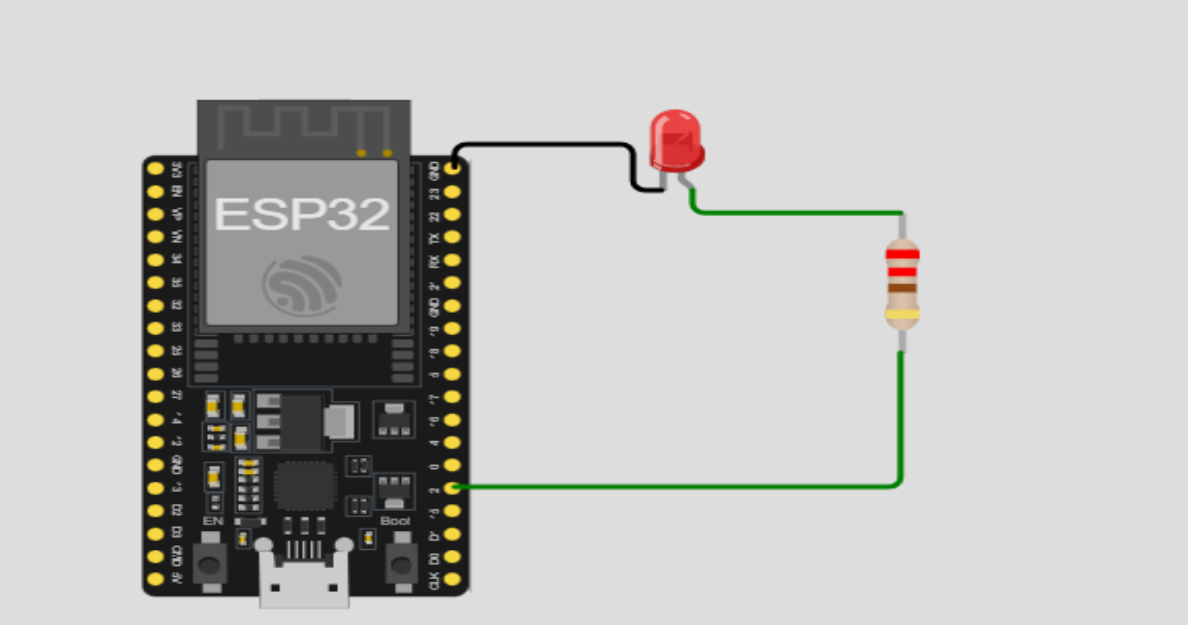

ESP32 DEV KIT V1 PINOUT
EN
Input only RTC GPIO0 SensVP ADC1_0 GPIO36 5
Input only RTC GPIO3 SensVN ADC1_3 GPIO39 8
Input only RTC GPIO4 ADC1_6 GPIO34 10
Input only RTC GPIO5 ADC1_7 GPIO35 11
RTC GPIO9 Xtal32P Touch9 ADC1_4 GPIO32 12
RTC GPIO8 Xtal32N Touch8 ADC1_5 GPIO33 13
DAC 1 RTC GPIO6 ADC2_8 GPIO25 14
DAC 2 RTC GPIO7 ADC2_9 GPIO26 15
RTC GPIO17 Touch7 ADC2_7 GPIO27 16
RTC GPIO16 Touch6 HSPI_CLK ADC2_6 GPIO14 17
RTC GPIO15 Touch5 HSPI_Q ADC2_5 GPIO12 18
RTC GPIO14 Touch4 HSPI_ID ADC2_4 GPIO13 20
GND
VIN
36 GPIO23 V_SPI_D MOSI
39 GPIO22 V_SPI_WP SCL RTS 0
41 GPIO1 TXD 0 CLK3
40 GPIO3 RXD 0 CLK2
42 GPIO21 VSPI_HD SDA
38 GPIO19 V_SPI_Q MISO CTS 0
35 GPIO18 V_SPI_CLK SCK
34 GPIO5 V_SPI_CS0 SS
27 GPIO17 TXD 2
25 GPIO16 RXD 2
24 GPIO4 ADC2_0 HSPI_HD Touch0 RTC GPIO10
22 GPIO2 ADC2_2 HSPI_WP0 Touch2 RTC GPIO12
21 GPIO15 ADC2_3 HSPI_CS0 Touch3 RTC GPIO13
GND
3.3v
www.mischianti.org


ADC0
Reserved
Reserved
SDD3 GPIO10
SDD2 GPIO9
SDD1 MOSI GPIO8
SDCMD CS GPIO11
SDD0 MISO GPIO7
SDCLK SCLK GPIO6
GND
3.3V
CH_PD EN
RST
GND
VIN
GPIO16 WAKE
GPIO5 SCL
GPIO4 SDA
GPIO0 FLASH
GPIO2 TXD1
3.3V
GND
GPIO14 HSCLK
GPIO12 HMISO
GPIO13 CTS0 HMOSI
GPIO15 RTS0 HCS
GPIO3 RXD0
GPIO1 TXD0
GND
3.3V
RST
FLASH
Power
GND
GPIO
SPI
I2C
PWM
ADC
UART
SDIO
Control
Reserved


Bouton ENABLE Permet d'initialiser la carte
Bouton ENABLE
Régulator 3,3 V
Antenne Wi-Fi
Connecteur Micro-USB
Bouton BOOT Permet de charger e micro logiciel (flashage)
BOOT
CP2102 USB to serial
Micro-contrôleur ESP32

Setting Up ESP32 in Arduino IDE

1. Install Arduino IDE – Ensure latest version.
2. Add ESP32 Board URL – In *File → Preferences → Additional Board Manager URLs* add: https://espressif.github.io/arduino-esp32/package_esp32_index.json
3. Install ESP32 Board – *Tools → Board → Board Manager*, search and install ESP32.
4. Select Board & Port – Choose *ESP32 Dev Module* and correct COM port.
5. Test with Blink Sketch – Verify setup by blinking onboard LED.



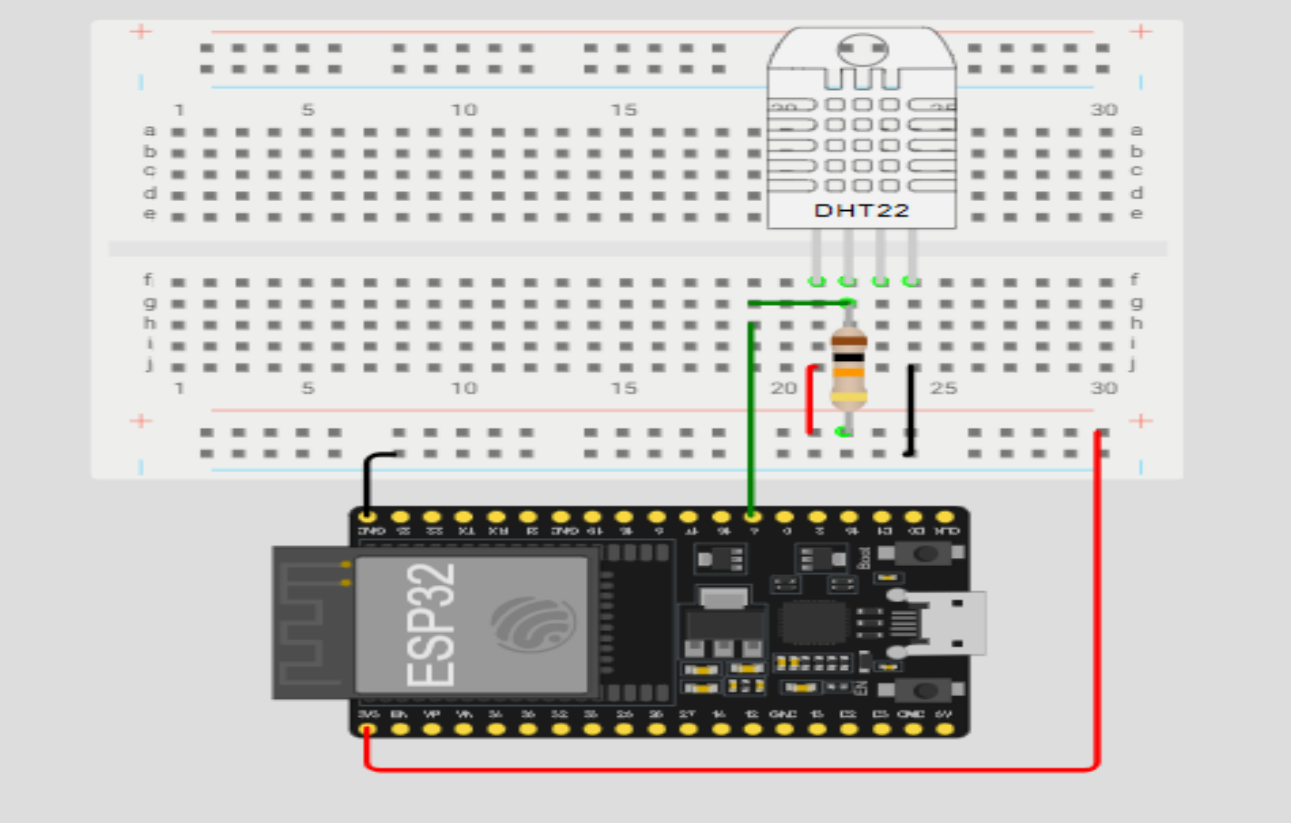

```
#define LED_PIN 2 // Onboard LED for ESP32-S series boards

void setup() {
pinMode(LED_PIN, OUTPUT); // Set LED pin as output
}

void loop() {
digitalWrite(LED_PIN, HIGH); // Turn LED ON
delay(500); // Wait 500ms
```

digitalWrite(LED_PIN, LOW); // Turn LED OFF

delay(500); // Wait 500ms

}

Weather Station with DHT11



IoT Smart Garden Project (ESP32 + DHT11 + Soil Moisture Sensor)

- **DHT11 Sensor** – Measures temperature (°C) and humidity (%).
- **Soil Moisture Sensor** – Monitors soil water content.
- **Code Structure**:
  - #define for pin naming.
  - Create sensor object (DHT dht(...)).
  - setup() – Initialize serial monitor & sensors.
  - loop() – Continuously read and display sensor data with delays to prevent overload.
- **Extensions**:
  - Automate watering with pump control.
  - Connect to cloud (Blynk, ThingSpeak) for remote monitoring.

- Analyse long-term environmental data.

Simulation with Wokwi

- **Wokwi.com** allows testing Arduino, ESP32, and IoT projects online without hardware.
- **Features**: Virtual components, real-time serial monitor, cloud integration, debugging tools.
- **Applications**: LED blinking, temperature monitoring, IoT MQTT connectivity, robotics.

IoT Application Examples

- **Temperature & Humidity Monitoring** – Remote weather station with alerts.
- **Smart Garden** – Automated irrigation based on soil moisture.
- **Air Quality Measurement** – Monitor pollution levels using sensors.
- **Home Automation** – Control devices via Wi-Fi or Bluetooth.

Conclusion

ESP32 is a versatile and cost-effective microcontroller ideal for **IoT projects**. Its built-in connectivity, wide range of compatible sensors, and compatibility with Arduino IDE make it suitable for **educational, hobby, and industrial** applications. Tools like **Wokwi** enable safe and cost-free experimentation before real-world deployment.

SCRATCH GAME DEVELOPMENT

Mr. PRASHANT KUMAR
TGT(WE)
KV KR PURAM

1. Player 1 (Shooter)

1. Click Choose a Sprite → select Paint.
2. In the Paint editor:
    - Select the Circle / Rectangle and Line tool.
    - Draw a small rectangle (like a spaceship base or a cannon).
    - Add a triangle on top (to look like the shooter's tip).
    - Use a solid color (e.g., blue).
3. Name the sprite Player 1.
4. Place it at the bottom center of the stage (y: -150).

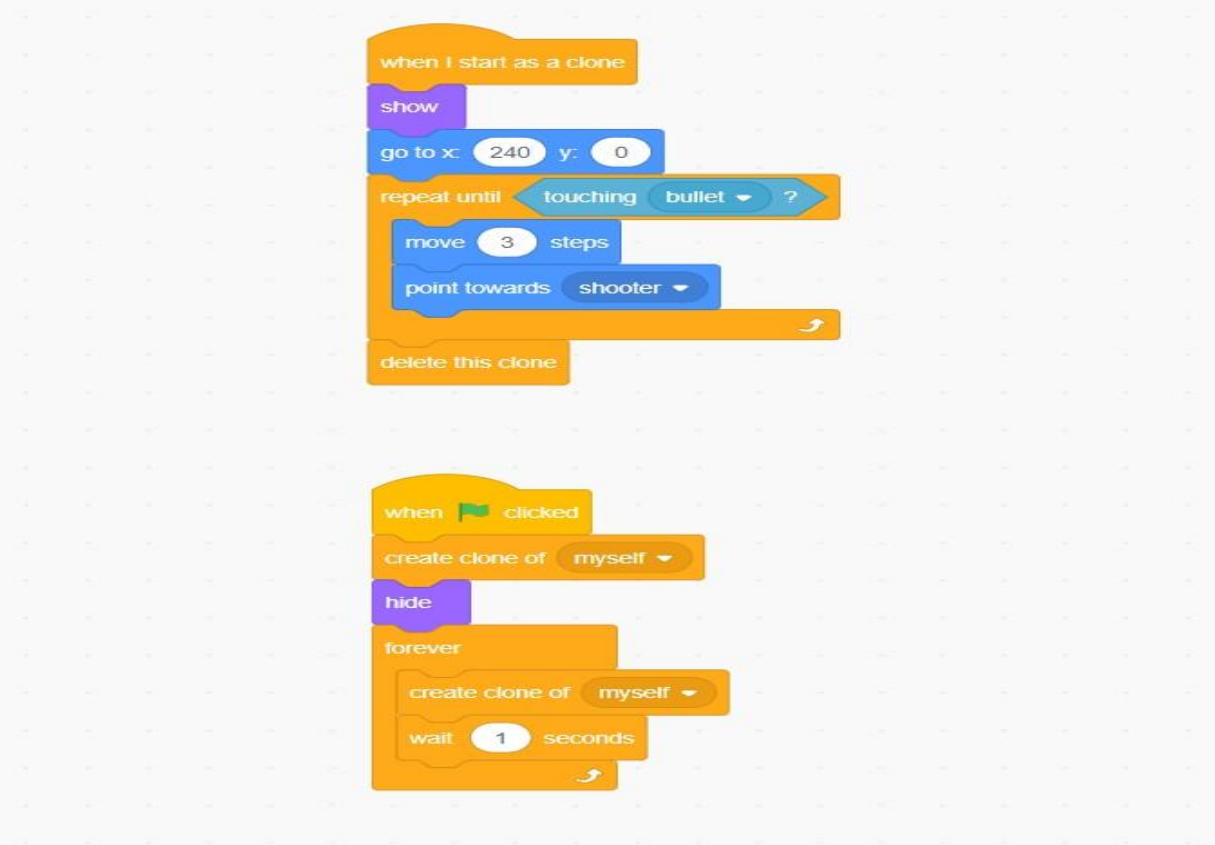
2. Bullet

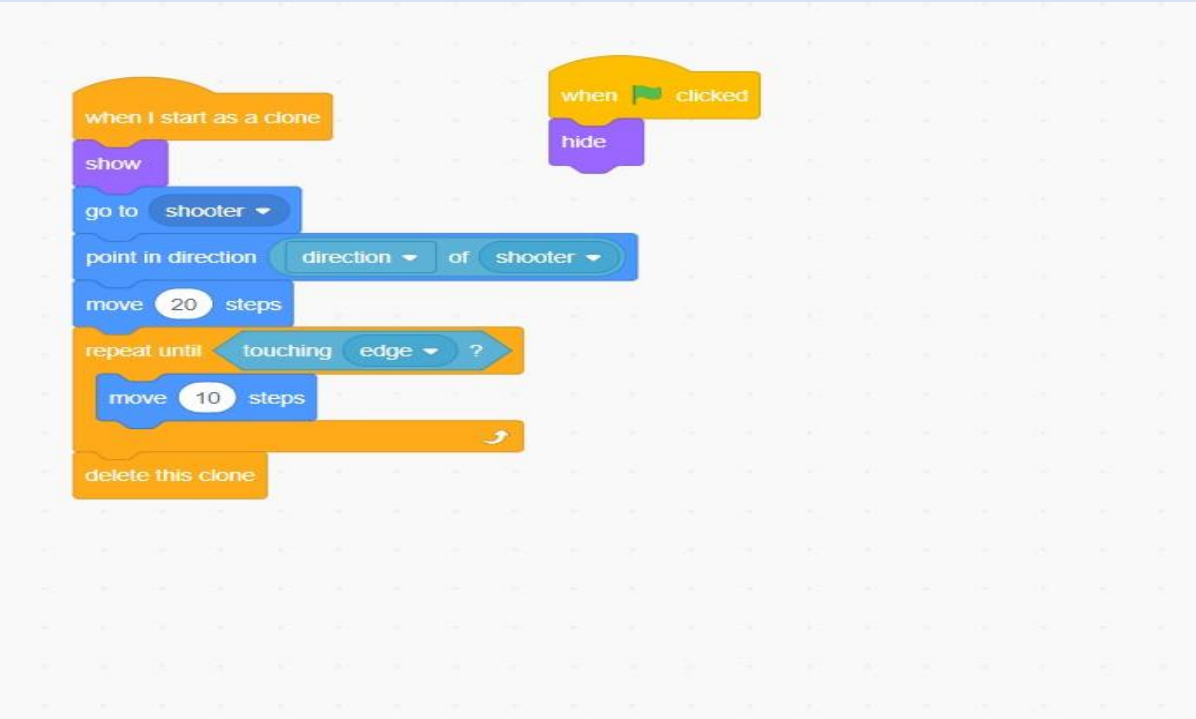
1. Click Choose a Sprite → Paint.
2. In the Paint editor:
    - Use the circle tool (or rectangle tool) to draw a tiny dot/rectangle.
    - Fill it with a bright color (e.g., red or yellow).
3. Name the sprite Bullet.
4. Make it small (resize if needed).

3. Enemy

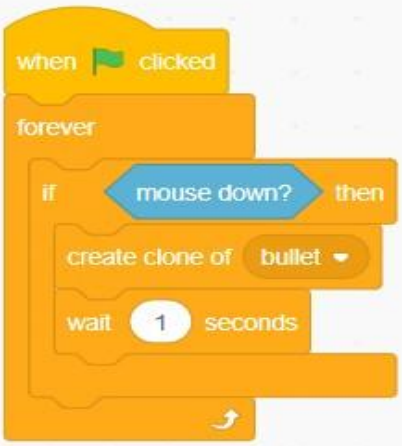
1. Click Choose a Sprite → Paint.
2. In the Paint editor:
    - Draw a simple shape (circle or square).
    - Add eyes or patterns to look like an alien/enemy.
    - Use a contrasting color (e.g., green).
3. Name the sprite Enemy.

4. Place it at the **top of the stage** (y: 150).






when clicked
forever
if key right arrow pressed? then
change x by 10
if key left arrow pressed? then
change x by -10
if key up arrow pressed? then
change y by 10
if key down arrow pressed? then
change y by -10
point towards mouse-pointer


when clicked
forever
if mouse down? then
create clone of bullet
wait 1 seconds

IMPLEMENTATION OF VOCATIONAL EDUCATION (KAUSHAL BODH – CLASSES 6 TO 8)

Dr. C S ANUPAMA
WET ARTS & CRAFTS
DMS RIE MYSORE

Introduction

Vocational Education under *Kaushal Bodh* aims to bridge the gap between theoretical learning and practical application. By focusing on life skills, employability, and experiential learning, the curriculum prepares students for real-world challenges. However, its implementation requires careful planning, teacher preparedness, and appropriate assessment methods. The following sections highlight practical issues and strategies for effective execution.

1. Teaching in Block Periods

Vocational education requires **extended time slots** to complete hands-on activities and projects. Unlike traditional subjects, practical tasks such as gardening, carpentry, or digital literacy cannot be confined to short 35–40 minute classes.

- **Suggested Approach:** Allocate **block periods (90–120 minutes)** once or twice a week.
- **Benefits:** Provides uninterrupted time for project completion, group discussions, and reflection.
- **Implementation:** Schools may adjust timetables or use *bagless days* as recommended under NEP 2020.

2. Writing Answers in Activity Book

The *Activity Book* serves as the core resource for documentation, reflection, and assessment. Students often face challenges in writing detailed answers due to lack of guidance.

- **Suggested Approach:**
  - Teachers should conduct **guided writing sessions**.
  - Encourage students to use **diagrams, flowcharts, and simple notes** rather than long paragraphs.
  - Promote **self-reflection** (What did I learn? How can I apply it?).
- **Outcome:** Helps in recording progress, building responsibility, and linking theory with practice.

3. Method of Practical Activities & Projects

Practical sessions are the **heart of vocational education**. However, variation in resources and expertise can create gaps in execution.

- **Suggested Approach:**
  - Adopt a **project-based learning (PBL) approach** with clear step-by-step instructions.
  - Use **locally available materials** to minimize cost.
  - Involve **community experts** (farmers, artisans, IT professionals).
  - Ensure **safety measures** while handling tools.
- **Outcome:** Students develop problem-solving, creativity, and application-based learning.

4. Conducting Tests and Assessment Method

Assessment must focus on **skills and competencies**, not just theoretical recall.

- **Formative Assessment:** Ongoing teacher observations, portfolios, group tasks, peer reviews.
- **Summative Assessment:**
  - Oral presentations and viva voce
  - Demonstrations of practical work
  - Role play/simulations
  - Situational tests (flowcharts, case-based MCQs)
- **Weightage:** Recommended 20% theory and 80% practical, ensuring learning by doing.

5. Use of Rubrics and Place in Report Card

Rubrics provide **transparent and structured evaluation**. They help both teachers and students understand the expected outcomes.

- **Suggested Rubric Parameters:**
  - Practical execution (accuracy, safety, creativity)
  - Teamwork and collaboration
  - Communication and presentation skills
  - Reflection in activity book
- **Integration in Report Card:** Vocational education should have a **dedicated section** in report cards, highlighting skills, competencies, and attitudes developed, not just marks.

6. Addition of New Activities

To maintain student engagement, activities must evolve with time and technology.

- **Suggestions for New Activities:**
  - Basic coding and robotics (introductory level)

    - Local entrepreneurship projects (e.g., eco-friendly products, small business plans)
    - Energy conservation/renewable energy projects
    - Community service initiatives
- **Outcome:** Keeps learning relevant, innovative, and aligned with NEP 2020's emphasis on future skills.

7. Use of Vocational Lab

A dedicated **Vocational Lab** enhances experiential learning. It should be flexible and multipurpose, supporting gardening, IT, crafts, and other activities.

- **Essential Features:**
    - Modular workstations
    - Digital tools (computers, internet access)
    - Basic carpentry/hand tools
    - Storage for raw materials and student projects
- **Benefit:** Encourages a culture of experimentation and innovation in a safe environment.

8. Teaching of Class 9 and Above

Transitioning vocational education from middle school (6–8) to secondary level (9–12) requires continuity.

- **Challenges:** Increased curriculum load, limited time, specialized skill requirements.
- **Solutions:**
    - Offer **elective skill subjects** (IT, Agriculture, Tourism, Retail, AI, etc.) aligned with NCERT framework.
    - Provide **career guidance sessions** linking vocational skills to future opportunities.
    - Strengthen **industry partnerships** for exposure and internships.

Conclusion

Effective implementation of vocational education in middle and secondary schools requires **planning, community involvement, and teacher training**. Assessment must prioritize **skills over rote learning**, while activities should be **student-centered, practical, and locally relevant**. By overcoming challenges in infrastructure, assessment, and pedagogy, vocational education can truly enhance employability, foster entrepreneurship, and instill dignity of labour among students.

PHOTOS


असतो मा सद्गमय
तमसो मा ज्योतिर्गमय


OBJECTIVES OF THIS SESSION
Understand learning outcomes (LOs) in vocational education
Explore assessment methods: Qualitative & Quantitative
Learn how to create and evaluate student portfolios


TOOLS AND EQUIPMENTS
IN VOCATIONAL LAB


Remote Control Switch
MB Electrical


ATL LAB SETUP


Key
Ground


GUEST HOUSE


OPPO F19 Pro+
D.Manohar | 2025.08.15 08:55


EFFECTIVE IMPLEMENTATION
It's a distinct subject starting from Grade 6
Purpose-
Learning by doing
Dignity of Labor
To provide wide range of work with skill
To build confidence among the learner
To apply conceptual learning with other curricular subject areas in real life situation


Rotating

Group photo


ZONAL INSTITUTE OF EDUCATION AND TRAINING MYSURU
5 DAY WORKSHOP ON SKILL ENRICHMENT IN VOCTIONAL EDUCATION :
PRACTICAL LEARNING WITH ATL & STEAM (11.08.2025 TO 15.08.2025)
आंचलिक शिक्षा एवं प्रशिक्षण संस्थान
K.V.S.
ZONAL INSTITUTE OF EDUCATION AND TRAINING
MYSORE