



2026-27

JR KG

8TH

DIFFICULTY : BEGINNER

CURRICULUM FOR ROBOTICS

- **3D DESIGN**
- **CODING**
- **SCIENCE**
- **ARTIFICIAL
INTELLIGENCE**

A structured, hands-on program introducing students to Robotics 3D designing, beginner coding, science experiments and Artificial Intelligence. Designed to build foundational thinking, creativity, observation, and problem-solving skills.

GRADE



STEM.ORG
ACCREDITED™
EDUCATIONAL EXPERIENCE ✓

CURRICULUM

Aligned to
**N.E.P
2020**

Aligned to
**N.C.F
2023**

Jr Kg Sr Kg		Coding Foundations Logic Building
1 2		Mechanics Construction
3 4		Robotics Motorised Output
5 6		Electronics Input & Logic
7 8		Programming Internet of Things

Life long Skills developed by Students



Creativity



Logical Reasoning



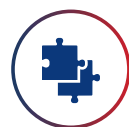
Improves Grades



Concentration



Hand Eye Coordination



Problem Solving



2026-27

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LET'S EXPLORE ROBOTICS

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- **SCIENCE**

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AS PER N.E.P 2020

AS PER N.C.F 2023

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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CONSTRUCTION & ENGINEERING



1.

GO FORWARD – 5 STEPS

Children walk forward 5 steps by following teacher instructions

- Counting till 5,
- Understanding forward movement.

- Early Math (counting)
- Gross Motor Skills
- Direction Sense.



2.

MEASURE CLASSROOM IN STEPS

Children measure the length and width of the classroom by walking and counting their steps.

- Long and short concept
- Counting steps
- Observation.

- Measurement Basics
- EVS (classroom awareness)
- Early Math.



3.

GO FORWARD AND COME BACK

Children walk forward five steps and then walk back five steps to the starting point.

- Forward and backward direction
- Memory skills.

- Direction sense
- Body coordination.



4.

TURN RIGHT AND LEFT

Children walk forward and turn right or left as instructed by the teacher.

- Right and left understanding,
- Listening skills.

- Body Awareness
- Spatial Sense.



5.

CLASSROOM ROUTE MAP

Children follow a simple route created using arrows around the classroom.

- Route following
- Observation
- Movement control.

- Pre-Math Mapping
- EVS,
- Logical Thinking.



6.

MOVE FROM GRID 1 TO GRID 4

Children move from one grid box to another using simple directions.

- Step-by-step thinking
- Direction control.

- Early Math
- Logical Thinking.



7.

START POINT TO FINAL POINT

Children move from a start point to a finish point on a grid.

- Goal-based movement
- Focus and planning.

- Problem Solving
- Cognitive Development.

Math

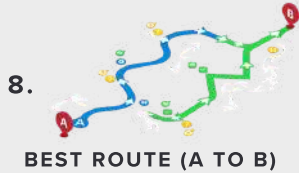
Engineering

Technology

Science

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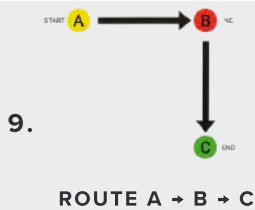
CONSTRUCTION & ENGINEERING



Children choose the shortest or easiest route between two points on a grid.

- Decision-making
- Comparing paths.

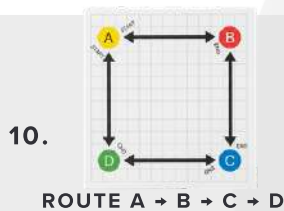
- Critical Thinking
- Early Logic.



Children follow a path touching points A, B, and C in the correct order.

- Sequencing
- Memory and order.

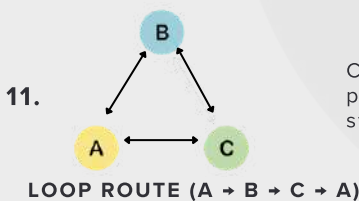
- Numeracy,
- Logical Order.



Children follow a longer route with more points on the grid.

- Attention span,
- Planning skills.

- Cognitive Skills
- Logical Thinking.



Children move through points and return to the starting point.

- Repetition concept,
- Route memory.

- Foundation for Coding Loops
- Logical Thinking.



Children find the correct path in a simple maze.

- Focus
- Direction control.

- Eye-hand coordination
- Thinking skills.



Children choose the correct path among two or more options.

- Choice making
- Trial and Error learning.

- Problem Solving
- Decision Making.



Children solve a slightly challenging maze with dead ends.

- Patience
- Logical thinking
- Confidence.

- Higher-Order Thinking Skills.

Math

Engineering

Technology

Science



2026-27

**SR
KG**

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AS PER N.C.F 2023

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CONSTRUCTION & ENGINEERING



1.

MEASURE THE CLASSROOM USING STEPS

Children walk across the classroom and count their steps to measure the length and width of the room.

- Children understand measurement using non-standard units (steps).
- They develop spatial awareness and counting skills.

- Measurement & Numbers
- Observation and Practical Measurement



2.

MOVE FORWARD AND RIGHT

Children move forward 5 steps and then walk right 5 steps by following instructions.

- Children learn directions such as forward and right and improve listening and movement coordination.

- Direction & Position
- Logical Thinking



3.

MOVE FORWARD AND LEFT

Children move forward 5 steps and then walk left 5 steps as instructed.

- Children understand left direction and sequence of actions.

- Direction Sense
- Sequencing Skills



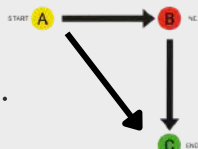
4.

GRID PATH – START TO END

Children guide a character from the start point to the final point on a grid.

- Children develop logical thinking and planning skills.

- Grids & Position
- Problem Solving



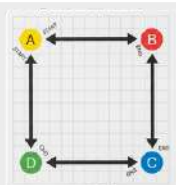
5.

BEST ROUTE FROM POINT A TO B TO C

Children find the shortest or best path from point A to B and then to C.

- Children learn route planning and step-by-step thinking.

- Patterns & Logic
- Algorithmic Thinking



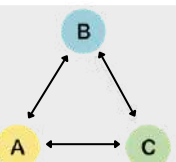
6.

ROUTE A → B → C → D

Children plan and draw a route connecting four points in the correct order.

- Children improve decision-making and logical sequencing.

- Reasoning
- Critical Thinking



7.

LOOP ROUTE (A → B → C → A)

Children find a route that starts and ends at the same point after visiting other points.

- Children understand loops and return paths.

- Logical Reasoning
- Basic Coding Concepts

Math

Engineering

Technology

Science

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CONSTRUCTION & ENGINEERING



8.

MAZE ROUTE – LEVEL I

Children find a simple route through a basic maze.

- Children develop focus and problem-solving skills.

- Logical Thinking
- Trial and Error Learning



9.

MAZE ROUTE – LEVEL II

Children solve a moderately challenging maze.

- Children enhance decision-making and persistence.

- Reasoning
- Analytical Skills



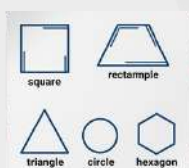
10.

MAZE ROUTE – LEVEL III

Children solve a complex maze by planning the correct route.

- Children apply advanced thinking and planning skills.

- Advanced Reasoning
- Problem-Solving Strategies



11.

DRAWING BASIC SHAPES

Children draw square, rectangle, triangle, hexagon, and circle.

- Children recognize and draw basic geometric shapes.

- Geometry
- Shape Recognition



12.

DRAWING ADVANCED SHAPES

Children draw star, heart, and ice-cream cone shapes.

- Children improve creativity and fine motor skills.

- Shape Exploration
- Design Thinking



13.

SCENERY DRAWING – HOUSE AND TREES

Children draw a house with two trees using basic and advanced shapes.

- Children apply shapes to real-world drawings and boost creativity.

- Art Integration with STEM
- Shape Usage



14.

PUZZLE SOLVING – HELP MICKEY REACH HOME

Children solve a puzzle by finding the correct path for Mickey to reach home.

- Children develop reasoning, planning, and patience.

- Logical Reasoning
- Problem Solving

Math

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Technology

Science

1

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CONSTRUCTION & ENGINEERING

1.



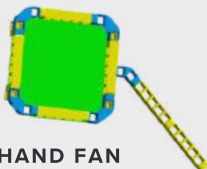
ABC OF ROBOTICS

Students create English alphabets or small words using building bricks. They explore how each letter is formed using lines, curves, and basic shapes.

- Understand how to use the Witbrix
- Naming of Witbrix.
- Improve hand control and fine motor skills.

- Shape & structure
- Problem-solving
- Design skills
- Symmetry

2.



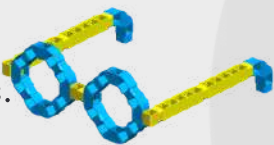
HAND FAN

Students build a hand fan that moves air when waved.

- Learn how air moves to create wind.
- Develop hand strength and movement control.
- Understand simple energy use.

- Air & force
- Basic mechanics
- Simple tools
- Motion analysis

3.



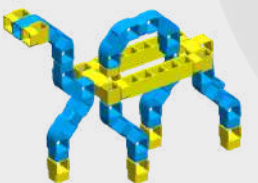
FUNNY SPECTACLES

Students create colorful, funny glasses using bricks.

- Learn symmetry and shape balance.
- Boost creativity and play-based learning.
- Improve design and imagination skills.

- Symmetry & structure
- Simple design
- Basic model construction
- Shape balance

4.



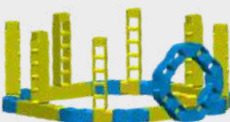
CAMEL FIGURINE

Students create a camel using building bricks, exploring shapes and structure.

- Learn to combine shapes to form a model.
- Improve creative thinking and imagination.
- Build fine motor and design skills.

- Shape formation
- Design & creativity
- Basic model-building
- Shape recognition

5.



CROWN OR TIARA

Students design and build their own crown using shapes and colors.

- Learn about shape patterns and combinations.
- Improve creative expression.
- Develop fine motor construction skills.

- Shape & structure
- Artistic design
- Structure building
- Proportions & geometry

6.



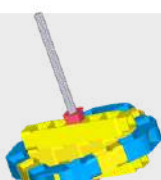
SOLDIER

Students build a small soldier model with a sword and shield.

- Enhance creativity and story imagination.
- Learn proportion and model-building skills.
- Explore 3D thinking.

- Basic structure
- Model-making
- Simple design
- Symmetry & scale

7.



SPINNING TOP

Students build a simple top that spins using a circular base.

- Learn rotation and motion.
- Improve hand control and timing skills.
- Understand how shape affects spinning speed.

- Motion & forces
- Hands-on construction
- Rotational mechanics
- Time & speed

Math

Engineering

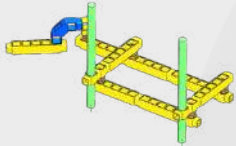
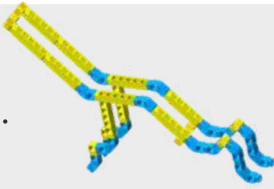
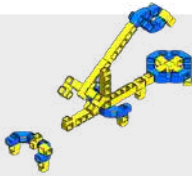
Technology

Science

GRADE 1



Math
Engineering
Technology
Science

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
8.	 FIDGET SPINNER	Students create a spinner toy that rotates smoothly.	- Learn rotational motion. - Develop design understanding	- Rotational motion - Mechanics - Design & construction - Speed & timing
9.	 SEE-SAW	Students build a mini see-saw to learn how balance works between two sides based on weight.	- Building a simple machine - how balancing and weight distribution works	- Balance & gravity - Simple machine principles - Structure design - Proportions & ratios
NEW 10.	 COPY PASTE MACHINE	Students make a mechanical model where one side moves and the other side copies the same movement. It shows simple input-output action.	- Learn mechanical movement concepts. - Improve logical and problem-solving skills.	- Movement & force - Automation - Mechanical systems - Sequences & patterns
11.	 HOOP BALL GAME	Students make a hoop and ball game where they throw or push a ball into the hoop.	- Learn game mechanics and scoring. - Concept of force and push	- Motion & energy - Game design - Simple mechanical systems - Angles & trajectory
12.	 SWINGING PENDULUM	Students make a pendulum that swings back and forth.	- Understand gravity and swing movement. - Learn rhythm, and motion patterns. - Observe how force changes speed.	- Gravity & motion - Simple mechanisms - Oscillation - Timing & measurement
13.	 BALL SLIDING TRACK	Students build a track where a ball rolls down from top to bottom.	- Learn slope, speed, and direction. - Observe how height changes motion.	- Motion & speed - Track design - Ramp design - Measurement & angles
NEW 14.	 MECHANICAL HAMMER	Students design a hammer that moves up and down using a basic mechanism. They learn how tools work in real life.	- Understand mechanism movement. - Learn cause-and-effect (push → movement). - Develop engineering thinking.	- Energy & movement - Simple machines - Mechanism construction - Motion analysis

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NEW

15.



BALL SHOOTER

Students build a simple model that shoots a small ball using rubber band force. They learn how motion works when pressure is applied.

- Learn about rubber band energy & force
- Every action has an equal and opposite reaction

- Force & motion
- Construction & design
- Kinetic Motion
- Measurement, angles

NEW

3D DESIGN ON TINKERCAD (OPTIONAL)

16.



SIMPLE NAME TAG

Students will place a rectangle for the base and add raised text (their name) on it to create a simple name tag.

- Learn how to work with basic shapes like rectangles.
- Understand how to add text to a 3D object.
- Develop skills in arranging and resizing objects.

- Shape formation.
- Text manipulation in 3D space.
- Basic design structure.
- Symmetry and spacing.

17.



TOY BLOCK TOWER

Students will drag basic shapes such as cubes and cylinders and stack them to build a toy block tower.

- Learn to manipulate simple shapes (cube, cylinder).
- Develop spatial awareness and fine motor skills.
- Encourage creativity in arranging shapes.

- Understanding basic shapes.
- Using a 3D design tool for construction.
- Building a stable structure.

18.



3D FRUIT MODEL

Students will create fruit models by using spheres for apples and cylinders for bananas, and combining other shapes to complete the fruit models.

- Learn how basic shapes can be combined to create more complex objects.
- Understand how different shapes represent everyday objects.
- Improve hand-eye coordination through manipulation of objects in 3D space.

- Understanding basic shapes in nature.
- Using 3D design software for modeling.
- Combining shapes to form a structure.
- Exploring volume and surface area through shapes.

19.



A TINY HOUSE

Students will design a tiny house using a box shape for the house and a roof shape on top. They can also add windows using hole shapes.

- Learn to combine various shapes to create a recognizable structure.
- Practice using hole shapes to create negative space (like windows).
- Develop an understanding of spatial design and balance.

- Structure and form.
- Design using a 3D tool.
- Simple architecture and space planning.
- Understanding proportions, scale, and space.

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NEW

CODING GAMES FOR LOGIC BUILDING (OPTIONAL)

20.



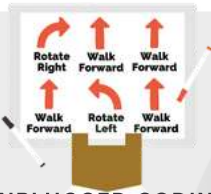
HUMAN ROBOT

A playful activity where children act like robots and follow step-by-step instructions to understand sequencing.

- Sequential thinking,
- Precision in instructions,
- Basic algorithm understanding,
- Communication clarity.

- Algorithms
- Sequencing
- Logical Reasoning.

21.



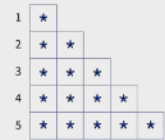
UNPLUGGED CODING WITH ARROWS

Students use arrow symbols to create simple movement algorithms.

- Directional coding
- Spatial reasoning
- Debugging basics,
- Problem-solving.

- Algorithms,
- Direction,
- Problem-solving,
- Debugging.

22.



PATTERN DETECTIVE

Children identify, extend, and create patterns that build loop foundations.

- Pattern recognition,
- Repetition understanding
- Loop fundamentals
- Prediction skills.

- Patterns
- Loops (repetition)
- Logical reasoning.

23.



TREASURE MAP CODING

Students follow and create map-based multi-step directions like a coding algorithm.

- Sequential instruction making,
- Spatial awareness
- Interpreting symbols
- Complex direction following.

- Mapping
- Sequencing,
- Algorithm design.

24.



SORTING GAMES

Children classify objects based on attributes to learn logic rules.

- Categorization property
- Recognition,
- Flexible thinking
- Conditional logic basics.

- Classification
- Conditions (if/then), logic.

Math

Engineering

Technology

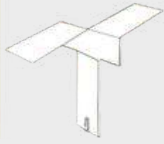
Science

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NEW

SCIENCE DIY ACTIVITIES (OPTIONAL)

25.



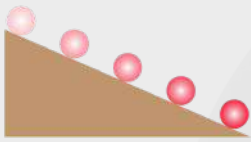
PAPER HELICOPTER SPINNER

Make a spinning paper helicopter.

- Learn that air rotational movement creates wind

- Air & gravity
- Simple mechanics
- Model building
- Speed & time measurement

26.



ROLLING RAMP TEST

- Create ramps using books and cardboard at different heights.
- Roll the ball down each ramp and compare how fast it rolls depending on the height.

- Learn how an inclined plane affects speed.
- Understand how height impacts how fast the ball moves.
- Observe friction and speed in a real-life scenario.

- Inclined planes, speed
- Ramp construction
- Building ramps
- Speed, measurement

27.



BALLOON ROCKET

- Thread the string through a straw and tape the straw to the balloon.
- Inflate the balloon and let go to watch the balloon fly along the string.

- Learn how air pressure, pushes the balloon in the opposite direction.
- Understand the idea of push/pull forces in motion.

- Push/pull, action-reaction
- Balloon-powered movement
- Rocket design
- Force, motion

28.



MYSTERY PROJECT

- Students build their own project
- solving a problem they see in the real world

- Testing their creativity
- Understanding of concepts to re-use and create

- Assess practically

Math

Engineering

Technology

Science

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LET'S EXPLORE
ROBOTICS

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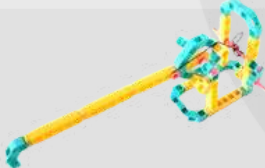
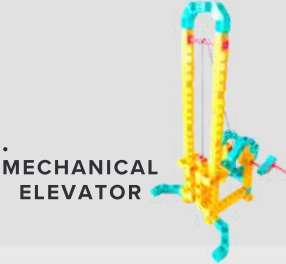
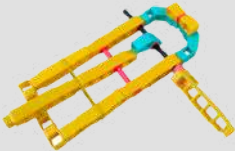
A playful STEM program introducing basic construction, simple machines, beginner 3D design, visual coding, and fun science activities. Designed to spark curiosity, build confidence, and strengthen early thinking and creativity.

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ENGINEERING & BASIC ELECTRONICS

Math Engineering Technology Science	1.		Students create a scissor-style tool to pick objects using a linking mechanism.	• Learns about simple machine & fulcrums • Understands force and rotational movement	• Mechanisms • Lever links • Motion transfer
	2.		Students build a small kicking mechanism that launches a ball using a manual lever.	• Understands force and motion • Angle of movement & propulsion	• Simple machines • Lever mechanism • Motion principles
	3.		Students create a working swing model showing push-pull motion.	• Understands back-and-forth motion (Pendulum Motion) • Learns balance	• Pendulum motion • Structure building • Mechanics
	4.		Students build a hand-controlled barrier that lifts and drops like real railway gates.	• Learns about Railway barrier systems & control movement • Understands Pulley and Lever systems	• Lever system • Motion control • Structure stability
	5.		Students create a manual elevator using pulley movement.	• Understands how lifts work • Learns about vertical motion and pulley systems	• Pulley system • Motion transfer • Load lifting
	6.		A rotating sound-based toy made using simple mechanical motion.	• Observes sound production due to vibration • Learns rotation movement • Boosts creativity	• Motion • Sound vibration creation • Basic mechanics
	7.		Students build a safe bow & arrow using elastic tension.	• Learns about Elastic energy • Understands angles and propelling movement	• Elastic energy • Launch mechanics • Simple machines

SCISSOR GRIPPER

BALL KICKER STAND

MANUAL SWING

MANUAL RAILWAY BARRIER

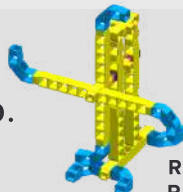
MECHANICAL ELEVATOR

TIK-TIK TOY

BOW & ARROW

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ENGINEERING & BASIC ELECTRONICS

8.		A sled model that moves using rubber band push-force.	• Learns force & direction of movement • Understands Potential & Kinetic Energy	• Mechanics • Elastic motion • Energy transfer
9.		A fan model powered by twisting a rubber band to create spin.	• Learns energy storage • Observes rotational motion	• Elastic energy • Rotation • Basic mechanics
10.		Students build a mini trebuchet that launches a ball using tension and release.	• Understands force, tension, and energy • Learns safe model building • Learns propulsion and launching angle and distance	• Simple machines • Catapult mechanics • Energy conversion
NEW 11.		A working torch model using battery, switch, and LED.	• About Power & Electricity • Understands circuit basics • How does LED work? • Understands switch function	• Electronics basics • Circuit building • Light technology
NEW 12.		Students make a headlamp with LED to understand wearable electronics.	• About Power & Electricity • Understands circuit basics • How does LED work? • How do miners work?	• Circuits • Light • Electricity • Wearable design
NEW 13.		A light-based model that creates shadows on a surface.	• Learns about light and shadow • About Power & Electricity • Understands circuit basics • How does LED work? • How do projectors work?	• Light properties • Projector technology • Circuits • Light • Electricity
NEW 14.		Students make a model of a camera, with a functional flash light in it	• About Power & Electricity • Understands circuit basics • How does LED work? • How do cameras work?	• Circuits • Light • Electricity • Camera Technology

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15.



STREET LAMP

Students build a model of a functional Street Lamp

- About Power & Electricity
- Understands circuit basics
- How does LED work?
- How do streetlamps work?

- Circuits
- Light
- Electricity

NEW

3D DESIGN USING TINKERCAD (OPTIONAL)

16.



CUSTOM KEYCHAIN

Students create personalized keychains using Tinkercad.

- Learns about Tinkercad & Digital modeling
- Understands the measurement tools - centimeters, millimeters
- Width, Depth, Height

- Geometry - Measurements
- Design thinking
- 3D concepts

17.



SIMPLE CAR

A 3D model car created using basic shapes.

- Understands wheels and motion
- Learns about 3D shapes - cuboid
- Learn about circles diameter

- Geometry - Circles, Cuboids
- Motion
- Design basics

18.



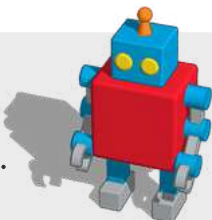
ANIMAL FIGURE

Students design animals using simple 3D shapes.

- Boosts creativity
- Understands shapes
- Improves visualization

- Shapes
- Art & design
- Spatial modelling

19.



3D ROBOT

Students design a basic 3D robot model using shapes and simple geometry.

- Learns how to integrate multiple 3D shapes
- Understands complex designs

- Geometry
- 3D modelling
- Spatial skills

20.



PLAYGROUND MODEL

Students design a mini playground with slides, swings, and benches.

- Learns about basic geometry
- Understands structures

- Geometry - Area, Perimeter
- Model design
- Spatial awareness
- Structures

Math

Engineering

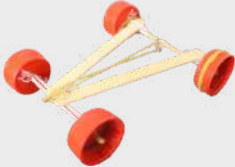
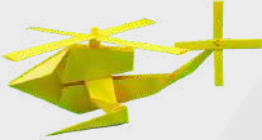
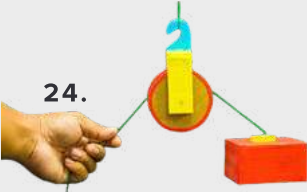
Technology

Science

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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NEW

SCIENCE DIY ACTIVITIES (OPTIONAL)

Math Engineering Technology Science	21.		A car model powered by a twisted rubber band.	• Observes motion • Learns force application • Improves creativity	• Elastic energy • Motion • Basic mechanics
	22.		Students make paper helicopters that spin when dropped.	• Learns air resistance • Observes rotation • Boosts curiosity	• Aerodynamics • Motion • Gravity concepts
	23.		A butterfly paper model that moves using static charge.	• Learns about static electricity • Improves observation • Encourages experimentation	• Electricity basics • Charge behaviour • Interaction forces
	24.		Students build a simple pulley system to lift small objects.	• Understands lifting force • Learns rope movement • Builds problem-solving	• Simple machines • Pulley mechanics • Load movement
OLL					

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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NEW

CODING GAMES FOR LOGIC BUILDING (OPTIONAL)

25.

PIXEL ART CODING

Students use coordinates to create images like early computer graphics.

- Coordinate reading
- Precision writing, Spatial reasoning
- Graphics fundamentals.

- Coordinates
- Data representation
- Basic graphics coding.

26.

FLOWCHART STORIES

Students create decision-based flowcharts that tell stories.

- Algorithm visualization
- Decision tree logic
- Breaking tasks into steps
- Program flow.

- Flowcharts
- Conditions if else
- Sequencing
- Loops

27.

VARIABLES STORAGE GAME

Teaching variables through interactive storage and value-changing activities.

- Variable concept
- Tracking values
- Assignment operation
- Multi-variable handling.

- Variables
- Data storage
- Value assignment.

28.

MYSTERY PROJECT

- Students build their own project
- solving a problem they see in the real world

- Testing their creativity
- Understanding of concepts to re-use and create

- Assess practically

Math

Engineering

Technology

Science

3

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LET'S EXPLORE ROBOTICS

- **ENGINEERING**
- **3D DESIGN**
- **CODING**
- **SCIENCE**

A hands-on STEM curriculum exploring moving mechanisms, functional 3D models, simple app coding, and engaging science experiments. Built to enhance creativity, observation, logical thinking, and foundational problem-solving in young learners.

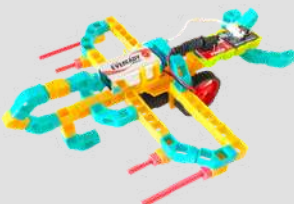
SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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ENGINEERING & ROBOTICS

Math Engineering Technology Science	1.		Students build a tall windmill showing how blades rotate to generate movement.	- Building a motorised machine: how blades rotate - How motors & electricity works - connect to renewable energy (intro)	Science: Electricity & Motion. Electricity Conversion Math: Measurement Engg: Machines Tech understanding: Motor basics
	2.		Kids create a robot that pushes blocks like a real bulldozer. compare speed while pushing light vs heavy objects.	- Understanding Weight, how much force is needed to move objects - understand real construction machines	Science: Work & Force Math: Distance, Weight Engg: Machine applications in real world
	3.		Students design a railway gate that lifts and drops using a motor and button	- Demonstrate how a switch controls the direction of motor - Explain manual vs motorised force	Science: Direction of Motion Tech: Input–Output Engg: Control mechanisms
	4.		Students create a see-saw that moves using a motor and observe how weight and movement create balance.	- Building a motorised machine. - Understanding weight and balance - Difference between Manual machines and Motorised Machines	Science: Electricity & Motion Math: Measurement, Weight & Balances Engg: Machines Tech understanding: Motor basics
	5.		Students build a robot that moves slowly like a snail using simple motor adjustments.	- Observe animal movement styles, how does a snail move - Creating structure to replicate snail like movement	Science: Living vs Non-living things Math: Speed Engg: Design modification
	6.		A fun robot that “walks” step-by-step when the motor turns.	- Observe new type of movement styles, how does a zombie walk - Break motion into steps - observe how rotation creates walking, understand mechanical sequencing	Science: Types of movements Engg: Walking Designs Tech: Sequencing
	7.		Students model a husking tool that rotates to mimic real-life machinery.	- Understand how rotation is used in farming tools, - connect machines to daily life objects - understand the idea of automation	Science: Force & Direction, Rotational Motion Engg: Levers Tech: Automation

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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ENGINEERING & ROBOTICS

Math Engineering Technology Science	 8. BALL KICKING ROBOT	A robot that rotates and kicks a small ball powered by a motor and battery.	- Understand how force transfer moves objects. - Relate machines to other sports applications.	Science: Laws of Motion, Action Reaction Maths : Angle & Speed Engg: Structures
	 9. WINDSHIELD WIPER	Students build a wiper system that shows how rotation turns into back-and-forth motion.	- Understand difference between circular and back-and-forth motion - relate to robotics real world machines	Science: Types of Motion Math: Patterns Engg: Mechanical linkages to create back and forth motion
	 10. CART PUSHING ROBOT	A robot that pushes a mini cart to show movement and strength.	- Observe how Wheels reduce effort, - compare smooth vs rough movement, - Understand friction with and without rubber - understand transport systems	Science: Friction & Force Math: Speed Engg: Wheels & Axles
	 11. MERRY GO ROUND ROBOT	Students build a rotating platform that spins like a merry-go-round.	- Understand circular motion - observe stability during rotation - relate to playground rides	Science: Types of Motion, Rotational Force Math: Circles Engg: Rotating platforms
	 12. HELICOPTER ROBOT	Students create a robot with spinning blades to mimic a helicopter.	- Understand role of spinning blades and how machines fly - observe how a helicopter balances - connect to transportation machines	Science: Air & Rotational Motion Engg: Balance
	 13. TURTLE BOT	Students create a robot that moves like a turtle – steady and smooth.	- Observe animal movement styles, how does a turtle move - Creating structure to replicate turtle like movement	Science: Living vs Non-living things Math: Speed , Symmetry Engg: Design modification
	 14. AN AEROPLANE ROBOT	A simple robotic airplane model with rotating propellers.	- Explain how propellers cause movement, - observe direction control, - relate to airplanes	Science: Motion & Air Engg: Propulsion Tech: Motor application

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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15.

ELECTRIC MOTORCYCLE

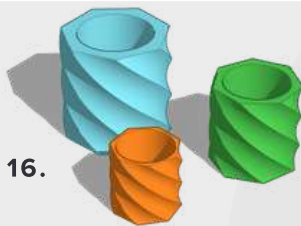
Students build a small model bike with a motor-driven wheel.

- Students understand how a two wheelers balance
- How direction of is changed, by changing the first wheel's angle
- Understand the model to real scooters.

Science – Balancing
Math – Angle, distance
Engineering – Wheels & axles
Technology – Motor-driven movement

NEW

TINKERCAD 3D DESIGN (OPTIONAL)



16.

PENCIL HOLDER

Students design a pencil holder using shapes and create a printable 3D model.

- Builds digital creativity
- Learns 3D shapes
- Understands design basics

- Geometry
- 3D modelling
- Spatial skills



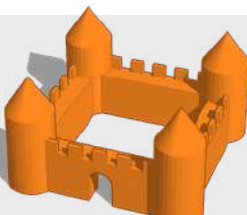
17.

FURNITURE SET

Students design tiny chairs, tables, or shelves using TinkerCAD shapes.

- Measurement, modelling
- Understands structures

- Model design
- Spatial awareness
- Learns scale, proportions



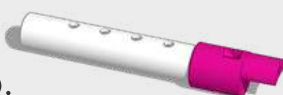
18.

SIMPLE CASTLE

Kids design towers, gates, and symmetry features of a castle in 3D.

- Learns geometric stacking & patterns
- Learns modelling
- Encourages imagination

- Geometry
- Structure
- Design basics



19.

WHISTLE OR TRINKET

Students create a small accessory or whistle model that can be 3D printed.

- Learns design for purpose
- Understands shapes
- Product Designing

- Shapes
- Art & design
- Spatial modelling

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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NEW

CODING – MIT APP INVENTOR (OPTIONAL)

20.



SOUND BUTTONS APP

Students create buttons that play different animal sounds (e.g., cat, dog, cow) when tapped.

- Learn to trigger actions (playing sounds) using event blocks.
- Understand how to connect events (button click → sound play).
- Develop listening and matching skills (sound to animal).
- Basic coding principles, event handling.
- Understanding sounds and their sources.
- Counting and sequencing buttons.

21.



FLASHLIGHT ON/OFF APP

Students create a simple app to toggle the flashlight on and off by pressing a button.

- Learn how to use device sensors (flashlight component).
- Understand the concept of toggle buttons (turning something on and off).
- Learn about basic device control in an app.
- Device management, basic coding.
- Basic understanding of light and how a flashlight works.
- On/off logic (binary concepts)

22.



SIMPLE DRAWING APP

Students build a screen-drawing app using touch controls.

- Improves creativity
- Understands touch events
- Learns UI elements
- Coding
- Human-computer interaction
- App logic

23.



QUIZ ME APP

Students create a quiz app with questions and feedback.

- Understands conditional logic
- Builds memory skills
- Learns simple UI
- Coding
- User interaction
- Logic blocks

Math

Engineering

Technology

Science

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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NEW

SCIENCE DIY ACTIVITIES (OPTIONAL)

24.



WATER WHEEL MODEL

Students build a simple wheel that turns using flowing water.

- Learns water force & rotation

- Renewable energy
- Basic mechanics

25.



HOMEMADE BALANCE SCALE

Kids create a scale to compare objects using a hanger or sticks.

- Understands weight comparison
- Balance and Pivot Point

- Measurement, mass
- Balance & scale

26.



MAGNET MAZE

Students move a piece inside a maze using a magnet under the sheet.

- Magnetic attraction
- Magnetic Materials

- Magnetic Force

27.



LEMON VOLCANO

Kids mix baking soda with lemon to create fizzy volcano bubbles.

- Acid-base reaction

- Chemical Change

28.



MYSTERY PROJECT

- Students build their own project
- solving a problem they see in the real world

- Testing their creativity
- Understanding of concepts to re-use and create

- Assess practically

Math

Engineering

Technology

Science

4



LET'S EXPLORE ROBOTICS

- **CONSTRUCTION**
- **3D DESIGN**
- **CODING**
- **SCIENCE**

An interactive STEM program featuring mechanical builds, precise 3D design, beginner app development, and practical science projects. Created to strengthen analytical thinking, design skills, experimentation, and real-world understanding in students.



NEW
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SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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CONSTRUCTION & ROBOTICS



1.

DARK TO GO ROBOT

A robot that starts moving automatically when darkness is detected.

- Understands light-dark sensing
- Learn about LDR sensor
- Learns input-output logic
- Develops autonomous movement

- Sensors & triggers
- Electrical circuits
- Logical automation



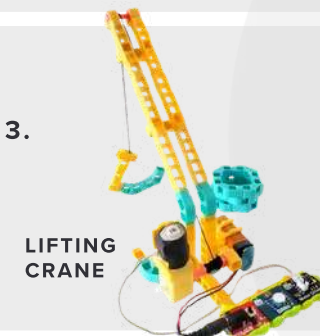
2.

CHAMELEON ROBOT

A robot that mimics the walk of a chameleon / lizard.

- Observe animal movement styles, how does a turtle move
- Creating structure to replicate chameleon like movement

- Science: Living vs Non-living things
- Math: Symmetry
- Bio-inspired engineering



3.

LIFTING CRANE

A crane robot that lifts objects using a motorised pulley system.

- Understands lifting mechanisms
- Learns about weight & pulleys
- Observes motor direction change

- Pulleys & Simple Machines
- Weight
- Engineering real world machines

NEW



4.

SMART VAULT SYSTEM

Smart Security Vault with A motorised vault door that opens and closes using a winch mechanism controlled by button "keys" and logic gates.

- Understands rotational movement, door movement
- Learns to integrate button, motor driver and power blox
- Applies mechanical winch concepts in a real model

- Inputs, actuators and automation control
- Simple machines: winch, and hinged door mechanisms
- Angles

NEW



5.

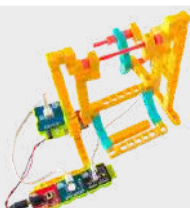
CONCRETE MIXER MACHINE

A rotating drum model that mixes materials like a real mixer.

- Understands how rotation causes mixing
- Learns about speed and centrifugal force
- Learns real-world machinery concepts

- Centrifugal Force
- Motor mechanics
- Industrial design basics

6.



SENSOR CONTROLLED MOTORISED SWING

A smart swing that automatically moves back and forth when the Dark sensor detects a light The motor rotates a crank-link mechanism, making the swing oscillate without any manual push.

- Learns about sensor-based activation
- Observes crank-link motion conversion
- Builds simple mechanical-electronic systems

- Motion, oscillation, gravity
- sensor input, motor output
- Crank-link mechanism, frame design
- Angles of swing, speed patterns

Math

Engineering

Technology

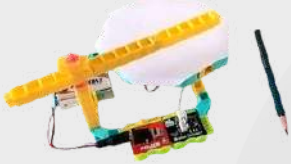
Science

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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CONSTRUCTION & MECHANICS

7.		A robot gripper that opens and closes using a motorised crank.	- Understands how Robotic hands work - How does friction between two objects enable gripping - Learns force control - Studies motion conversion	- Motor-linkage connection Mechanical gripping - Friction - Automation
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MOTORISED CRANK DRIVEN ROBOT GRIPPER

8.		Build a robot that moves in a circular path to draw a perfect circle using controlled motor speed and rotation.	- Understands circular motion - Learns about radius - adjust motor speed to control shape accuracy	- Circle Radius - Mechanics of links - Motor rotation - Automation basics
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CIRCLE DRAWING ROBOT

9.		A gripper built using a 4-bar linkage that produces smooth, even gripping motion.	- Understands how Robotic hands work - Learns linkage motion - Understands force distribution - Enhances problem-solving in mechanisms	- Linkage systems - Motion transfer - Mechanical engineering - Automation
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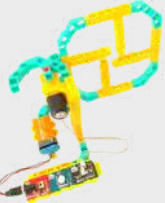
BAR LINKAGE MOTORISED GRIPPER

NEW 10.		A vending machine that drops balls when a sensor detects an object.	- Learns sensor-triggered output - Understands flow control & dispensing - Encourages automation creativity	- IR sensing - Input-output control - Smart mechanisms
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SENSOR-CONTROLLED BALL VENDING MACHINE

NEW 11.		A bridge model that retracts and extends using a motorised pull-and-release system.	- Learns retractable motion - Understands tension, pull & hinge action - Builds engineering imagination	- Rotary-to-linear movement - Motor control - Structural engineering
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MOTORISED RETRACTABLE SINGLE BRIDGE MECHANISM

12.		A door that opens automatically when the surroundings become dark.	- Understands automation - Learns condition-based action - Develops real-world application thinking	- Light sensors - Motor control - Logical programming
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DARK ACTIVATED MOTORISED DOOR

13.		A two-legged robot that pulls a small rickshaw model.	- Learns about mechanisms for handicapped people - Understands balance & load - Enhances robotics imagination	- Biped motion - Structural stability - Mechanical design
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HANDICAPPED ROBOT

Math

Engineering

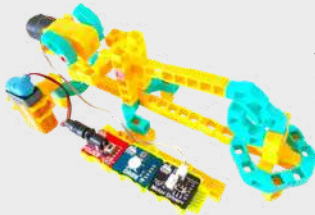
Technology

Science

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CONSTRUCTION & MECHANICS

14.



SENSOR-BASED MOTORISED POWER HAMMER

A hammer that automatically strikes when triggered by a sensor.

- Understands impact force
- Uses sensors for timing
- Learns repetitive automation

- Sensor triggers
- Motorised motion
- Energy transfer

15.



TABLETOP BLENDER MECHANISM

A small table model of a rotating blender mechanism.

- Learns mixing mechanics
- Understands rotational speed

- Rotational motion
- Motor output
- Practical design models

NEW

TINKERCAD 3D DESIGN (OPTIONAL)

16.



CUSTOM STAMP OR LOGO

A personalised 3D stamp or logo model created using geometric tools.

- Learns shape manipulation
- Understands embossing
- Develops brand design sense

- Geometry
- 3D modelling
- Creative design

17.



PERSONALIZED BOOKMARK

A unique bookmark designed with text and shapes in 3D.

- Learns layering & shapes
- Understands text design
- Improves creativity

- Shapes & patterns
- Precision placement
- Digital modelling

18.



3D ROOM DESIGN

A miniature 3D room designed with furniture and layout.

- Learns scaling
- Understands measurements
- Studies spatial layout

- Area & dimension
- Functional modelling
- Precision design

Math

Engineering

Technology

Science

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NEW

TINKERCAD 3D DESIGN

19.



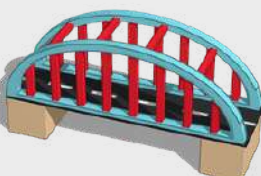
3D RING OR PENDANT

A small wearable 3D accessory such as a ring or pendant.

- Learns product design
- Studies curves & organic shapes
- Develops craftsmanship

- Symmetry
- 3D shapes
- Aesthetic design

20.



MINI BRIDGE DESIGN

A small, strong 3D bridge demonstrating supportive structure.

- Learns load distribution
- Understands structure
- Applies mathematical accuracy

- Structure stability
- Angles & symmetry
- Engineering design

NEW

CODING – MIT APP INVENTOR (OPTIONAL)

21.



PEDOMETER FITNESS APP

An app that counts steps like a simple fitness tracker.

- Learns data counting
- Understands sensors
- Builds UI logic

- Algorithms
- Input sensors
- Health & tech

22.



WEATHER VIEWER APP

An app that shows weather conditions on the screen.

- Learns API basics
- Understands data display
- Builds clean UI

- Data reading
- Screens & layouts
- Logic flow

23.



TRANSLATOR APP

A simple app that translates words from one language to another.

- Learns text conversion
- Builds multi-screen apps
- Enhances logic use

- Text handling
- Input/output
- Conditional commands

24.

SIMPLE CALCULATOR APP



A basic calculator app for addition, subtraction, multiplication, etc.

- Learns operations & logic
- Improves number handling
- Understands UI behaviour

- Arithmetic logic
- Buttons & events
- App workflows

Math

Engineering

Technology

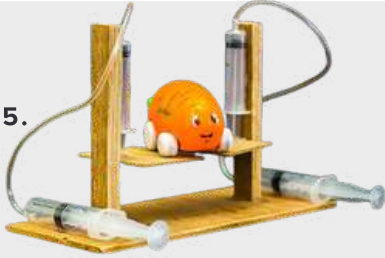
Science

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NEW

SCIENCE DIY ACTIVITIES (OPTIONAL)

25.



**HYDRAULIC LIFT
(SIMPLE SYRINGE MODEL)**

A lifting model made using syringes to show hydraulic power.

- Learns fluid pressure
- Understands force transfer
- Builds mechanical reasoning

- Pascal's law
- Hydraulic systems
- Simple machines

26.



BALL DROP CHALLENGE

A test where balls dropped from heights show speed differences.

- Learns gravity & speed
- Understands comparison
- Enhances analytical thinking

- Gravity
- Speed & height
- Observation science

27.



HOMEMADE WATER FILTER

A simple filter made using layers to clean water.

- Understands filtration
- Learns water purification
- Observes material properties

- States of matter
- Soil/sand filtration
- Environmental science

28.



MYSTERY PROJECT

- Students build their own project
- solving a problem they see in the real world

- Testing their creativity
- Understanding of concepts to re-use and create

- Assess practically

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LET'S EXPLORE **ROBOTICS**

- **CONSTRUCTION**
- **3D DESIGN**
- **CODING**
- **SCIENCE**

An advanced STEM course covering complex mechanisms, engineering-style 3D design, logic-based coding, and applied science activities. Designed to develop innovation, structured reasoning, technical confidence, and independent problem-solving abilities.

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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CONSTRUCTION & MECHANICS

Math Engineering Technology Science	1.		A fast-moving robotic car designed for track racing.	• Learns motor control • Understands direction logic • Develops competitive engineering skills	• Motor understanding • Motion algorithms • Structure stability
	2.		A robot car that stops or turns when something comes in front of it.	• Learns distance detection • Understands safety automation • Applies conditional logic	• Sensor input • Decision-making • Robotics safety
	3.		A robot that avoids falling off edges or tables.	• Learns surface detection • Understands drop avoidance • Improves logical navigation	• IR sensors • Movement control • Conditional responses
	4.		A robot that follows a black line using only one sensor.	• Learns contrast sensing • Understands path following • Builds calibration skills	• IR sensors • Infrared Light • Navigation logic • Simple algorithms
	5.		A motorised winch that lowers and lifts a bucket without touching.	• Learns automation • Understands motor lifting • Applies safe-distance triggers	• Sensor activation • Motor lifting • Real-world mechanisms
	6.		A robot that follows walls by keeping a fixed side distance.	• Learns continuous sensing • Understands direction logic • Reinforces autonomous navigation	• Proximity detection • Logic decisions • Robotics algorithms
	7.		Students build a hand-controlled barrier that lifts and drops like real railway gates.	• Learns detection response • Understands motion correction • Improves problem-solving	• Sensor scanning • Motor decision output • Path planning

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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CONSTRUCTION & MECHANICS

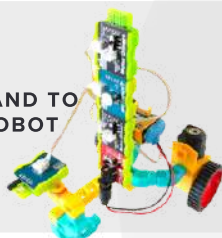
8.	BIDIRECTIONAL MATERIAL ELEVATOR	A model elevator that moves up/down when sensors are activated.	- Understands vertical motion - Learns two-way control - Studies sensor activation	- Up-down mechanism - Motor direction - Sensor triggers
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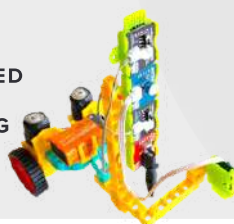
9.	SHOW HAND TO GO / REVERSE ROBOT	A robot that moves forward or backward when a hand is shown.	- Learns gesture-based control - Understands IR detection - Builds interactive systems	- IR input - Gesture logic - Condition-based movement
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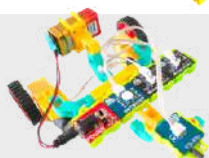
10.	SHOW HAND TO SEEK ROBOT	A robot that "seeks" your hand and moves toward it.	- Learns following behaviour - Understands distance tracking - Builds reactive motion	- Sensor tracking - Movement algorithms - Human-robot interaction
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11.	ADVANCED EDGE AVOIDING ROBOT	A smarter robot that avoids edges with improved accuracy.	- Learns multi-sensor logic - Understands complex navigation - Builds precision control	- Multi-sensor fusion - Navigation algorithms - Safety robotics
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12.	HAND FOLLOWING / AVOIDING ROBOT	A robot that either follows or avoids a hand with turning action.	- Learns dual behaviour - Understands proximity response - Enhances coding logic	- Bi-modal sensing - Directional logic - Motion planning
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13.	4 LEGGED MONSTER BUG ROBOT	A fun robot with four legs that walks like a creature.	- Learns walking mechanisms - Understands linkages - Enhances creativity	- Bio-inspired robotics - Legged motion - Mechanical rhythm
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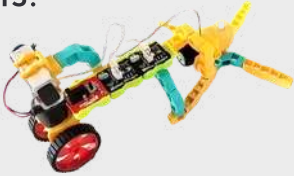


14.	SENSOR CONTROLLED TABLE FAN	A small fan that turns on/off or speeds up based on sensor input.	- Learns temperature/light control - Understands motor regulation - Studies real appliance logic	- Sensor data - Automation - Energy control
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SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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15.



ROOM CLEANING ROBOT

A mini cleaning robot that moves and sweeps small bits of paper.

- Learns sweeping motion
- Understands circular pathing
- Studies automation basics

- Rotation movement
- Path logic
- Real-world robotics

NEW

TINKERCAD 3D DESIGN (OPTIONAL)

16.



WORKING GEAR PAIR

A 3D gear set where one gear turns another accurately.

- Learns gear ratios
- Understands rotation transfer
- Studies mechanical systems

- Gear geometry
- Motion transfer
- Mechanical design

17.



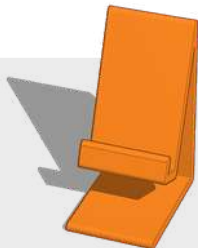
3D HOUSE BLUEPRINT

A 3D model of a house created from a blueprint.

- Learns scaling
- Understands blueprint reading
- Studies spatial layout

- Measurements
- Geometry
- Structure design

18.



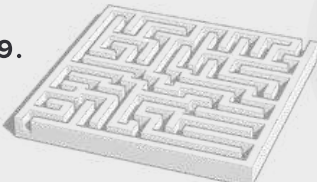
PHONE STAND

A practical phone stand designed using 3D shapes.

- Learns design for use
- Understands stability
- Builds precision modelling

- Symmetry
- Angles & support
- Functional modelling

19.



SIMPLE MAZE

A 3D maze with walls and pathways designed digitally.

- Learns path designing
- Understands layout planning
- Enhances creativity

- Geometry
- Grid structure
- Spatial reasoning

20.



MULTI-PART TOY

Students design animals using simple 3D shapes.

- Learns multi-component design
- Understands attachments
- Builds creative engineering

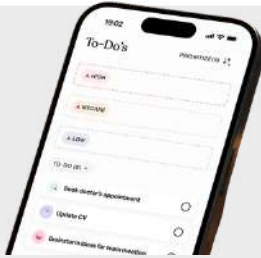
- Modular design
- Shape combination
- 3D assembly

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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NEW

CODING – MIT APP INVENTOR (OPTIONAL)

21.



TO-DO LIST APP

A simple app where users add and manage tasks.

- Learns data entry
- Understands storage
- Builds interface logic

- Variables
- UI elements
- Basic coding

22.



QUIZ APP (MULTI-QUESTION)

A multi-question quiz with score tracking.

- Learns question logic
- Understands scoring
- Builds decision trees

- Conditional logic
- Multiple screens
- Input/output

23.



MAP FINDER APP

An app that shows locations on a map screen.

- Learns map features
- Understands location use
- Builds navigation UI

- Map components
- Search logic
- User interface

24.



REACTION TIMER GAME

A game that measures how quickly a user taps the screen.

- Learns timing
- Understands random events
- Improves logic & UI feedback

- Events & timing
- Random blocks
- Game design

Math

Engineering

Technology

Science

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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NEW

SCIENCE DIY ACTIVITIES (OPTIONAL)

25.



**HOVERCRAFT
(BALLOON-POWERED)**

A small hovercraft powered by balloon-released air.

- Learns air pressure
- Understands thrust
- Builds motion curiosity

- Aerodynamics
- Pressure systems
- Motion science

26.



**AIR PRESSURE
LAUNCHER**

A launcher that pushes objects upward using air pressure.

- Learns compressed air
- Understands force release
- Builds experimental thinking

- Pressure
- Force & motion
- Energy burst

27.



PERISCOPE

A tube device that lets you see over walls using mirrors.

- Learns reflection
- Understands angles
- Studies light travel

- Optics
- Mirror angles
- Observation science

28.



MYSTERY PROJECT

- Students build their own project
- solving a problem they see in the real world

- Testing their creativity
- Understanding of concepts to re-use and create

- Assess practically

Math

Engineering

Technology

Science

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LET'S EXPLORE ROBOTICS

- **CONSTRUCTION**
- **3D DESIGN**
- **CODING**
- **SCIENCE**

A structured, hands-on program introducing students to basic construction, simple machines, 3D designing, beginner coding, and science experiments. Designed to build foundational thinking, creativity, observation, and problem-solving skills.

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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NEW

CONSTRUCTION & ROBOTICS

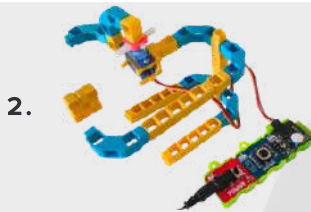


MOTORISED OBJECT PUSHER

Students build a servo-driven mechanism that pushes objects to study force, load, and controlled motion.

Explain how servo angle controls motion, compare pushing force for different loads, relate torque to object movement

Science: Force & motion, Friction Pressure
Math: Speed, Distance and Time
Engineering: Mechanical design, Linkage System, Stability



OBJECT GRABBING GRIPPER

A servo-controlled gripper to pick and release objects.

Demonstrate controlled gripping, explain how angle change opens/closes gripper, relate to robotic arms

Science: Force & motion, Friction
Math: Angles
Computers: Control logic
Levers, gripping force, angular motion



SMART DUSTBIN ROBOT

Automated lid opening system using servo motion.

Explain automated opening mechanisms, relate motion to hygiene solutions, understand basic automation logic

Science: Motion, Sensing
Distance
Math: Distance Measurement, Angle
Computers: Automation, cause-effect, rotation



GARAGE DOOR CONTROL SYSTEM

Students model a garage door that opens and closes using a servo motor to understand controlled lifting mechanisms.

Controlled lifting motion, explain real-life garage mechanisms, observe safety in automated systems

Science: Motion, Gravity
Math: Door Mechanism
Rotational motion, control systems



SECURED TURNSTILE GATE

Students build a rotating gate system that allows controlled access, similar to metro or office entry gates.

Explain access control using motion limits, relate to metro gates, understand controlled rotation

Science: Motion, torque
Math: Angles & symmetry, Timing
Computers: Security basics



WINDSHIELD WIPER MECHANISM

Students construct a wiper mechanism to convert motor rotation into back-and-forth wiping motion.

Convert rotary to oscillatory motion, explain sweep angle, relate to vehicle safety

Science: Motion, Controller
Engineering: Oscillatory motion, angular sweep
Math: Angle

A.I.

Engineering

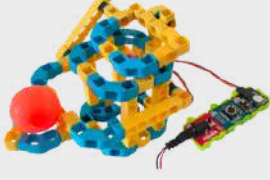
Technology

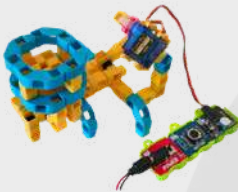
Science

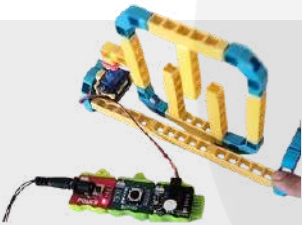
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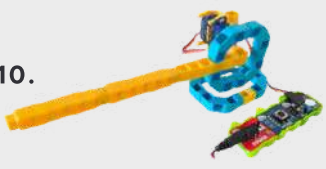
NEW

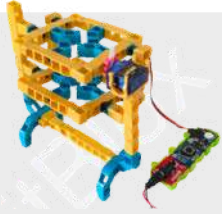
CONSTRUCTION & ROBOTICS

7.		Students design a mechanism that collects and pulls in balls through sequential mechanical movement.	Demonstrate step-by-step mechanical action, explain sequencing in machines	Science: Force & motion, Friction Sequential motion, timing, coordination Math: Angle
BALL EATING ROBOT				

8.		Students create a dispensing mechanism that releases an item using timed and controlled servo motion.	Explain how machines dispense items, observe timing-based motion, relate to real vending systems	Science: Motion, Gravity Math: Angle Rotational motion, control systems
VENDING MACHINE				

9.		Students build a door model that locks and unlocks using precise angular control of a servo motor.	mechanical locking, relate precision to security	Science: Motion Math: Angles Computers: Access control
CONTROLLED ACCESS SECURED DOOR USING SERVO MOTOR				

10.		Students design a safety barrier that lifts and lowers to simulate real railway crossing systems.	importance of timing in safety, relate to public infrastructure	Science: Motion , Friction Math: Time & sequence and Angle Computers: Control logic
RAILWAY BARRIER MECHANISM USING SERVO MOTOR				

11.		Students create an adjustable duct system to control airflow using angular motor positioning.	Understand how airflow is regulated, relate to buildings and HVAC	Science: Air & Atmosphere Math: Measurement Computers: System control Engineering: Flap Mechanism
VENTILATION DUCT CONTROL SYSTEM USING SERVO MOTOR				

12.		Students build a sweeping mechanism to clean solar panels, highlighting maintenance of renewable systems.	How cleaning improves efficiency, relate motion to maintenance	Science: Sources of Energy, Friction Math: Angle, Patterns Computers: Automation
CLEANING MECHANISM FOR SOLAR PANELS USING SERVO MOTOR				

A.I.

Engineering

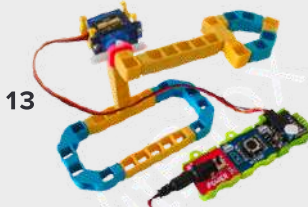
Technology

Science

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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NEW

CONSTRUCTION & ROBOTICS



13

BALL LAUNCHER USING SERVO MOTOR

Students design a launcher that throws a ball using stored mechanical energy and controlled force.

See how force stores and releases energy, compare distances

Science: Force & Energy
Math: Measurement
Computers: Control



14.

DOOR UNLOCK SYSTEM USING SERVO MOTOR

Students model a locking system where a servo motor unlocks a door through precise movement.

Demonstrate unlocking motion, explain real-life lock systems

Science: Motion
Math: Angles
Computers: Security systems



15.

SOLUTION AGITATOR SYSTEM

Students build a stirring mechanism to mix liquids, demonstrating circular motion and mixing processes.

Understand how stirring aids mixing, relate speed to effectiveness

Science: Separation of Substances
Math: Speed (intro)
Computers: Process control

NEW

TINKERCAD 3D DESIGN (OPTIONAL)



16.

KEY-PRESS ASSIST TOOL

Students design a 3D-printed assistive tool that helps press buttons easily using correct measurements.

Design a functional tool, apply accurate dimensions

- Functional 3D design
- Measurements & scaling
- Real-world engineering



17.

PROSTHETIC-STYLE GRIPPER

Students model a mechanical gripper inspired by prosthetic hands to understand linkage-based movement.

human-inspired engineering, model mechanical fingers

- Mechanical modelling
- Linkage design
- Human-assistive engineering



18.

MINIATURE CITY LAYOUT

Students design a scaled 3D city model with roads and buildings to learn layout planning and geometry.

Apply scale accurately, explain basic city planning

- Maps & layout geometry
- Measurement accuracy
- Urban design basics

A.I.

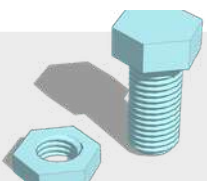
Engineering

Technology

Science

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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19.



CUSTOM MECHANICAL PART

Students design a precise mechanical part that fits into a system, focusing on accuracy and functionality.

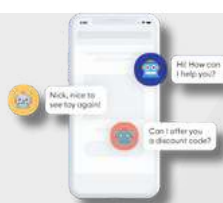
Design accurate parts, explain why precision matters

- Mechanical geometry
- Engineering design
- Multi-part construction

NEW

CODING – MIT APP INVENTOR (OPTIONAL)

20.



CHAT BOT APP

Students code an An app that answers user questions like a simple chatbot.

- Learns conditional replies
- Understands text-processing
- Builds UI interaction

- Events & logic blocks
- Input/output •
- Basic AI behaviour

21.



INVENTORY TRACKER APP

Students code an app that tracks items, stock levels, and quantities.

- Learns data storage
- Understands list management
- Builds functional UI

- Variables
- Database handling
- Productivity app skills

22.



FITNESS LOGGER APP

Students code an app that records daily steps, workouts, or habits.

- Learns data entry
- Understands tracking patterns
- Builds multi-screen design

- Variables & logs
- Charts/basic stats
- Health-based computing

NEW

SCIENCE DIY ACTIVITIES (OPTIONAL)

23.



HYDRAULIC ROBOTIC ARM (BASIC)

A syringe-powered arm that lifts and moves objects.

- Learns hydraulic force
- Understands fluid pressure
- Builds mechanical coordination

- Pascal's law
- Simple machines
- Robotics basics

A.I.

Engineering

Technology

Science

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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24.



MINI WIND TURBINE

A small turbine model that spins using wind.

- Learns renewable energy
- Understands blade rotation
- Studies electricity basics

- Energy conversion
- Motion → power
- Environmental science

25.



WATER CLOCK (CLEPSYDRA)

A clock that measures time using dripping water.

- Learns time measurement
- Understands flow rate
- Studies ancient engineering

- Motion of liquids
- Measurement
- Early technology

NEW

AI TOOLS (OPTIONAL)

26.



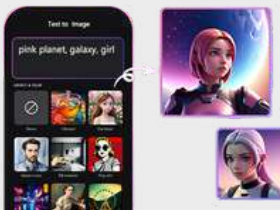
CREATE A WEBSITE USING VIBE CODING

Create a website using an AI tool understand how AI reads prompts.

- Learns prompting
- Understands language models

- Logical sequencing
- Language processing
- Technology communication

27.



CREATE A COMICBOOK USING AI

Design a comic book using an AI image generator. Students describe their own comic books vividly; AI converts text to image.

- Understands generative AI
- Learns descriptive prompting
- Builds visual creativity

- Shapes & visuals
- Image generation models
- Design & engineering thinking

28.



MYSTERY PROJECT

- Students build their own project
- solving a problem they see in the real world

- Testing their creativity
- Understanding of concepts to re-use and create

- Assess practically

A.I.

Engineering

Technology

Science



2026-27

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LET'S EXPLORE ROBOTICS

- CONSTRUCTION
- 3D DESIGN
- CODING
- SCIENCE

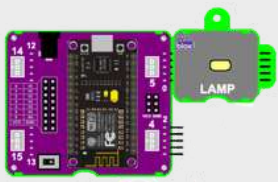
A structured, hands-on program introducing students to basic construction, simple machines, 3D designing, beginner coding, and science experiments. Designed to build foundational thinking, creativity, observation, and problem-solving skills.

AS PER N.E.P 2020

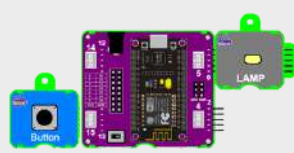
AS PER N.C.F 2023

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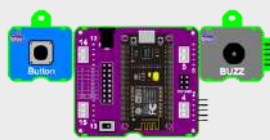
ROBOTICS & CODING

1.		A basic program that makes the onboard LED blink to understand timing and coding flow.	- How to use WitPro and its interface - Learn variables & loops - Understands digital output - Builds coding confidence	- Variables - Loops - Microcontroller basics - Programming logic
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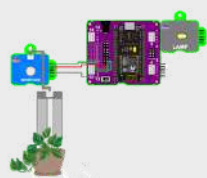
BLINKING AN LED

2.		A system where pressing a button triggers an output (LED or buzzer) that works only while the button is pressed.	- Understand push-button working - Learn digital input reading - Differentiate between pressed and released states	- Input Devices - Digital Signals (HIGH/LOW) - Boolean Logic
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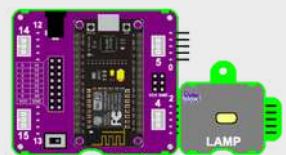
MOMENTARY INPUTS

3.		A system where pressing a button triggers an alarm system that stays active until reset.	- Learns input–output interaction - Learns toggle logic - Builds basic circuit skills	- Input / Output - Conditions - Toggle - Loops
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TOGGLE PANIC ALARM

4.		A system that detects soil moisture level and triggers a buzzer and LED when the soil becomes dry.	- Read analog sensor values - Understand threshold logic - Connect sensor input with output response	- Sensors & Analog Electronics - Data Interpretation - Conditional Programming
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MOISTURE BEEP AND LIGHT

5.		Students control the brightness of an LED using PWM to understand how digital signals can simulate analogue control.	- Understand PWM (Pulse Width Modulation) - Control LED brightness levels - Learn value mapping	- Electrical Energy & Intensity - Analog Output - Signal Variation
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CONCEPT OF BRIGHTNESS

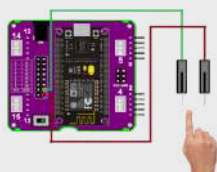
6.		A structure along with a circuit where pressing a button switches on a night lamp that stays on until clicked again.	- Practises input–output interaction - Practices toggle logic - Builds basic structure skills and integration with circuit	- Input devices - Electrical circuits - Logic gates
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BUTTON CONTROL NIGHT LAMP

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ROBOTICS & CODING

7.



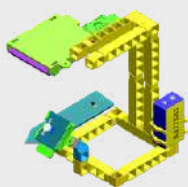
ANALOG INPUTS

A system that reads analog values from sensors and displays or uses them for control.

- Learns analog reading
- Understands variable input
- Builds real sensor logic

- Analog electronics
- Sensors
- Data interpretation

8.



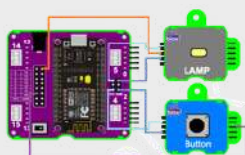
MOISTURE LAMP BRIGHTNESS

A smart system where soil moisture level automatically adjusts the brightness of a lamp.

- Combine analog reading with PWM
- Apply environmental data to control output
- Strengthen real-world automation thinking

- Environmental Science
- Sensor-Based Automation
- Data Mapping
- Smart Systems

9.



SERIAL COMMUNICATION

A project where data is sent from a laptop to the device through the Serial Monitor and components turn ON or OFF based on commands.

- Learn serial communication basics
- Send and receive data from laptop
- Control outputs using typed commands

- Data Communication
- Input/Output Interaction
- Terminal Interface
- IoT Foundations

AI EXPLORERS (OPTIONAL)

10.



TRAIN YOUR OWN AI

Use Google teachable machine, to Train an AI model to recognize hand gestures.

- Understand how supervised AI training works
- How AI is trained

- Data labeling
- Classification.
- Teachable Machine (image/audio).

11.



CREATE YOUR OWN BASIC CHATBOT

Design a chatbot for "School Library Assistant." using Jot form

- Understand Generative AI
- Integrate LLM API (Large language models)
- Understand GPTs

- ChatGPT / Poe / Dialogflow Lite (template mode)

12.



- Students build their own project
- solving a problem they see in the real world

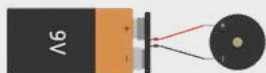
- Testing their creativity
- Understanding of concepts to re-use and create

- Assess practically

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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ELECTRONICS USING TINKERCAD (OPTIONAL)

13.



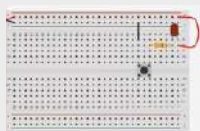
BUZZER CREATE SOUND

Students connect a piezo buzzer to a simple circuit and vary voltage to explore how electrical signals produce different sound intensities.

- Learns sound generation from electrical signals
- Understands piezoelectric effect basics
- Sees relationship between voltage & sound

- Sound & vibrations
- Electrical energy
- Basic electronics & sensors

14.



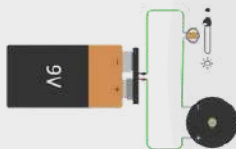
PUSH BUTTON CIRCUIT WITH LED

Students build a push-button LED circuit to explore momentary switches and understand manual control in everyday devices.

- Learns momentary vs maintained contacts
- Understands manual circuit control
- Relates to doorbells & keyboards

- Electric circuits
- Switches & control devices
- Real-world applications

15.



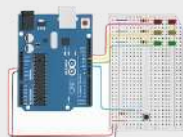
SENSOR BASED ALARM

Students connect a relay to control a load, observing how electromagnets enable switching and electrical isolation.

- Understands electromagnetic switching
- Learns isolation between circuits
- Sees how low-power signals control high-power devices

- Electromagnetism
- Control systems
- Power & safety engineering

16.



TRAFFIC LIGHT SYSTEM

Students design a simple LDR voltage divider to trigger an LED based on ambient light levels.

- Understands light-sensitive components
- Learns voltage divider principles
- Sees applications in automatic lighting

- Sensors & measurement
- Environmental sensing
- Electronics in automation

A.I.

Engineering

Technology

Science

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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CODING WITH PYTHON (OPTIONAL)

17. INTRODUCTION TO PYTHON

Students write their first Python program using print() and input() to display a simple student profile.

- Understand Python syntax
- Use input and output
- Store and display data using variables

- Python (IDLE / Thonny / Online IDE)
- Computer system
- Python basics
- Syntax
- print() and input()
- Variables

18. VARIABLES & OPERATORS

Create a calculator that performs basic mathematical operations using user input.

- Perform calculations using operators
- Store and manipulate numeric data
- Understand data flow in programs

- Python
- Keyboard input
- Variables
- Mathematical operators (+ - * /)
- Data manipulation

19. CONDITIONS (IF / ELSE)

Convert temperature from Celsius to Fahrenheit using conditional logic.

- Make decisions using conditions
- Understand logical flow
- Solve real-world problems with code

- Python
- Scientific reasoning
- if / else conditions
- Comparison operators
- Decision making

20. LOOPS (FOR LOOP)

Generate multiplication tables using a for loop.

- Understand repetition and iteration
- Automate repetitive tasks
- Improve logical thinking

- Python
- Mathematics integration
- for loop
- Range function
- Iteration

21. LOOPS (WHILE LOOP)

Build an interactive game where the program keeps running until the correct number is guessed.

- Use controlled repetition
- Apply condition-based loops
- Create interactive programs

- Python
- Game logic design
- while loop
- Conditions
- Controlled repetition

22. FUNCTIONS (MILESTONE PROJECT)

Create reusable functions to build an interactive quiz or story generator using menus, loops, and conditions.

- Write reusable code blocks
- Use parameters and return values
- Combine all learned concepts into one project

- Python
- Logical design & problem solving
- Functions
- Parameters & return values
- Loops + conditions
- Modular programming



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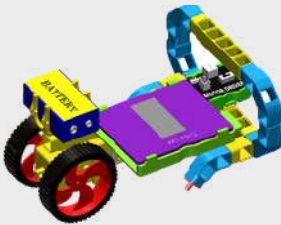
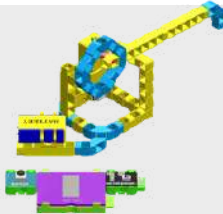
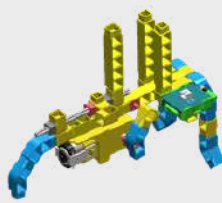
LET'S EXPLORE ROBOTICS

- CONSTRUCTION
- 3D DESIGN
- CODING
- SCIENCE

A structured, hands-on program introducing students to basic construction, simple machines, 3D designing, beginner coding, and science experiments. Designed to build foundational thinking, creativity, observation, and problem-solving skills.

AS PER N.E.P 2020

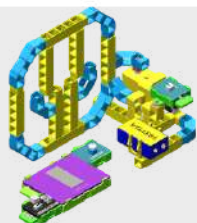
AS PER N.C.F 2023

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
ROBOTICS & CODING				
1.	 MOTOR CAR	Students build a simple motor-driven car and control forward and backward motion using programmed digital outputs.	Basic motor control and movement directions	- Physics: Motion & Force - Computer: Digital output control
2.	 THE MOTOR MASTERY	Students learn to control motor speed using pulse width modulation and observe how signal variation changes speed.	Understand motor speed control using PWM	- Physics: Speed & Energy - Computer: PWM & Signal Control
3.	 SPEED DEMON	Students experiment with different speed levels and compare performance outcomes using measurable parameters.	Speed variation and performance testing	- Math: Measurement & Comparison - Physics: Velocity
4.	 MONSTER ROBOT	Students create a powerful robot using multiple motors and coordinate directional movement.	Multi-motor coordination	- Physics: Motion in multiple directions - Computer: Logic control
5.	 RAILWAY BARRIER	Students design an automatic railway gate that opens and closes using sensor detection logic.	Programming motor driver control using sensor input	- Physics: Automation systems - Computer: Conditional programming
6.	 RAPID SHOOTER	Students build a rotating shooter mechanism using controlled motor bursts and timed commands.	Motor timing and trigger control	- Physics: Rotational motion - Computer: Timed sequences

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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ROBOTICS & CODING

7.



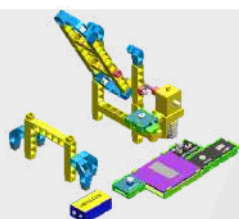
HAND MOTION DOOR

Students use motion or IR sensors to control robot movement using hand gestures.

- Gesture-based input control

- Physics: Sensors & Waves
- Computer: Analog input processing

8.



SMARTDRAW BRIDGE

Students build a lifting bridge mechanism controlled by a Witpro programmed chip.

- Servo angle control and mechanical design

- Physics: Simple machines
- Math: Angles

9.



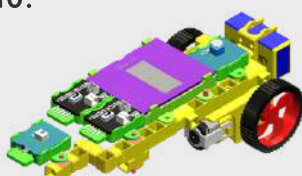
MIXER MACHINE

Students design a mixing system using controlled motor rotation and looping logic.

- Continuous motor rotation control

- Physics: Circular motion
- Computer: Loop programming

10.



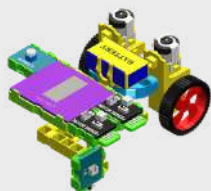
OBSTACLE AVOIDER

Students build a robot that detects obstacles using ultrasonic sensors and changes direction automatically.

- Distance sensing and conditional navigation

- Physics: Distance measurement
- Computer: If-Else logic

11.



THE EDGE AVOIDER

Students design a robot that detects edges or table boundaries and prevents falling.

- Cliff detection and safety automation

- Physics: Reflection & Sensors
- Computer: Sensor-based decision making

12.



ROTATING TURRET SHOOTER

Students create a rotating turret system with controlled aiming mechanism.

- Motor sweep control and targeting logic
- Witpro advanced the time and aim angle mechanism.

- Physics: Angular motion
- Computer: Control systems

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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ROBOTICS & CODING

13.



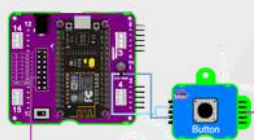
THE LINE FOLLOWER

Students program a robot to follow a line using IR sensor input and logic-based steering.

- IR sensor data interpretation

- Math: Pattern recognition
- Computer: Data mapping

14.



SERIAL MONITOR

Students control a door mechanism using serial commands sent from a computer interface.

- Serial communication and command control

- Computer: Data transmission
- Physics: Electronic control systems

AI EXPLORERS (OPTIONAL)

15.



AI SCHOOL CHATBOT

Build a chatbot that answers school-related questions, explains concepts, and helps students study.

- NLP basics
- Prompt design
- Conversational logic

- ChatGPT, Prompt Engineering, NLP, Intent Mapping

16.



AI SMART MONEY MANAGER & SPENDING PREDICTOR

Students design an AI-powered personal finance system that tracks expenses, analyzes spending behavior, predicts future expenses, and gives smart financial suggestions.

- Understand financial data & budgeting
- Apply math concepts (percentages, averages, trends)
- Use AI for prediction & decision-making

- Predictive AI – future expense estimation
- Decision Intelligence – smart suggestions
- Rule-Based AI – spending alerts
- Automation AI – workflow execution
- Generative AI – reports & explanations

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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CODING WITH PYTHON (OPTIONAL)

17. INTRODUCTION TO PYTHON

Students write their first Python program using print() and input() to display a simple student profile.

- Understand Python syntax
- Use input and output
- Store and display data using variables

- Python (IDLE / Thonny / Online IDE)
- Computer system
- Python basics
- Syntax
- print() and input()
- Variables

18. VARIABLES & OPERATORS

Create a calculator that performs basic mathematical operations using user input.

- Perform calculations using operators
- Store and manipulate numeric data
- Understand data flow in programs

- Python
- Keyboard input
- Variables
- Mathematical operators (+ - * /)
- Data manipulation

19. CONDITIONS (IF / ELSE)

Convert temperature from Celsius to Fahrenheit using conditional logic.

- Make decisions using conditions
- Understand logical flow
- Solve real-world problems with code

- Python
- Scientific reasoning
- if / else conditions
- Comparison operators
- Decision making

20. LOOPS (FOR LOOP)

Generate multiplication tables using a for loop.

- Understand repetition and iteration
- Automate repetitive tasks
- Improve logical thinking

- Python
- Mathematics integration
- for loop
- Range function
- Iteration

21. LOOPS (WHILE LOOP)

Build an interactive game where the program keeps running until the correct number is guessed.

- Use controlled repetition
- Apply condition-based loops
- Create interactive programs

- Python
- Game logic design
- while loop
- Conditions
- Controlled repetition

22. FUNCTIONS (MILESTONE PROJECT)

Create reusable functions to build an interactive quiz or story generator using menus, loops, and conditions.

- Write reusable code blocks
- Use parameters and return values
- Combine all learned concepts into one project

- Python
- Logical design & problem solving
- Functions
- Parameters & return values
- Loops + conditions
- Modular programming

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on Hot Seat of KBC



VIDUSHI DAGA

Chairperson OLL
15+ Years in Education
Taught 5 lac+kids



AMIT MODI

IIT Bombay Alumni
10+ Years in Robotics
Education for Kids



HEATHER ANDERRSON

President UNESCO World
Genesis Foundation
15+ Years in Education

AS SEEN ON SHARK TANK INDIA, ON HOT SEAT OF KBC





2026-27

9 & 10

LET'S EXPLORE ROBOTICS

- **AUTOMATION**
- **INDUSTRY GRADE**
- **I.O.T**
- **REAL WORLD**

A structured, hands-on program introducing students to basic construction, simple machines, 3D designing, beginner coding, and science experiments. Designed to build foundational thinking, creativity, observation, and problem-solving skills.



AS PER N.E.P 2020

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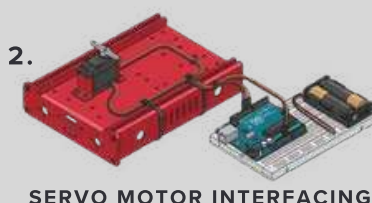
ROBOTICS & CODING



Assemble a metal chassis robot car with motors, wheels, couplers and fasteners.

- Assemble mechanical systems correctly,
- Understand load distribution and stability

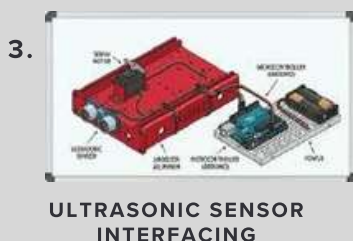
- Basic Robotics
- Mechanical Engineering.



Control servo movement using microcontroller.

- Understanding the Breadboard & how it works
- Control servo angles through code
- relate signals to motion

- Arduino Connection
- Basic Electronics
- Servo Motors
- Control Systems.



Connect ultrasonic sensor and measure distance digitally.

- Measure distance using time-of-flight, interpret sensor data

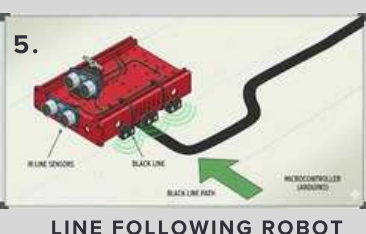
- Science: Sound
- Math: Speed-time-distance
- Computers: Sensors & input



Mount ultrasonic sensor on servo to scan surroundings.

- Create scanning systems, visualise distance across angles
- Angular motion, scanning, looping logic

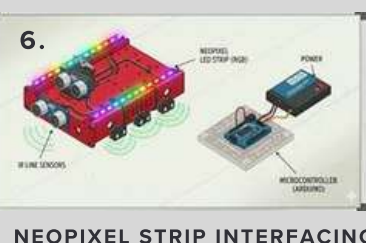
- Science: Sound & motion
- Math: Angles
- Computers: Loops



Robot follows a black line using IR sensors.

- Learn about IR sensors.
- Learn about Infrared technology
- Reflection of light, threshold logic, feedback
- Implement closed-loop control, tune sensor thresholds

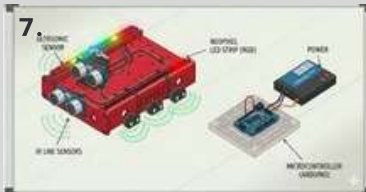
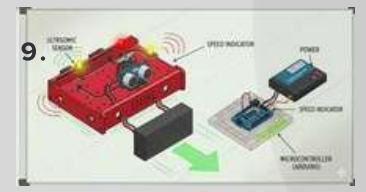
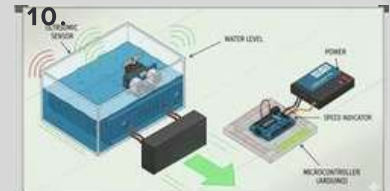
- Science: Light
- Math: Logic
- Computers: Conditionals



Program addressable RGB LED strip on robot chassis.

- Learn about LED (Light emitting diode)
- Understands Loops
- Control LEDs programmatically, create patterns
- RGB colour mixing, digital addressing

- Science: Electric circuits, Light
- Math: Patterns
- Computers: RGB Colour coding system

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
ROBOTICS & CODING				
7.		Coding the Distance of IR sensor values using LED levels on a strip.	- Input using IR sensor - Convert numeric sensor data to visual output - Data mapping, visual indicators	- Math: Ratios & ranges - Computer: Data representation & Data
8.		Students build a car reverse parking system, where the rear ultrasonic sensor triggers warning outputs as distance reduces. Indicating the object is coming closer	- Breaking down real world Safety systems - Understanding sensor real life applications. - Proximity sensing, alert logic	- Physics: Sound - Math: Comparison - Computer: Conditional logic
9.		Students code a robot where the Motor speed automatically changes based on distance sensor input.	- Implement variable speed control using sensor data - Feedback systems, PWM speed control	- Physics: Motion - Math: Variables - Computer: Control logic
10.		Students build a robot where the Ultrasonic sensor measures liquid level without physical contact.	- Measure water levels safely using sensors - Understanding SONAR systems of sound vibration based depth measurement - Basics of industrial robotics.	- Physics: Sound SONAR - Math: Measurement, Distance - Computer: Input data calculation
11.		Robot detects obstacles and changes direction autonomously.	- Practices Decision making, Conditions using input and output - Autonomous movement.	- Physics: Motion - Math: Direction - Computer: If-else
12.		Students control robot wirelessly from mobile app or web controller.	- IoT basics, - wireless communication. - Send commands remotely - Explain basic networking control	- ICT, - IoT Foundations.

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ROBOTICS & CODING

13.



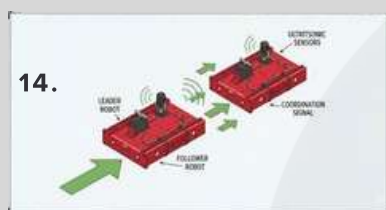
VOICE COMMAND ROBOT

Robot executes predefined commands given through voice module.

- Speech interface, automation.
- Understand sound-to-command mapping
- Trigger programmed actions

- AI Interaction
- Embedded Tech.

14.



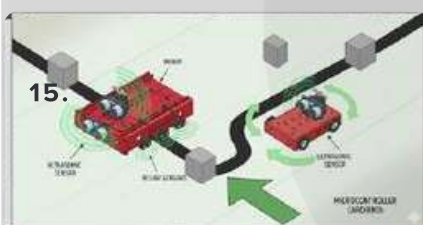
MASTER-FOLLOWER ROBOT

Students create One robot that leads, and another follows using sensors.

- Multi-robot logic
- IR+Ultrasonic use.

- Advanced Robotics Concepts.

15.



LINE FOLLOWING ROBOT

Combines line following with obstacle avoidance.

- Hybrid logic,
- Coding optimization.

- Integrated Robotics Systems.

16.

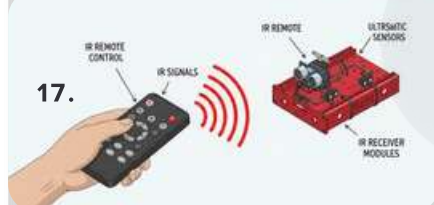


Robot maintains constant distance from wall.

- Proportional control
- sensor logic.

- Algorithms, Real-World Robotics.

17.



IR REMOTE CONTROLLED ROBOT

Students control robot wirelessly from mobile app or web controller.

- IR decoding,
- Pair device wirelessly
- Send commands remotely
- Explain basic networking control

- Communication Devices,
- Electronics.

18.



EDGE AVOIDER ROBOT

Detects table edges and prevents falling.

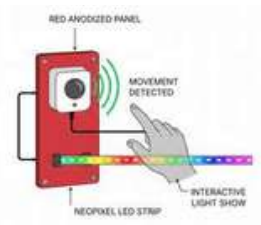
- Safety logic,
- IR reflective sensing.

- Sensors, Autonomous Systems.

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ROBOTICS & CODING

19.



INTERACTIVE IR LED STRIP

LEDs respond to IR sensor inputs.

- Responsive lighting, real-time coding.

- Electronics
- Human-Tech Interaction.

20.



WIFI CONTROLLED DIWALI LIGHTS

Control decorative LEDs through WiFi.

- IoT lighting, automation basics.

- Smart Home Technology, IoT.

AI EXPLORERS

26.



AI SCHOOL CHATBOT

Build a chatbot that answers school-related questions, explains concepts, and helps students study.

- NLP basics
- Prompt design
- Conversational logic

- ChatGPT, Prompt Engineering, NLP, Intent Mapping

27.



AI SMART MONEY MANAGER & SPENDING PREDICTOR

Students design an AI-powered personal finance system that tracks expenses, analyzes spending behavior, predicts future expenses, and gives smart financial suggestions.

- Understand financial data & budgeting
- Apply math concepts (percentages, averages, trends)
- Use AI for prediction & decision-making

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- Automation AI – workflow execution
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28.

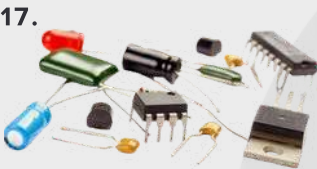
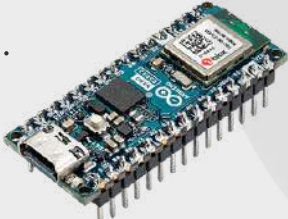
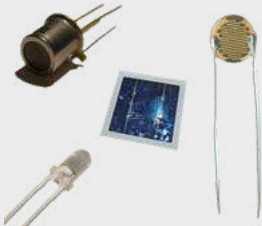


MYSTERY PROJECT

- Students build their own project solving a problem they see in the real world

- Testing their creativity
- Understanding of concepts to re-use and create

- Assess practically

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
INDUSTRIAL AUTOMATION WITH ARDUINO & ESP32				
16.	 INTRODUCTION TO AUTOMATION SYSTEMS	Students explore what automation is, where it's used, and how industries rely on automated machines for production.	- Understand levels of automation - Identify automation in daily life - Differentiate PLCs and microcontrollers	- Real-world machines - Automation systems - Industrial workflows - Logical analysis
17.	 BASICS OF ELECTRICAL & ELECTRONIC COMPONENTS	Students learn safe handling of electrical components and assemble a basic LED-switch circuit.	- Identify resistors, LEDs, relays, motors - Follow electrical safety steps - Build simple breadboard circuits	- Electricity basics - Circuits & components - Breadboard wiring - Resistance, polarity
18.	 INTRODUCTION TO ARDUINO UNO & ESP32	Students learn the layout of Arduino and ESP32 boards and upload their first LED blink program.	- Understand microcontroller architecture - Upload code using IDE - Identify input/output pins	- Light & electricity - Coding & hardware - Digital control - Timing cycles
19.	 SENSORS	Students interface IR and ultrasonic sensors to observe real-time values.	- Identify different sensors - Read analog/digital signals - Use Serial Monitor for data	- Waves, distance - Electronic sensing - Sensor wiring - Measurement readings
20.	 ACTUATORS	Students drive a DC motor and servo using Arduino outputs.	- Understand electrical-to-mechanical motion - Control motor direction & speed - Operate servos precisely	- Forces & motion - Actuator control - Motor drivers - Angle values

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INDUSTRIAL AUTOMATION WITH ARDUINO & ESP32

21.



RELAY ISOLATION LAB

Students learn how relays safely control higher-power devices using Arduino.

- Understand relay operation
- Implement safety isolation
- Build relay control circuits

- Magnetism
- Relay switching
- Safe design
- Voltage levels

22.



MINI AUTOMATION SYSTEM

Students create an automatic fan/light using LDR or temperature sensors.

- Apply if-else logic
- Build complete automation loop
- Analyze threshold values

- Heat/light
- Automation logic
- Functional systems
- Threshold mapping

23.



CONVEYOR BELT SYSTEM

Students design a small working conveyor using a DC motor and belt.

- Understand material handling
- Build functional conveyor
- Detect objects using sensors

- Motion
- Motor control
- Conveyor design
- Speed calculation

24.



SMART SORTING MECHANISM

Students build a system that detects object color/type and sorts it using a servo diverter.

- Detect objects using sensors
- Control servo diverters
- Implement sorting logic

- Light reflection
- Color/IR tech
- Sorting mechanisms
- Logical flow

25.



INTRODUCTION TO ROBOTIC ARMS

Students assemble a robot arm and manually control its movements.

- Understand degrees of freedom
- Operate multiple servos
- Learn basic arm anatomy

- Rotational motion
- Servo control
- Robotic joints
- Angles & position

SR NO	PROJECT NAME	PROJECT DESCRIPTION	LEARNING OUTCOMES	ALIGNMENT TO STEM SYLLABUS
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INDUSTRIAL AUTOMATION WITH ARDUINO & ESP32

16.



CODING ROBOTIC MOVEMENTS

Students write code to move the arm from point A to B automatically.

- Write motion sequences
- Use timed automation
- Execute pick-and-place cycles

- Load & torque
- Automation coding
- Sequence design
- Angle mapping

17.



CONVEYOR BELT + ROBOTIC ARM INTEGRATION

Students integrate conveyor detection with robotic arm picking.

- Synchronize sensors with actuators
- Build end-to-end industrial cycle
- Understand system timing

- Motion & timing
- Real automation
- System integration
- Delay & sync values

18.



ESP32 WI-FI BASICS

Students use ESP32 to display sensor values on a live webpage.

- Create web server
- Read wireless sensor data
- Understand IoT basics

- Waves & signals
- Wi-Fi systems
- Embedded networking
- Data sampling

19.



MOBILE-CONTROLLED AUTOMATION

Students control motors/servos using mobile apps via ESP32.
LEARNING OUTCOMES:

- Operate devices remotely
- Connect microcontroller to cloud
- Build mobile IoT control

- Communication
- IoT platforms
- Remote systems
- Real-time data

20.



INDUSTRIAL DATA LOGGER

Students log environmental data and analyze trends for automation decisions.

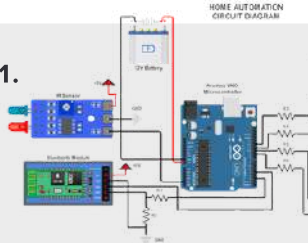
- Collect and store sensor data
- Interpret graphs
- Understand predictive control

- Environmental factors
- Data handling
- Smart automation
- Graph analysis

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INDUSTRIAL AUTOMATION WITH ARDUINO & ESP32

21.



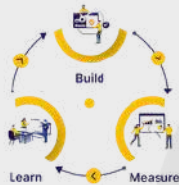
AUTOMATION SYSTEM BLUEPRINT

Students design their final automation project with diagrams and components list.

- Plan automation systems
- Create block diagrams
- Choose sensors & actuators
- STEM ALIGNMENT:
- Full STEM integration

Full STEM integration

22.



PROTOTYPE BUILD & DEBUG

Students assemble, wire, code, and test their project.

- Build functional automation
- Debug circuits & code
- Improve system reliability

• Full STEM integration

23.



IOT & AUTOMATION SHOWCASE

Students present their completed automation system

- Communication & teamwork
- Explain logic, circuitry, and design
- Demonstrate real industrial workflow

• Full STEM integration

24.



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