Navachar 2025 – Ready-to-Understand Example Project Ideas

This document provides detailed, ready-to-build example ideas for all five categories of Navachar 2025. Each project includes objectives, materials, working mechanisms, and AI integration guidance to help students visualize and create practical science models.

1. Agriculture – Smart Farming & Crop Management

Project: Smart Irrigation System Using Soil Moisture Sensors

Objective: Automate irrigation based on soil moisture levels.

Materials: Arduino UNO, soil moisture sensor, relay module, water pump, LEDs, and a power supply.

How It Works:

• The sensor detects soil moisture.

• When it drops below a set level, the Arduino activates the water pump.

• Once sufficient moisture is reached, it stops automatically.

AI Integration: Use a small dataset to predict when irrigation will be needed next (based on temperature, humidity, and soil readings).

Project: AI-Based Pest Detection

Objective: Detect pest infestations using AI-based image recognition.

Materials: Raspberry Pi / ESP32-CAM, camera module, and model crops (paper or artificial).

How It Works:

• The camera captures leaf images.

• An ML model (trained on pest vs. healthy leaves) identifies infections.

• A buzzer or LED signals the alert.

AI Integration: Trained image classifier using Teachable Machine or Edge Impulse.

2. Energy & Its Conservation

Project: Hybrid Solar-Wind Energy Generator

Objective: Demonstrate how solar and wind energy can work together to produce power.

Materials: Mini solar panel, small DC motor with propeller (as wind turbine), LEDs, multimeter.

How It Works:

• Both sources feed into a charge controller that powers LEDs or charges a battery.

AI Integration: An AI model predicts energy output based on sunlight/wind intensity data.

Project: Smart Street Light System

Objective: Reduce electricity wastage by automatically controlling street lights.

Materials: LDR sensor, IR motion sensor, Arduino, LEDs.

How It Works:

• Lights turn ON automatically when it's dark (detected by LDR).

• Motion sensors turn them OFF if no movement is detected.

AI Integration: Predict traffic density patterns to optimize lighting duration.

3. Industrial Development & Environment

Project: Air Quality Monitoring Station

Objective: Monitor air pollution levels in industrial areas.

Materials: MQ-135 gas sensor, Arduino, LCD display, Wi-Fi module.

How It Works:

• The system measures air pollutants (CO■, NOx).

• Displays values and color-codes the air quality index.

AI Integration: Trend analysis to predict pollution spikes.

Project: Automated Waste Segregation System

Objective: Segregate waste into dry and wet automatically.

Materials: Ultrasonic sensor, servo motor, moisture sensor, conveyor setup.

How It Works:

• Sensor identifies type of waste (metal/non-metal or wet/dry).

• Servo directs it to correct bin.

AI Integration: Use camera vision to classify waste types more accurately.

4. Educational Technology

Project: AI-Powered Science Demonstrator

Objective: Demonstrate Newton's Laws with sensors and AI feedback.

Materials: Motion sensor, Arduino, LCD, or buzzer.

How It Works:

• When an object moves, sensors measure acceleration and display force readings.

• The AI component predicts outcomes (e.g., motion duration).

AI Integration: Use regression models to predict acceleration vs. mass relationships.

Project: AR Periodic Table

Objective: Make chemistry more interactive with Augmented Reality.

Materials: Mobile phone, printed element cards, AR app (like ZapWorks or Unity).

How It Works:

• Scanning an element card displays 3D atomic structures or properties.

AI Integration: Personalized quizzes based on which elements the user struggles with.

5. Technology in Health & Inclusivity

Project: Smart Health Monitoring Wristband

Objective: Monitor vital signs such as heart rate and oxygen level.

Materials: Pulse sensor, temperature sensor, Arduino Nano, OLED display.

How It Works:

• Sensors track vitals and display on the screen.

• Alerts are triggered if readings cross safe limits.

AI Integration: Predict potential health risks based on previous readings.

Project: Assistive Walking Stick for the Visually Impaired

Objective: Detect obstacles and alert the user.

Materials: Ultrasonic sensor, vibration motor, buzzer, Arduino.

How It Works:

• Sensor detects objects within 1 meter.

• The stick vibrates or beeps to warn the user.

AI Integration: Add voice feedback or object identification using a small ML model.