SRUSTI CENTRE FOR SUSTAINABLE DEVELOPMENT (SCSD)

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**SRUSTI ACADEMY OF MANAGEMENT AND TECHNOLOGY (AUTONOMOUS)**

**Srusti Centre for Sustainable Development (SCSD)**

**ACADEMIC IMPLEMENTATION FRAMEWORK**

# Sustainability Project-Based Learning Framework

*Student Engagement and Capability Development*

*Environmental Science and Sustainability (VAC101)*

**Academic Year 2025-26**

| | | |
|---|---|---|
| **BIO-ENZYME**<br>Organic-waste conversion, observation and practical use planning. | **HERB GARDEN**<br>Container gardening, growth monitoring and care management. | **WASTE-TO-WEALTH**<br>Waste-paper reuse, creative production and cultural sustainability. |

Bhubaneswar, Odisha

*Structured project learning through planning, execution, observation, reflection and assessment*

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**Section**

# 1. Purpose and Academic Design

The Environmental Science and Sustainability (VAC101) project framework extends classroom learning into a structured three-month academic engagement. Students work in project teams on practical sustainability themes, follow a defined weekly schedule, maintain project records and complete a final presentation. The design enables learners to connect environmental concepts with resource use, institutional practices, teamwork and responsible decision-making.

**Table 1: Academic Components of the Project Framework**

| Structured Duration | Team-Based Responsibility |
|---|---|
| The project cycle is planned for 13 weeks, with two sessions per week and approximately 1.5 hours per session. Each week has a defined operational task and expected output. | Student leaders and functional coordinators manage attendance, materials, process quality, data recording, housekeeping, photographs, documentation and presentation. |

## 1.1 Academic Components

**Table 2: Project Learning Cycle**

| | |
|---|---|
| 1 | **Project planning:** Selection of a sustainability issue, role allocation, material planning, work scheduling and safety preparation. |
| 2 | **Practical execution:** Regular project activity involving organic-waste processing, campus gardening or waste-paper product development. |
| 3 | **Observation and recording:** Maintenance of fermentation, growth, cost, material-use and progress records throughout the project cycle. |
| 4 | **Analysis and reflection:** Identification of operational issues, corrective action, sustainability relevance, campus application and SDG linkage. |
| 5 | **Academic communication:** Submission of the final output, project report, learning note, display material and presentation. |

## 2. Sustainability Projects and Learning Contexts

Three project themes provide different but complementary sustainability learning contexts. Each project requires students to combine technical activity with planning, observation, teamwork and responsible use of resources.

**Table 3: Sustainability Projects and Planned Outputs**

| Project theme | Core activity | Primary learning context | Planned output |
|---|---|---|---|
| Bio-Enzyme Preparation | Preparation of six separately labelled bio-enzyme batches using eggshells, neem leaves, vegetable peels, citrus peels, tea leaves and banana peels. | Organic-waste utilisation, fermentation monitoring, quality control, safe dilution, plant care and campus use. | Six samples, observation records, process charts, use-case chart, cost sheet, report and presentation. |
| Kitchen Herb Garden | Establishment and maintenance of a container-based garden with coriander, mint, tulsi, curry leaves, fenugreek, ajwain and lemongrass. | Resource-efficient cultivation, biodiversity, plant-care discipline, growth monitoring and campus replicability. | Functional herb garden, labels, growth records, care manual, cost sheet, report and presentation. |
| Waste-to-Wealth Product | Conversion of discarded paper into an eco-friendly Jagannath statue through paper-mache or paper-clay technique. | Waste segregation, creative reuse, low-cost innovation, process quality, safe handling and cultural sustainability. | Completed product, process record, display board, cost sheet, report and presentation. |

### 2.1 Common Project Cycle

| PLAN | IMPLEMENT | OBSERVE | IMPROVE | PRESENT |
|---|---|---|---|---|
| Define the task, assign responsibilities and arrange materials. | Carry out the technical work through scheduled sessions. | Record progress, measurements, quality issues and costs. | Review outcomes, resolve problems and refine the project. | Compile the report, learning note, display and presentation. |

## 3. Capability Development Framework

The project design develops academic, professional and personal capabilities through repeated practice across the three-month cycle.

**Table 4: Capability Development through Project Work**

| Capability | Development through project work | Student performance indicators |
|---|---|---|
| Systems thinking | Learners connect waste, natural resources, plant systems, campus operations, stakeholders and long-term consequences. | Explains interrelationships, identifies trade-offs and links project choices with sustainability outcomes. |
| Environmental responsibility | Projects address organic waste, resource conservation, biodiversity, cleaner practices and responsible consumption. | Selects appropriate materials and methods, minimises waste and follows safe-use instructions. |
| Planning and teamwork | Defined roles create accountability for coordination, materials, process quality, records, housekeeping and presentation. | Completes assigned responsibilities, collaborates with the team and follows the project schedule. |
| Observation and data discipline | Students maintain fermentation, growth, progress, cost and material-use records over multiple weeks. | Records observations regularly, compares progress and presents information accurately. |
| Problem-solving | Learners identify spoilage, plant-health, structural, material and quality issues and take corrective action. | Diagnoses project issues, applies suitable corrections and documents improvement decisions. |
| Communication and reflection | Final reports, learning notes, display material and presentations require structured explanation and reflection. | Communicates process, sustainability relevance, learning and recommendations with clarity. |

**Learning approach:** Capability is developed through the full cycle of planning, practical work, observation, corrective action, documentation and presentation. The focus is not limited to the final product; it also includes the quality of the process and the learner's ability to explain sustainability implications.

## 4. Assessment and Academic Monitoring

Project assessment combines common academic parameters with project-specific performance. The consolidated framework allocates 20 marks to common parameters and 30 marks to project-specific parameters, resulting in a total of 50 marks per student or project.

**Table 5: Project Assessment Structure**

| Common Parameters - 20 Marks | Project-Specific Parameters - 30 Marks |
|---|---|
| Planning and team discipline, project execution, regular records, sustainability relevance, final presentation and learning reflection. | Technical quality and completion requirements defined separately for the bio-enzyme, herb-garden and waste-to-wealth projects. |

### 4.1 Academic Monitoring Structure

**Table 6: Academic Monitoring Records**

| Monitoring record | Purpose | Review responsibility |
|---|---|---|
| Attendance register | Records regular student participation across scheduled project days. | Student leader and faculty mentor |
| Day-wise work log | Records assigned work, progress achieved, hours dedicated and faculty remarks. | Project group and faculty mentor |
| Observation record | Captures fermentation, growth, product progress, quality issues and corrective action. | Data recorder and process monitor |
| Material and cost sheet | Tracks resources used and develops awareness of low-cost and responsible implementation. | Material and documentation coordinators |
| Final academic submission | Combines the physical output, report, learning note, photographs, display and presentation. | Faculty evaluator |

**Academic review principle:** Regular faculty monitoring ensures that students are assessed on continuity, technical discipline, problem-solving, responsible resource use and the quality of their final communication.

## 5. Institutional Coordination and Academic Continuity

The project framework is coordinated through the Srusti Centre for Sustainable Development in association with the academic department responsible for VAC101. The structure supports recurring delivery through defined project themes, scheduled faculty engagement, common monitoring formats and a consolidated assessment framework.

**Table 7: Institutional Coordination Responsibilities**

| Academic Department | Srusti Center for Sustainable Development |
|---|---|
| Integrates project work with course delivery, communicates schedules, assigns faculty mentors and maintains academic records. | Coordinates sustainability themes, SDG linkage, campus relevance and documentation of institutional sustainability learning. |

### 5.1 Continuity Mechanisms

**Table 8: Academic Continuity Mechanisms**

| | |
|---|---|
| 1 | **Recurring course integration:** Project work is linked with the regular delivery of Environmental Science and Sustainability (VAC101). |
| 2 | **Defined project schedules:** Each theme has a week-wise sequence, expected outputs, care instructions and final deliverables. |
| 3 | **Standard monitoring formats:** Attendance, work-progress, observation and faculty-review formats enable consistent academic follow-up. |
| 4 | **Assessment integration:** Common and project-specific parameters connect project participation with formal academic evaluation. |
| 5 | **Scope for annual refinement:** Project themes, technical guidance and campus applications can be updated in response to emerging sustainability priorities. |

### 5.2 Included Academic Records

The following pages reproduce the approved project structure, project-wise schedules and consolidated evaluation framework used for VAC101 project implementation. They are retained in their original institutional format.

# Annexures: Academic Project Documents

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## Three-Month Sustainability Project Work Schedule

### UG Project-Environmental Science and Sustainability (VAC101)

### 1. Project Structure

| Parameter | Plan |
|---|---|
| Total projects | 3 project proposals: Bio-Enzyme Preparation Project, Kitchen Herb Garden, and Waste-to-Wealth Product Making Activity. |
| Student groups | 3 groups, each having 8 students. Each group will work on one project only. |
| Group leadership | Each group will nominate one Student Leader responsible for coordination, attendance, weekly reporting, and submission. |
| Duration | 3 months. Operational schedule is planned for 13 weeks / approximately 90 days so that bio-enzyme fermentation can complete the minimum required period. |
| Weekly engagement | 2 days per week. Each day: 1.5 hours. Total structured engagement per group: 3 hours per week. |
| Evidence required | Attendance sheet, photographs, weekly work log, material list, cost sheet, observation records, and final presentation. |
| Final output | One completed project output per group with documentation, photographs, learning note, and presentation. |

### 2. Suggested Group Allocation and Roles

| Group | Project Assigned | Team Composition | Core Responsibility |
|---|---|---|---|
| Group 1 | Bio-Enzyme Preparation Project | 8 students including 1 Student Leader | Prepare six separate bio-enzyme batches, maintain fermentation records, and submit final samples and use-case documentation. |
| Group 2 | Kitchen Herb Garden | 8 students including 1 Student Leader | Create and maintain a functional campus herb garden with selected herbs, growth records, and care protocol. |
| Group 3 | Waste-to-Wealth Product Making Activity | 8 students including 1 Student Leader | Create an eco-friendly Jagannath statue using waste paper and submit process documentation and display material. |

| Role within each 8-student group | Responsibility |
|---|---|
| Student Leader | Coordinate work, maintain attendance, allocate weekly duties, communicate with faculty mentor, and ensure timely submission. |
| Documentation Coordinator | Maintain weekly work log, process notes, cost sheet, and final report. |
| Material Coordinator | Arrange materials, tools, containers, labels, soil, waste paper, paints, etc. as applicable. |
| Process and Quality Monitor | Check correct method, safety, cleanliness, and quality of project output. |
| Data Recorder | Maintain observation sheets, growth records, fermentation log, or product progress record. |
| Photo and Evidence Coordinator | Capture dated photographs and compile evidence for submission. |
| Safety and Housekeeping Coordinator | Ensure cleanliness, safe handling, and proper disposal/storage after each session. |
| Presentation Coordinator | Prepare final presentation, display board, and speaking points. |

### 3. Common Weekly Working Pattern

| Weekly Day | Time | Purpose |
|---|---|---|
| Day 1 | 1.5 hours | Planning, preparation, technical activity, data entry, and issue resolution. |
| Day 2 | 1.5 hours | Execution, maintenance, observation, documentation, photographs, and next-week task allocation. |

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## Project 1: Bio-Enzyme Preparation Project

**Project Objective:** To prepare six separate bio-enzyme batches from campus/home organic waste and document their preparation, fermentation, use cases, precautions, and sustainability value.

### A. Six Bio-Enzymes to be Prepared

| No. | Bio-Enzyme | Raw Material | Best Use |
|---|---|---|---|
| 1 | Eggshell Bio-Enzyme | Clean, sun-dried eggshells | Calcium support for plants and compost mineral boosting. |
| 2 | Neem Leaves Bio-Enzyme | Fresh neem leaves | Natural pest-repellent spray and soil pest control. |
| 3 | Vegetable Peel Bio-Enzyme | Vegetable peel scraps | General plant tonic, compost booster, and basic drain odour control. |
| 4 | Citrus Fruit Peel Bio-Enzyme | Lemon/orange/sweet lime/mosambi peels | Floor, bathroom, kitchen-surface, dustbin, and drain cleaning. |
| 5 | Tea Leaves Bio-Enzyme | Used tea leaves without milk | Soil enrichment, plant growth tonic, and compost booster. |
| 6 | Banana Peel Bio-Enzyme | Banana peels | Potassium support for flowering and fruiting plants. |

### B. Standard Formula for Each Batch

| Component | Quantity per Bio-Enzyme Batch | Instruction |
|---|---|---|
| Organic raw material | 300 g | Use only the assigned raw material. Do not mix all six materials together. |
| Jaggery / brown sugar | 100 g | Dissolve properly in water before adding raw material. |
| Water | 1 litre | Prefer non-chlorinated water. |
| Container | Minimum 1.5 litre plastic bottle/container | Use plastic only. Fill maximum 70% to allow gas formation. |
| Fermentation time | 90 days minimum | Best maturity is 100-120 days, but project submission will be based on the 90-day cycle. |

### C. Student Instructions for Bio-Enzyme Preparation

1. Create six separate labelled containers: Eggshell, Neem Leaves, Vegetable Peel, Citrus Peel, Tea Leaves, and Banana Peel.
2. For each batch, follow the 3:1:10 ratio: 300 g raw material, 100 g jaggery/brown sugar, and 1 litre water.
3. Use plastic containers only and fill only up to 70% of the container capacity.
4. Keep all containers in a shaded and dry place. Avoid direct sunlight.
5. Open the lid daily for the first 15 days to release gas. After the first 15 days, open once every 3-4 days.
6. Shake each container gently 2-3 times per week.
7. Maintain one observation sheet per bio-enzyme: date, smell, gas formation, colour, any fungal layer, corrective action, and photo evidence.
8. Do not use any batch if it develops rotten smell, black fungus, worms/maggots, very thick foul sludge, or sewage-like smell.
9. Do not use eggshell or tea-leaf bio-enzyme as a cleaner. Use them mainly for plants and compost.
10. Citrus bio-enzyme may be used for cleaning after dilution. Avoid undiluted use on marble, granite, or natural stone.

### D. Bio-Enzyme Specific Preparation Notes

| Bio-Enzyme | Preparation Instruction | Dilution / Use Method |
|---|---|---|
| Eggshell | Wash properly, remove egg residue, sun-dry completely, and crush into pieces or powder. | 10 ml in 1 litre water for calcium plant support; 20 ml in 1 litre water for soil calcium support. |
| Neem Leaves | Wash leaves, chop roughly, and keep in a dark shaded place. | 5 ml in 1 litre water as pest-repellent spray; 10-15 ml in 1 litre water for soil pest control. Use in evening only. |
| Vegetable Peel | Use clean peels such as potato, carrot, cucumber, bottle gourd, pumpkin, beetroot, or ridge gourd. Avoid cooked/oily/rotten scraps. | 10 ml in 1 litre water as plant tonic; 20 ml in 1 litre water as compost booster. |
| Citrus Peel | Cut citrus peels into small pieces and keep in a cool shaded area. | 50 ml in 1 litre water for floor cleaning; 100 ml in 1 litre water for bathroom cleaning; 20-30 ml in 1 litre water for kitchen surfaces. |
| Tea Leaves | Use only tea leaves without milk. Wash once and squeeze excess water. | 5-10 ml in 1 litre water as plant growth tonic; 20 ml in 1 litre water as compost booster. |
| Banana Peel | Cut banana peels into small pieces and fill the bottle only up to 70%. | 10 ml in 1 litre water as potassium plant tonic; 10-15 ml in 1 litre water for flowering support. |

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## E. Three-Month Work Schedule - Bio-Enzyme Group

| Week | Day 1 - 1.5 Hours | Day 2 - 1.5 Hours | Weekly Output |
|---|---|---|---|
| Week 1 | Orientation; assign roles; collect six plastic containers, labels, raw materials, jaggery, water, gloves, weighing scale, and logbook. | Clean/chop/crush raw materials and prepare all six batches separately. Label each bottle with batch name, date, ratio, and group details. | Six labelled batches initiated; batch register opened. |
| Week 2 | Open lids for gas release; check smell, colour, and container swelling; record observations. | Release gas again; shake gently; update photo record; verify containers are in shaded storage. | First-week fermentation log completed. |
| Week 3 | Daily gas-release compliance review; identify any leakage, fungal growth, or bad smell. | Shake all bottles; correct filling/storage issues; record observations. | Quality-control note prepared. |
| Week 4 | Review first 21 days of fermentation; check sour/mild alcohol-like smell, brownish liquid, gas formation. | Prepare individual process charts for all six bio-enzymes. | Month 1 progress sheet and process chart draft. |
| Week 5 | Open lids once in 3-4 days; shake gently; continue observation log. | Prepare use-case chart for each bio-enzyme with dilution ratios. | Use-case chart draft. |
| Week 6 | Monitor colour, smell, gas, and white layer if any; check spoilage signs. | Prepare safety and precaution poster for bio-enzyme handling. | Safety poster and mid-cycle observation record. |
| Week 7 | Continue fermentation monitoring; photograph bottles and storage area. | Prepare cost sheet: raw material, jaggery, containers, labels, gloves, and other items. | Cost sheet draft. |
| Week 8 | Faculty mentor review; identify weak batches and corrective actions. | Prepare campus-use mapping: plant tonic, pest spray, compost support, cleaner, drain odour control. | Campus-use mapping chart. |
| Week 9 | Continue observation; release gas if required; shake gently. | Prepare final documentation format and assign writing responsibilities. | Documentation structure ready. |
| Week 10 | Prepare sample labels and final bottle tags for six bio-enzymes. | Draft final report sections: objective, materials, method, observation, use cases, SDG linkage. | Final report draft initiated. |
| Week 11 | Check all batches for good fermentation signs and spoilage signs. | Prepare final presentation slides/display chart with photographs. | Presentation draft and display chart. |
| Week 12 | Near-final observation and documentation review; do not use any batch before 90 days completion. | Correct documentation gaps; complete observation tables and evidence file. | Complete project file except final maturity check. |
| Week 13 / Day 90 | Final maturity check. Filter only if 90 days are complete and the batch shows acceptable fermentation signs. | Submit six labelled bio-enzyme samples, process chart, use-case chart, cost sheet, observation log, and presentation. | Final submission: six bio-enzymes and full documentation. |

## F. Final Deliverables - Bio-Enzyme Group

- Six separate labelled bio-enzyme samples.
- Bio-enzyme batch register and observation sheet for each batch.
- Preparation process chart for each bio-enzyme.
- Use-case and dilution chart.
- Cost sheet and material-use note.
- Photographic evidence from Week 1 to Week 13.
- Final report and presentation.

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## Project 2: Kitchen Herb Garden

**Project Objective:** To establish a small kitchen herb garden on campus using practical container gardening methods, maintain growth records, and create a replicable herb-care model for students.

### A. Herbs to be Cultivated

| Herb | Propagation / Starting Method | Care Requirement | Expected Benefit |
|---|---|---|---|
| Coriander | Start from seeds. | Rich, well-draining soil; moderate watering. | Fresh leaves for culinary use and quick learning on seed germination. |
| Mint | Propagate from cuttings; can root in a glass of water. | Plenty of water; keep soil evenly moist. | Fast-growing herb suitable for continuous harvesting. |
| Tulsi / Holy Basil | Start from sapling or seeds. | Requires 4+ hours of direct sun and moderate watering. | Fragrant medicinal and cultural herb. |
| Curry Leaves | Use sapling for better success. | Bright sunlight and well-draining soil; slow-growing woody herb. | Staple culinary herb and long-term garden component. |
| Fenugreek | Start from seeds. | Cool to mild weather; container friendly; ready within 2-3 weeks. | Fast harvest and visible student outcome. |
| Ajwain / Indian Borage | Use cuttings or sapling. | Warm climate; low maintenance; avoid overwatering. | Leaves useful for culinary and home-remedy purposes; natural mosquito-repellent value. |
| Lemongrass | Use slips/cuttings or sapling. | Hot and humid conditions; pots or loamy soil; regular watering. | Continuous supply of citrusy blades for tea/soups. |

### B. Required Materials

- Medium-sized pots/grow bags/repurposed containers with drainage holes.
- Garden soil, compost, cocopeat or sand for drainage improvement.
- Seeds: coriander and fenugreek; saplings/cuttings: mint, tulsi, curry leaves, ajwain, and lemongrass.
- Watering can/spray bottle, gloves, hand trowel, labels, marker, and small sticks for support.
- Organic compost or standard organic fertilizer.
- Garden record sheet, photographs, and growth measurement scale.

### C. Procedure for Students

11. Identify a suitable campus space with sunlight, access to water, and safe student movement.
12. Prepare containers with drainage holes. Add a soil mix of garden soil and compost; add sand/cocopeat where needed for drainage.
13. Label each container with herb name, planting date, student group, and care instruction.
14. Sow coriander and fenugreek seeds directly in containers. Plant mint, tulsi, curry leaves, ajwain, and lemongrass from saplings/cuttings.
15. Check soil moisture before watering. Mint and tulsi require evenly moist soil; curry leaves, ajwain, and lemongrass should not be waterlogged.
16. Pinch top leaves periodically to encourage bushier growth. Do not overharvest young plants.
17. Use organic compost/fertilizer lightly during the growth period.
18. Maintain weekly growth records: germination, plant height, number of leaves, pest issues, watering, pruning, and photographs.
19. Assign a minimal rotating care roster for watering checks when soil becomes dry between scheduled project days.

### D. Three-Month Work Schedule - Kitchen Herb Garden Group

| Week | Day 1 - 1.5 Hours | Day 2 - 1.5 Hours | Weekly Output |
|---|---|---|---|
| Week 1 | Orientation; identify garden location, sunlight, water access, and container requirements. | Finalize layout; allocate herbs among students; prepare material list and cost sheet. | Garden layout and material plan. |
| Week 2 | Collect pots/grow bags, soil, compost, seeds, saplings, labels, and tools. | Prepare soil mix and containers with drainage holes; label each container. | Containers ready for planting. |
| Week 3 | Sow coriander and fenugreek seeds; plant mint cuttings and tulsi saplings. | Plant curry leaves, ajwain, and lemongrass; water and record initial condition. | All herbs planted and labelled. |
| Week 4 | Check germination of coriander and fenugreek; monitor mint rooting and tulsi establishment. | Prepare first growth record with photographs; adjust sunlight/watering if needed. | Month 1 growth record. |
| Week 5 | Watering and soil-moisture check; remove weeds; inspect pest/disease signs. | Light composting if required; update plant height and leaf-count records. | Maintenance log. |
| Week 6 | Pinch top leaves of suitable herbs to encourage bushier growth; avoid overharvesting. | Prepare herb care cards showing watering, sunlight, and harvesting instructions. | Herb care cards. |
| Week 7 | Review fast-growing herbs; begin limited harvest of fenugreek if mature. | Document first harvest, weight/quantity, and learning from quick-cycle herbs. | First harvest note. |

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| Week | Day 1 - 1.5 Hours | Day 2 - 1.5 Hours | Weekly Output |
|---|---|---|---|
| Week 8 | Continue care: watering, pruning, soil check, pest check. | Prepare kitchen-herb use-note and campus replicability note. | Use-note and replicability draft. |
| Week 9 | Replace weak plants if required; strengthen plant support and containers. | Update growth table and photo evidence; compare growth across herbs. | Comparative growth record. |
| Week 10 | Conduct regular harvesting of mint/coriander/fenugreek where ready; prune safely. | Prepare signage for the herb garden: herb name, use, care, SDG linkage. | Garden signage draft. |
| Week 11 | Final maintenance round: cleaning, arrangement, pruning, pest check. | Prepare final report sections: objective, materials, procedure, care, growth record, outcome. | Final report draft. |
| Week 12 | Prepare garden display and final photographs. | Prepare final presentation and assign speaking roles. | Presentation draft. |
| Week 13 | Final inspection of garden; record survival and growth status of all herbs. | Submit herb garden, growth record, care manual, cost sheet, photographs, and presentation. | Final submission. |

## E. Care and Maintenance Protocol

| Care Area | Instruction |
|---|---|
| Watering | Always check soil before watering. Mint and tulsi prefer evenly moist soil. Curry leaves, ajwain, and lemongrass need moisture but must not be waterlogged. |
| Sunlight | Ensure adequate sunlight. Tulsi needs 4+ hours of direct sun; curry leaves require bright sunlight. |
| Harvesting | Pinch top leaves gently to encourage bushier growth. Fenugreek may be harvested within 2-3 weeks if grown well. |
| Feeding | Use organic compost or standard organic fertilizer lightly. Avoid excessive fertilizer. |
| Documentation | Record planting date, growth, watering, pruning, pest issues, harvest details, and photographs weekly. |

## F. Final Deliverables - Kitchen Herb Garden Group

- Functional herb garden with at least seven selected herbs.
- Garden layout and plant labels.
- Growth observation sheet and weekly photo evidence.
- Herb care manual and watering/harvesting protocol.
- Cost sheet and material-use note.
- Final report and presentation.

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## Project 3: Waste-to-Wealth Product Making Activity

**Project Objective:** To convert waste paper into an eco-friendly Jagannath statue using paper-mache/clay technique and demonstrate waste-to-worth creativity, low-cost innovation, and cultural sustainability.

### A. Product Output

| Product | Technique | Sustainability Value |
|---|---|---|
| Eco-friendly Jagannath statue | Waste-paper paper-mache / clay technique with painted finish. | Converts discarded paper into festive/cultural decor; reduces waste and promotes creative reuse. |

### B. Materials Required

| Material | Details |
|---|---|
| Waste paper | Old newspapers, magazines, rough draft papers, used office paper. |
| Adhesive | White glue such as Fevicol or homemade flour-and-water paste. |
| Structure base | Discarded plastic bottle, paper cups, cardboard, crumpled paper, or crumpled foil. |
| Coating material | Wall putty or tissue paper for smooth finish, if required. |
| Paints | Acrylic colours: white, black, yellow, crimson red, and blue. |
| Tools | Brushes, mixing bowl, water, cloth, gloves, pencil, scissors/cutter, and drying tray. |

### C. Step-by-Step Procedure for Students

20. Collect clean waste paper from classroom/office sources. Remove plastic, staples, and glossy non-usable material where possible.
21. Tear waste paper into tiny pieces and soak in warm water for a few hours.
22. Drain water and blend or mash the soaked paper into a fine pulp.
23. Mix the pulp with sufficient white glue or flour-and-water paste to make a dough-like material.
24. Build the base using a discarded bottle, cardboard, paper cups, or tightly bound crumpled paper.
25. Shape the dome-like square head and torso structure of Lord Jagannath.
26. Apply paper pulp over the base and sculpt the eyes, smiling face, and iconic arm stumps.
27. Smooth the surface using fingers, tissue paper, or a thin layer of wall putty if required.
28. Dry the idol completely in sunlight or a ventilated area. Drying may take 24-48 hours depending on thickness.
29. Apply a white base coat after full drying.
30. Paint the traditional design: black face, large white eyes with black pupils, yellow-red body structure, blue accents where required, and fine black borders.
31. Prepare display label explaining materials used, process, sustainability value, and cultural relevance.

### D. Three-Month Work Schedule - Waste-to-Wealth Group

| Week | Day 1 - 1.5 Hours | Day 2 - 1.5 Hours | Weekly Output |
|---|---|---|---|
| Week 1 | Orientation; discuss waste-to-worth concept, product target, roles, safety, and evidence requirements. | Collect waste paper, cardboard, discarded bottle/paper cups, glue, paints, brushes, and tools. | Material collection and project plan. |
| Week 2 | Clean and segregate waste paper; tear into small pieces and soak in warm water. | Drain, mash/blend pulp, mix with glue/paste, and test pulp consistency. | Paper pulp prepared. |
| Week 3 | Create rough sketch and size plan of Jagannath statue. | Build base using discarded bottle/cardboard/crumpled paper; secure structure. | Base structure ready. |
| Week 4 | Apply first layer of paper pulp over the base. | Shape the head, torso, and arm stumps; begin basic facial structure. | First sculpting layer complete. |
| Week 5 | Add more pulp to improve shape, thickness, and stability. | Refine large eyes, smiling face, and body details. | Main idol form complete. |
| Week 6 | Surface smoothing with fingers/tissue/wall putty as required. | Dry the idol in sunlight/ventilated space; check cracks and weak points. | Smoothed idol drying. |
| Week 7 | Repair cracks using pulp/putty; sand/smooth lightly if required. | Final drying and structural quality check. | Ready for painting. |
| Week 8 | Apply white base coat uniformly after complete drying. | Second base coat or touch-up if required. | Base painting complete. |
| Week 9 | Paint black face and main colour zones. | Paint large white eyes, black pupils, yellow-red body, blue accents, and borders. | Traditional colour work complete. |
| Week 10 | Detailing, correction of borders, and final paint touch-up. | Apply optional protective coating if available and safe. | Finished statue. |
| Week 11 | Prepare display board: materials, steps, sustainability value, SDG linkage, and cost sheet. | Compile photographs from every stage and write process documentation. | Display and documentation draft. |
| Week 12 | Final product inspection and display | Prepare final presentation and speaking | Presentation ready. |

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| Week | Day 1 - 1.5 Hours | Day 2 - 1.5 Hours | Weekly Output |
|---|---|---|---|
| | arrangement. | roles. | |
| Week 13 | Final exhibition/display and peer/faculty review. | Submit statue, process report, cost sheet, photographs, learning note, and presentation. | Final submission. |

## E. Safety and Quality Instructions

- Use scissors/cutters only under supervision.
- Keep the work area clean and dry after each session.
- Do not use rotten or dirty paper waste.
- Dry the idol completely before painting to avoid cracks and fungal growth.
- Use paint in a ventilated area and keep brushes/materials organized.
- Avoid religious disrespect in form, colour, or display. Maintain a clean, dignified presentation.

## F. Final Deliverables - Waste-to-Wealth Group

- One eco-friendly Jagannath statue made from waste paper.
- Before-during-after photographic evidence.
- Material list and cost sheet.
- Step-by-step process documentation.
- Display board with sustainability and SDG linkage.
- Final report and presentation.

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## Environmental Science and Sustainability (VAC101) - Evaluation Framework

**Common Mark Distribution Parameter - 50 | Common: 20 Marks + Project-specific: 30 Marks = Total: 50 Marks**

| Component | Marks | Applicability | Sheet Reference | | |
|---|---|---|---|---|---|
| Common Parameters | 20 | All three projects | Each project sheet | | |
| Bio-Enzyme Project-specific Parameters | 30 | Bio-Enzyme Preparation Project | Bio-Enzyme | | |
| Kitchen Herb Garden Project-specific Parameters | 30 | Kitchen Herb Garden | Herb Garden | | |
| Waste-to-Wealth Project-specific Parameters | 30 | Waste-to-Wealth Product Making Activity | Waste-to-Wealth | | |
| Total Marks per Student/Project | 50 | 20 + 30 | Evaluator entry | | |

| Project | Common Marks | Project-specific Marks | Total Marks | Purpose | Key Evidence |
|---|---|---|---|---|---|
| Bio-Enzyme Preparation Project | 20 | 30 | 50 | Evaluate six bio-enzyme batches and documentation | Batch register, observation sheets, photos, use-case chart, final report |
| Kitchen Herb Garden | 20 | 30 | 50 | Evaluate functional herb garden and maintenance discipline | Growth records, labels, photos, care manual, cost sheet, final report |
| Waste-to-Wealth Product Making Activity | 20 | 30 | 50 | Evaluate eco-friendly product and process quality | Final statue/product, display board, photo evidence, cost sheet, final report |