Inca Engineering Design Framework: Homeschool Planning Checklist

Target Audience: Students (Grades 5–8) **Goal:** Apply historical engineering principles to a modern project-based experiment.

Phase 1: Research & Diagnosis

- [ ] **Objective Identification:** Define what specific environmental problem the Inca were solving (e.g., soil erosion, frost damage, or water scarcity).
- [ ] **Historical Context:** Identify which specific region (e.g., Sacred Valley, Moray) was chosen for the infrastructure and why its climate required these solutions.
- [ ] **Resource Analysis:** List the available natural materials (stone, clay, manure, specific crop varieties) that were used to achieve system sustainability.

Phase 2: Experimental Setup (The Model)

- [ ] **Site Selection:** Define the space for the experiment (bin, tabletop, or backyard patch).
- [ ] **Materials Procurement:** Assemble the components: gravel (drainage), sand (filter), soil/compost (growth medium), and retaining wall material (clay/stone).
- [ ] **Safety Protocol:** Verify that the workspace is ventilated and that children are using safe tools for digging or crushing materials.

Phase 3: Execution & Testing

- [ ] **Hypothesis:** Predict how the model will handle "simulated Andean weather" (e.g., pouring 500ml of water to simulate heavy rain).
- [ ] **Data Logging:** Record observations during the experiment:
    - *Did the water runoff occur?*
    - *Was the bottom layer effective in drainage?*
    - *Did the retaining wall maintain structural integrity?*

Phase 4: Critical Reflection

- [ ] **Systems Thinking:** Explain why the system worked within its historical context but identify the limitations for modern scaling.
- [ ] **Ethical Review:** Evaluate the social cost of the system. *Did the environmental success justify the use of mandatory labor systems like the mita?*
- [ ] **Climate Adaptation:** Propose one modification to the design to account for modern accelerated climate change (e.g., increased evaporation rates).