**Residential Tower Project Plan** Group 6 (Waterfall approach)

**Scope**

We are building a small-scale residential tower using Lego bricks, straws, and connectors to simulate vertical structure and infrastructure design. The model includes modular floors, straw-based vertical projections, and reflects thoughtful planning for both design and weight distribution.  
While we follow a Waterfall project structure for major milestones, we incorporate Agile-inspired iterations to test and improve sections for stability and cost-effectiveness.

**Success Criteria**

* Deliver the residential tower within budget and within the class period.
* The model must be freestanding and at least 2 feet tall.
* Structure must pass a basic wind test and demonstrate load stability.
* Model must reflect an innovative, luxurious, and exclusive architectural design.
* The Waterfall process must be completed and documented as an artifact.

**Budget Breakdown**

| **Material** | **Unit Cost** | **Quantity Used** | **Total Cost** |
| --- | --- | --- | --- |
| Large Lego | $7,500 | 30 | $225,000 |
| Small Lego | $4,500 | 0 | $0 |
| Small Straws | $750 | 40 | $30,000 |
| Large Straws | $1,000 | 16 | $16,000 |
| Connectors | $500 | 28 | $14,000 |
| Wood Blocks | $2,500 | 0 | $0 |

We prioritized cost-effective materials and reduced reliance on more expensive components like wood.

**Phase 1: Initiation & Planning**

**Initiation**  
We consulted with our project sponsor, Madhawa, who expressed a preference for a design inspired by the Gensler skyscraper. Inspired by its dual-tower structure, we adapted the concept for our model and named our building accordingly. Given Miami's environmental challenges (e.g., rising sea levels), we also considered weight management, intentionally using lighter materials for upper levels.

**Planning**

* Defined objectives and prioritized low-cost material usage.
* Assigned roles:
  + Project Sponsor – Madhawa
  + Project Manager – Ashlynn
  + Team Members – Eduardo, Andrea
* Created a preliminary sketch provided by the sponsor as a design reference. Design referenced the unique building in Sri Lanka, the Gensler skyscraper.

**Phase 2: Design**

**Design Execution**

* Developed a staircase-style tower to maximize rentable space (4 units per elevated floor, 12 on the base).
* Strategically used short straws for vertical support and long straws to create a dome at the tower’s peak.
* Allocated stronger and costlier materials (like large Legos) at the base for load-bearing support.

**Milestones**

* Base stability successfully achieved.
* Tower height progressed as a measurable success metric.

**Phase 3: Build Floor 1**

* Constructed a sturdy base using large Legos.
* Added vertical straw supports to elevate the first floor.
* Avoided use of wood per sponsor's feedback to reduce cost and weight.

**Phase 4: Agile Sprint – Change Management Log**

**Sprint Review + Changes:**

* Introduced a more cost-effective base design proposed by Andrea and Eduardo.
* Revised from full-floor structure to staircase design for cost savings and uniqueness.
* Swapped some materials to reduce costs (e.g., fewer wood components).
* Reinforced lower staircase after identifying instability.
* Added a feature staircase to emphasize the “Staircase to Heaven” concept.
* Incorporated long straws for height and design innovation in the second-floor dome.

**Phase 5: Testing & Presentation**

**Stability Test:**  
The model remained freestanding throughout design and construction phases.

**Presentation Prep**

Our residential tower represents a modern, sustainable, and luxurious structure inspired by iconic architecture and grounded in practical project management. Built using a cost-efficient mix of materials, the tower is over 2 feet tall and structurally sound. The design allows for Miami residents to enjoy a beautiful view of the city and for us to maximize the ROI based on design aesthetics. Large windows for the second floor to offset the minimal view and smaller windows on the floor above to appreciate the views while utilizing fewer materials lowering costs. We made the use of the building design and height to offset the costs of the building based on what can be charged for rent/leasing.

We leveraged Agile-inspired feedback cycles to improve stability and aesthetics, while staying aligned with budget and time constraints. Each design decision—from vertical straw placement to base reinforcement—was made with long-term livability, elegance, and environmental concerns in mind.

**Lessons Learned**

* Start small—early simplicity prevents later overhauls.
* A sturdy base eliminates the need for excessive upper-level materials.
* Collaboration led to creative, budget-conscious innovations.
* Agile flexibility made our Waterfall structure more resilient and responsive.