

Appendix

Design Proposal Template:

School: Roberto Clemente MS State: MD Division: Middle School or High School

Team Members' Names: Riya Tolani and Taelyn Kim

Project Title: Should be creative and give readers a general sense of what the project is about and want to read more. (20 words maximum)

The SmartPot: An Automated Home-Grown Solution to Encourage Healthy Diets

Community Challenge Being Addressed: Describe the community challenge that you will attempt to address with your proposed solution. (75 words maximum)

At school, convenience stores, and family homes, we are surrounded by affordable but unhealthy, high-calorie food. This causes families in our community and throughout the United States to experience diet-related illnesses such as obesity and Type 2 diabetes. The consumption of fast and junk foods in the U.S. results in the highest obesity rates of all OECD countries and a surge in Type 2 diabetes.

Community Research and User Identification: Explain the process used to identify the community challenge and select your user. Include any research done to identify issues in your community and understand which groups face challenges because of these issues. (150 words maximum)

We surveyed middle school students in our county and discovered concerns about eating habits, specifically the abundance of junk food and the lack of fresh produce. Then we interviewed neighbors with diabetes and heart disease about the impact of diets on health. We spoke with a single mother employed at a fast-food franchise where fast food is always available. Although she wants to feed her son fresh fruits and vegetables, she can't afford pricey groceries, and he has Type 1 diabetes. We also interviewed a 73-year-old with coronary heart disease who wants to eat healthier. He regrets not doing so when he was younger; obesity has led to his heart condition. But his age makes it difficult to shop and carry heavy groceries. Further research revealed that Type 2 diabetes takes 95% of American diabetes cases and that 42% of American adults are obese, with growing rates in children.

User Profile: Provide a detailed description of your selected user. Include information about challenges they face, how those challenges impact their lives, and specific project needs based on user feedback. (150 words maximum)

Our user is anyone who wants to eat healthier and/or struggles with diet-related issues. We spoke with a peer in our school who has Type 2 diabetes. Because of his condition, he is significantly overweight and tires easily, preventing him from playing his favorite sport: volleyball. When he found out about our idea, he mentioned that he wished he had eaten healthier to prevent his diagnosis. Chips and sodas were readily available to him, and they became a dietary staple. Before we gave him our prototype to test for a month, he listed some criteria for the SmartPot to follow.

- **Successful Growth of Plants:** A technologically-advanced tool that grows a plant to produce healthy, nutritious snacks consistently.
- **Ease of Use:** An automated device for those who struggle to grow food that can be used without previous knowledge.
- **Affordability:** A cost-effective solution accessible to families of all incomes.

Project Goals: List your project goals and explain how these goals will address the community challenge. Project goals should define the desired outcomes, not specific features of the proposed solution. (150 words maximum)

We aim to support healthy diets to prevent obesity and Type 2 diabetes by making gardening accessible, cost-effective, and efficient, enabling our users to access healthy food. Users will be able to eat fresh fruits and vegetables without worrying about grocery costs, transportation, maintenance, and time. We want to:

1. Create an Arduino-powered pot that is easy to set up and use for people of all education levels and financial situations.
2. Construct a self-watering tool that waters the plant only when the soil is dry, with a low-maintenance reservoir to minimize refills and user effort.
3. Design an automated pot that costs under \$30: within the budget for low-income families.
4. Build a product that consistently grows appetizing, nutrient-rich fruits and vegetables to encourage healthy diets.
5. Develop an app that connects to the pot and guides users on setup, plant care, and healthy eating in a clear, effective form.

Proposed Solution: Describe your proposed solution, including any innovative and unique features, and explain how this solution will address your users' needs and the challenges they face. (150 words maximum)

The SmartPot is a user-friendly product that helps communities combat unhealthy diets, obesity, and diabetes by simplifying home gardening. Our vision uses technology to improve health: unpack the device, place sensors in the soil and reservoir, situate the pump, and power the battery to grow food effortlessly. The design features a self-watering system tailored to each plant, powered by a peristaltic pump, soil moisture sensor, SST liquid-level sensor, LEDs, and other components, ensuring each plant receives the perfect amount of water. We included a mobile app for user manuals, planting and eating guides, and communication from the plant through the HC-05 Bluetooth module. The SmartPot adapts to different plants based on soil moisture, transmits soil moisture readings, and alerts the user to refill the water reservoir. By utilizing this technology, the SmartPot transforms indoor gardening from a challenging task into a straightforward process that anyone can accomplish.

Initial Design: A single graphic of your first design idea with key features adequately labeled. It should be easy to understand, and the reader should have a general understanding of how the prototype functions by looking at the graphic. Max size 8.5" x 11". May contain up to 4 views of the design.

