Overview of the Problem

At Penn State University, there is so much waste that goes out every day due to the large student body. However, the methods of disposal currently in place are overwhelming to the typically busy college student. There are multiple trash bins with a poster on it that states the category of trash that is supposed to go inside ranging from compost to plastic to cardboard to landfill. However, this large number of trash bins requires time and effort that students may not have resulting in many pieces of trash to wrongly disposed of into another trash bin. To improve the disposal process for the average student, a color system would improve time needed and how much waste is being properly disposed of. Products will be categorized and given a color and number. Smalls stickers will be attached to these samples before they enter the Pollack Market shelves. This color and number have a corresponding trash bin with the same label. Once the student finishes the product, they can simply match the sticker to the bin by color and number.

Engineering Design Process

To improve the current waste issue on campus, concepts were initially generated on ways to limit waste altogether. This included educational presentations to be shown to current student on sustainability initiatives on campus, a phone application that scanned a bar code in the dining halls that determined if it was compost, and pre-plated food in the dining halls to limit food waste specifically. Our solution broadened beyond the idea of just food waste on campus to all waste, especially its disposal.

Going into prototyping, the design needed to be convenient, effective, and organized for the user, a college student. Additionally, it had to be affordable and accessible to the university officials in charge of campus waste services. To address these needs, the design selected, a colored sticker system for trash, was simple yet effective. It was simply an improvement to the existing disposal system on campus. This makes it more likely to be adopted by the University and used by the students.

As shown below, a design was created to show what the stickered product and its matching bin would look like for the users. This shows the simplicity of the idea and how easily it can be used by college students.
To test the design needs, two Google Forms were created to show the effectiveness and convenience of the design. The forms simulated the existing disposal system and the proposed design, a colored sticker system. The form participants were asked to complete the existing system form first by placing the product in the correct trash category. They were then asked to complete the new design, which had them place the product with a colored and numbered sticker attached to the corresponding colored and numbered bin.

**Outcomes and Recommendations**

To make sure this system improves the effectiveness and convenience of waste disposal on campus, two Google Forms were sent out that mirrored the existing and proposed solutions. The results of these Google Forms showed less waste being thrown in the wrong bin and a thirty second improvement in time taken to throw away trash. The colored sticker system passed both criteria for effectiveness and convenience for the user, college students. Additionally, this solution to the waste problem is simply an improvement to an already existing system. There is little cost to the university, specifically only the cost of colored stickers for the products and colored paper for the trash bins. Ultimately, this would help with the adoption of the colored sticker system by the University, which shows high reward in campus sustainability at a little cost. Going forward, biodegradable stickers are recommended to ensure the most sustainable solution to the waste problem at Penn State. Also, Penn State can provide incentives to encourage participation by the students for improvements in proper waste disposal. This system will ultimately help Penn State’s desire to be a sustainable institution, which they have strived for years for. This would seal Penn State’s legacy of being a green university.