

Design Proposal:

School: Eleanor Roosevelt High School **State:** Maryland **Division:** ☐ Middle School or ☒ High School

Team Members' Names: Nicolas Rivero, Eric Godsey, Rahel Kabba, Samson Asmelash

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

The Handy Helmet - A Collapsible, Clean, & Customizable Helmet for the University of Maryland

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

Students attending the **University of Maryland** use **electric scooters** as a primary means of transportation. **52%** of University of Maryland students interviewed¹⁴ do not wear helmets, even though helmets “reduce the risk of severe brain injury by 75 percent”¹⁶. With rising e-scooter riders in the U.S., injuries treated in “emergency departments rose ... nearly **300%** from 2020 to 2024,”¹⁷ creating a **community** and **national** issue.

(68 words)

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 word maximum)

During the process to identify their community challenge, the team noticed students around the University of Maryland riding e-scooters **without helmets**. One of the most popular e-scooter companies, **Veo**, recently updated their contract with the university and ridership was “up 62 percent from last year”⁹. College Park Mayor, Fazul Kabir, stated that “with more scooters in the street ... it also increases the chance of **accidents**”⁹. In **September of 2025**, the city witnessed this first-hand, “when a man **lost his life** in College Park”¹¹ while headed towards campus. Even though the university requires “anyone operating a micromobility vehicle...on university property to wear a helmet at all times,”⁸ students choose not to wear helmets. The team conducted **25 student interviews**¹⁴. **52%** did not/would not wear a helmet. Main reasons that students did not wear helmets included inconvenience when storing, not owning a helmet, and peer pressure.

(150 words)

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 word maximum)

Every day, students at the **University of Maryland** put their **lives at risk** because they do not wear a helmet while riding e-scooters. Student interviews¹⁴ show that University of Maryland students claim that they **lack easy access to helmets**, and current helmets are **bulky**, making them **difficult to carry and store**. Furthermore, students face **constant peer pressure** preventing them from wearing a helmet. These barriers to helmet usage can result in **concussions**, face lacerations, **traumatic brain injuries**, internal bleeding, and possibly **death**^{3,5}. The University of Maryland **needs** a solution that gives students access to **easy-to-store** helmets that keep them **safe**, while providing them the **confidence** to combat the effects of peer pressure. Not to worry, the *Helmet Helpers* are here to help!

(123 words)

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 word maximum)

The Handy Helmet's main goal is to **increase** the number of students that wear helmets at the University of Maryland to **decrease** the amount of e-scooter injuries and **save lives**. Since students face difficulty storing current helmets, the solution needs to be **easy** for students to transport and store. To be publicly **accessible** and used by multiple students across campus, the solution also needs to be **sanitary** to prevent bacteria transfer from user to user. The solution must also give users **confidence** to combat peer pressure, since this is a driving factor leading students to neglect helmets. Finally, the solution must effectively **protect** the user from impacts. By **lifting the barriers** of transport, accessibility, and peer pressure, the solution works towards solving the community challenge by increasing the number of helmets worn across the university to decrease injuries and save lives.

(141 words)

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 word maximum)

The Handy Helmet is a **collapsible** helmet paired with an **ultraviolet cleaning case** that is designed to be attached to the front of an e-scooter. The helmet consists of three 3D printed PETG sections, making the helmet **durable** and **collapsible**. The sections are held together by the interweaving chin strap. To absorb impacts, there is removable **foam padding** on the interior. If the padding becomes unsanitary, it can easily be replaced. To combat peer pressure, the helmet can be **customized** in a combination of colors with added **logos** and **engravings**. To make the helmet publicly **accessible** and **sanitary**, the ultraviolet cleaning case utilizes an Arduino Uno R3, infrared sensor, 400 nanometer UV-A neopixel light strip, and indicator lights. Once the helmet collapses, it is placed inside the case and detected by the infrared sensor. The UV-A light strips turn on for 20 minutes, making it ready for the next user.

(150 words)

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.

