Design Proposal Template:

School: Hallie Wells Middle School **State:** Maryland **Division:** Middle School or High School

Team Members' Names: Ashrit Mandava, Rian Ganesh, Sameer Singh, Summit Lu

Project Title: Readers should have a general sense for what the project is about and want to read more. (20 word maximum)
Flick- AI Math Tutoring With the Flick of a Switch
Inequity Being Addressed: Describe the inequity that you will attempt to address with your proposed solution, and why you chose this inequity. Students are able to consider a global perspective related to their inequity. (75 word maximum)
Flick addresses the economic inequity in education that low-income students face. These students struggle academically and are unable to afford tutoring, hindering U.N SDG 4.5, equitable access to quality education. Our research showed that among economically disadvantaged students, only 8.7% were proficient (Maryland State Department of Education, 2024). Students that are proficient at mathematics bring themselves out of poverty and make a difference in their community and the world.
Community Research and User Identification: Explain the process used to identify the inequity 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)
We found that economically disadvantaged students performed significantly worse in mathematics than their counterparts (Maryland State Department of Education, 2024). However, this disparity can be addressed with tutoring, which has been proven to increase mathematical proficiency (Kohlmoos & Steinberg, 2024). Unfortunately, this solution remains out of reach due to economic constraints. The average cost for middle school math tutoring is $35 per hour, (Wyzant, 2025) totaling $1,680 annually for weekly tutoring. For families already stretched on basic living expenses, this is simply too much. This led to the conclusion that there was an inequity in education. Students from economically disadvantaged backgrounds struggle in mathematics and cannot receive tutoring because of financial limitations. This prompted us to create Flick, a cost-effective alternative to traditional tutoring. Flick aims to serve middle school students from economically disadvantaged backgrounds, who lack proficiency in mathematics.

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)

The primary users of Flick are economically disadvantaged students who struggle in mathematics. These students often attend underfunded schools that lack adequate math instruction, tutoring resources, and up-to-date tools. This lack of access creates a barrier to success, leaving students unprepared for future opportunities. These challenges especially harm students without support from education systems.

Our users cannot afford tutoring, so they seek out online resources such as Khan Academy and YouTube. But these resources are not interactive, distraction-free, versatile, nor engaging enough to satisfy their needs. Most of all, they aren't personalized, which 76.9% of users we surveyed requested.

Flick was created to address this divide by providing interactive and personalized assistance that increases mathematical proficiency at a student's own pace. Therefore, we designed Flick to be cost-effective, easy to access, and adaptable.

By focusing on autonomy and flexibility, Flick meets students where they are—helping them move forward.

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

Our project assists economically disadvantaged students by:

1. **Promoting UN Goals:** Flick aligns with UN SDG 4.5, addressing educational inequity by reducing the learning gap and allowing low-income students to get the assistance they need.
2. **Cost Efficiency:** Create a cost-efficient alternative to tutoring for low-income students.
3. **Portability:** Develop a portable tutoring assistant to ensure students can access help wherever learning happens.
4. **Versatility:** Help students build proficiency across core middle-school math topics at their own pace. Support different learning styles, such as visual input and step-by-step learning processes, aiding the 76.9% of users who requested personalized education. Deliver help when support is needed most.
5. **Efficiency:** Deliver real-time feedback in seconds, supporting students who get stuck and need instant help.
6. **Engaging/Interactive and Distraction-free:** Provide an alternative to online teaching resources, which users often find unengaging and distracting.

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

Flick is an interactive math tutor designed for low-income students. To address this inequity, Flick includes these features:

1. **AI**: Flick uses a Raspberry Pi 5 as its controller. It manages inputs and outputs directly connecting to the OpenAI API to ensure a distraction-free experience and personalized responses in real-time.
2. **USB Camera**: Flick has a USB camera that can rest on top of the box or be stored inside, capturing images of worksheets or notes. By analyzing these visuals, Flick tailors its support to match the content and format the student is working with.
3. **Microphone & Speaker**: Flick is equipped with a microphone, capturing voice input, while a built-in speaker allows Flick to respond aloud. This replaced a typing-based system once users requested a more interactive experience.
4. **Raspberry Pi Screen**: A screen mounted on the front displays Flick's animated character and responses. This visual element creates a more engaging and easy-to-follow experience.

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”

1. Flick the exterior switch to turn the device on.
2. If it is the first boot, navigate to settings and connect to WiFi.
3. Snap a picture by navigating through the UI and the camera.
4. Tap on the screen for Flick to listen, then tap again to let it think.
5. Listen to Flick's response and take a look over the diagrams that it provides.