

Design Proposal Template:

School: Westwood Middle School **State:** Spokane, WA **Division:** Middle School

Team Members' Names: Eldana Zemedkun, Kensy Bahme, and Remi Zickler

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)

B.O.N.D. (Baby Observation Notification Device)

Tracking every breath and every beat to bring parents peaceful sleep.

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

One of the leading causes of infant mortality is Sudden Infant Death Syndrome (SIDS), leaving parents anxious over their child's condition at night. According to Children's Public Health and Healthcare (2025), lower-income families experience a SIDS mortality rate that is 2.4 times higher than that of higher-income families worldwide. We aim to address this by making an affordable infant vitals tracker to improve both child wellbeing and parents' peace of mind for all families.

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)

To address this challenge, we questioned potential users in our community. Through our interviews and surveys with 21 parents, we discovered that over 85% of them face significant challenges in ensuring their child's safety during sleep, with many expressing anxiety over monitoring their baby's well-being. Additionally, we analyzed data from a KHQ study, which found that one-third of families in Washington are classified as ALICE households (Asset Limited Income Constrained but Employed). This information highlighted the financial barriers many families face in accessing necessary safety devices. Understanding these challenges, we saw that existing products on the market were far too expensive for our community, reaching up to \$300. Thus, our project aims to provide affordable solutions that enhance sleep safety for low-income parents and their infants.

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)

We will use a 35-year-old single mother, Leah, as an example of our target user. Leah balances a full-time job with the care of her infant and 4-year-old. She regularly checks on her infant's temperature and breathing throughout the night, resulting in exhaustion. Leah's financial constraints make it difficult to afford infant health monitors on the market. These factors quickly lead to high stress and feelings of shortcoming, impacting her mental health. Feedback from parents like Leah reveals the need for an affordable monitoring system that allows them to quickly recognize potential health issues, enabling a faster response time in moments of their infant's distress. Users also expressed their discomfort with directly attaching a device strap to their child's leg and emphasized the need for the device to be safe and reliable. This feedback is crucial in aligning our project with our users' needs and ensuring child wellbeing.

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)

- **Reliability:** Creating a device that is accurate and reliable to make a parent's response time to a child in distress faster and decrease sleep-related infant mortality.
- **Affordability:** Families of all socioeconomic statuses deserve access to the same quality of childcare technology as the more expensive products currently on the market and therefore our device must be a more financially accessible option.
- **Comfortable:** A baby's sleep should not be hindered by our device and parents should not have to worry about our device causing harm to their child.
- **Easy to Use:** The use of our device should not be another obstacle for parents to manage, but rather a simple and straight-forward tool to monitor their infant's health. Usability should never interfere with time spent aiding the child.

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)

BOND consists of a Child Device and a Parent Device that communicate via microbit radio signals. The Child Device is encased in a pocket of the child's onesie, limiting direct contact with the infant and making it removable so the clothing can be washed. It continuously monitors the baby's temperature, heartrate, blood oxygen, and sound levels. If the "Alert" feature is activated, it will set off an alarm on the Parent Device if the baby becomes distressed. This feature allows parents to sleep peacefully knowing BOND will promptly wake them when needed. The Parent Device can also clip onto clothing for convenient carrying and displays real-time vitals when the corresponding button is pressed, so parents can check their child's status from any room in the house. BOND's simple design keeps the device affordable and supports easy setup/operation, ensuring a child's wellbeing is accessible for all families.

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.

