**Com sci investigation**

**Research:**

Fitness Wearable (Fitbit):

Fitbit is a wearable that tracks heart rate to gather data relating to cardiovascular fitness as well as using an accelerometer to track steps taken for a similar purpose. It also has software to help users understand their sleep quality.

[https://www.jameco.com](https://www.jameco.com/Jameco/workshop/Howitworks/how-it-works-fitbit.html#:~:text=The%20Fitbit%20uses%20a%203,device%20that%20measures%20acceleration%20forces.)

I chose to include the heart rate tracking but found no use for the accelerometer and discovered that the sleep aid technology would not be feasible to test.

Mental Health Apps (Headspace)

Headspace: Meditation app for stress reduction, user-friendly with accessible programs. Personalized features include progress tracking, meditation goals, and tailored recommendations.

[www.forbes.com](https://www.forbes.com/health/mind/headspace-review/)

I incorporated elements of simplistic design and tailoring towards user’s needs but chose to not include meditation as the focus of my device.

Simple Games (Tetris)

Classic puzzle game: arrange falling shapes for complete lines, testing organization skills. Simple gameplay enhances spatial reasoning and quick decision-making. Tetris combines challenge and enjoyment with deceptive simplicity.

[www.nationalworld.com](https://www.nationalworld.com/culture/gaming/tetris-game-mental-health-anxiety-tetris-effect-wellbeing-4144843)

I decided to build the premise of my device around this idea of a game that is used to improve mental health through repetition and simple gameplay and develop reaction time and decision-making skills.

*Sleep Aid (Sleep Cycle)*

Sleep Cycle tracks sleep patterns using phone accelerometers, waking users during the lightest sleep for a refreshing start. Detects stages—deep, light, and wakefulness—and provides detailed sleep statistics.

As stated, before the idea of a sleep aid became too difficult to accurately test in class.

[www.ncoa.org](https://www.ncoa.org/adviser/sleep/sleep-cycles/)

**How it works:**

My device, after prompting the user to press a button will show a growing series of arrows in the up, down, left, and right directions along with respective buzzers and colored Leds. The user will return the same sequence. By tracking the heart rate of the user, the device will increase or decrease the difficulty of new rounds.

My objectives are to model a system which:

* Is fully automated, uses the analogue heart rate input, the digital button inputs, the analogue buzzer output, and the digital LED outputs.
* Validates and stores the data gathered from the microbit in firebase.
* Analyses the data gathered to inform decisions on how long the user should play (dependent on time of day).
* Uses Python and/or JavaScript to create a graph of reaction times which effects the what if questions.
* Offers wellbeing insights based on these two “what if” questions:
  + What if the user is playing late at night, reduce game speed over time to “wind down” the player
  + What if the user is getting frustrated, track heart rate and reduce game speed/tell user to take a break
* Graphs the history of the user's reaction time and heart rate.