Riley:

Sleep Background

Slides 1-8

Intro (SleepSync Title) / Slide 1

- "Hello everyone, we're Team Sapphire, and our project is SleepSync"
- "SleepSync helps people build healthier, more consistent sleep habits."
- "Our tagline encapsulates our goal for SleepSync – *Get in Sync, Catch More Z's*."

Skip Slide 2, Table of Contents

Transition to Team Bios / Slide 3

- "Before we get too deep into what SleepSync does, let's talk about the people behind it!"
- Introduce myself, let everyone else do their intros. When I finish explaining, say "Now onto RJ." Everyone else says "Now for X." X being the next person.

Transition to Running on Empty / Slide 5

- "Now that you know who we are, let's talk about why we built SleepSync."

(BACKGROUND SLIDE)

- "According to the CDC, sleep deprivation is a huge issue."
- "About a third of adults don't get enough sleep, and around 40% report accidentally falling asleep during the day."
- "A lot of people are running on empty, and it's not just being tired. Lack of sleep affects both mental and physical health."
- "This leads us into the next slide…"

Transition to The Sleep Gap / Slide 6

- "Sleep deficiency is linked to anxiety, depression, heart disease, stroke, and many other health conditions"
- "Most adults aren't hitting the recommended 7–8 hours."
- "Over time, missing sleep builds what we call the sleep gap, and your body definitely feels it."
- "That gap eventually turns into something called sleep debt."

Transition to Sleep Debt & Risk / Slide 7

- "Sleep debt is the difference between how much sleep your body needs and how much you actually get."
- "When you don't make up that lost sleep, it stacks up — causing fatigue, poor focus, mood changes, and long-term issues."
- "Some groups feel it harder than others, people with busy schedules, night shifts, students, parents, first responders."
- "So who exactly struggles with this the most? That's where the next slide comes in…"

Transition to Affected Groups / Slide 8

- "Technology users — coders, gamers, office workers who stay on screens late."
- "Night owls — teens, young adults, college students."
- "Late-shift workers — restaurant staff, hospital workers, new parents."
- "Health-conscious folks — athletes or gym-goers who train hard but don't rest enough."
- "Different challenges, same issue: unhealthy sleep habits."

- “With that background covered, Grant’s going to explain the specific problem we identified and how SleepSync solves it.”
  HAND OFF TO GRANT

Grant:
Problem Statement
Slides 10-12
Slide 10:
Ok, so what is the problem? Staring at a computer screen all night can make falling asleep difficult. Individuals can easily lose track of time, news and media stimulants keep the brain active, and the blue light reduces melatonin production all of which are bad for a healthy sleep. Due to these factors, coders and gamers are generally known to have irregular sleep schedules. When people stay up late, they need to wake up later to retain enough sleep. However, not everyone’s schedule allows time for late mornings despite staying up late. They still need to be up for work, class, fitness, and more. This leads to coders and gamers getting a lot less sleep than they need. **[CHANGE SLIDE]**
Slide 11:
So let's look at the problem characteristics. No resource has everything in one place for free. Many people struggle with their sleep schedule. People can lose track of time while they idly scroll their phones. Blue light from screens cause a decrease in melatonin. All of these issues can be solved by a variety of different apps, but no resource has everything for free. **[CHANGE SLIDE**]
Slide 12:
So let's look at our current process flow. It starts with a user needing to go to bed on time, early, or has the ability to go to bed late. Mostly, a user will fall into the first two, as they have work, scoring, and other obligations. Most of the time, a user is going to be on their phone either right before bed or in bed, which can lead to them not getting enough sleep and having a worse quality of sleep. They may also forget to set their alarm in the process, further hindering their day to day lives. Sleepsync is our solution to this problem because a good night's sleep is an important part of life. So let me turn it over to Alexa and she can tell you more about the solution. **[CHANGE SLIDE]**

Alexa:
Problem Solution
Slides 14-16
[Slide 13]
Thank you, Grant!
The question is, how does SleepSync help solve this problem? It starts by helping to simplify the bedtime preparation routine.
[NEXT SLIDE]
Slide 14

Similar to the current process flow in the solution process flow, you can see that a user prepares for bed, but instead of having to guess a time to sleep, a user can input a new desired wakeup time or have one added in, and will get a wind-down time to help them fall asleep easier. Users who want to spend extra time using a device like their phone or playing video games will receive notifications about when to start winding down. Alarms will be automatically set, and users can adjust when they go off by letting the application know whether they need to get up early to prepare or are fine getting up late.

[NEXT SLIDE]

Slide 15

SleepSync is an application that will allow users to maintain a healthy, beneficial sleep schedule by using their desired wake-up time to inform them of their own optimal bedtime. The app will send personalized reminders during the designated “wind-down” windows to encourage users to start preparations for bed. SleepSync will also give users access to relaxing music, tips, and other resources to help in falling asleep faster and to help create a calming nighttime routine. All these features allow SleepSync to be more than an alarm; it's a sleep companion.

[NEXT SLIDE]

Slide 16

The Solution Characteristics of SleepSync include:

- Our application has all of these resources to improve users' sleep quality in one location. Users won't have to worry about having multiple applications to have similar resources
- Users are able to personalize their sleep schedule to fit their needs and any surprises life may bring, like trips, new infants, or illness
- Our app will increase users’ awareness of the time spent on their devices and will inform them of a time to start winding down.
- Our application will automate a blue-light filter that will increase in intensity the later in the afternoon it becomes.
- Users who prefer holistic sleep improvement tips will have the option to only receive resources relating to it. Such as stress management resources, helping them to exercise timing awareness, and educational tips about nutrition to improve sleep quality.

After talking about how SleepSync is a solution to this problem, let's pass it off to Thomas to talk about the functional components of SleepSync.

[NEXT SLIDE]

Slide 18

Thomas:

Functional components and development tools

Slides 18-21

Slide 18 - Major Functional Components: Thank you, Alexa! I'm excited to walk you through the major functional components of SleepSync.

At the core, we have a Sleep Tracker that monitors users' sleep patterns. This works hand-in-hand with our curated sleep resources and rest tips to provide evidence-based guidance. One key feature is automatic blue light filtering, which reduces the disruptive

effects of screen exposure before bedtime. We offer personalized scheduled reminders for wind-down and sleep. The system generates a customized sleep schedule that truly benefits them, incorporating information users disclose at their discretion to create a wind-down time that suits their unique circadian rhythm. We've also included recommended exercises to encourage deeper sleep, helping users physically prepare for rest.

Finally, we have color noises to help users fall asleep more easily: white noise, which sounds like TV static; pink noise, like wind; green noise, similar to a waterfall; and brown noise, which mimics thunder. Each has different frequencies that work better for different people. **[CHANGE SLIDE]**

Slide 19 - Major Functional Components Diagram: Let me walk you through our system architecture to show how all these components work together.

On the Presentation layer, users interact with our app through their desktop or mobile device UI. This connects to our SleepSync Application, which serves as the central hub. The Application layer communicates with our web server; It connects to the Blue Light Filter for automatic screen adjustment and pulls content from both the YouTube Sleep Aid Resources API and our Website Sleep Aid Resources API to provide helpful content.

On the Data side, we have our Sleep Calculation Tool. The analytics page shows sleep duration and provides insights with personalized suggestions based on user patterns.

All of this feeds into our Storage layer, a PostgreSQL Database storing user data, including name, age, gender, wake-up time, and sleep quality metrics. Our system calculates data for gender, age group, and wellness metrics, determining the ideal amount of sleep and when to wind down based on these factors.

The app utilizes various sensors in the user's phone, with users sleeping with their phones beside them. When they wake up, the phone asks about sleep quality and provides a report on sleep cycles. The phone tracks movement: no movement near the sensors would indicate deeper sleep cycles and peaceful rest, whilst restless movement suggests lighter sleep cycles or possibly poor rest. **[CHANGE SLIDE]**

Slide 20 - Development Tools: Finally, let me cover the development tools and dependencies we'll be using to bring SleepSync to life.

For our Frontend, we're using React with Tailwind CSS and HTML to create a responsive, modern user interface that works seamlessly across devices. On the Backend, we're leveraging Node.js for server-side logic and API development, with Java handling our core logic and other backend services. This combination gives us both flexibility and robust performance.

For Design and Collaboration, we're using Lucidchart to create diagrams and map out our process flows, GitHub for version control and team collaboration, and Visual Studio Code as our primary IDE for development.

Looking ahead to Deployment, we're considering hosting via cloud services like AWS or Azure, and if we expand to a full cross-platform experience, we'll be looking at mobile app packaging for iOS and Android. This architecture ensures SleepSync can deliver

personalized, data-driven sleep optimization while maintaining user privacy and providing transparency and actionable insights. **[CHANGE SLIDE]**

Slide 21 - Dependencies: For dependencies;

We're using React with Tailwind CSS for our frontend UI, and React Router for navigation between pages. Axios handles API calls to the backend, and Recharts provides data visualization for sleep tracking graphs.

On the backend, Express.js powers our Node.js REST API, while Spring Boot handles our Java services. We're using pg (node-postgres) for PostgreSQL connectivity, and JDBC/JPA for Java database operations.

For development, we have Jest for testing, SerpAPI for search functionality, and ESLint to maintain code quality. Now let me hand it over to RJ, who will walk you through what SleepSync will and won't do, as well as our competition analysis. **[CHANGE SLIDE]**

RJ:

Do's and Dont's + Competition
Slides 22-24
Thanks Thomas,

Slide 22

SleepSync is designed to help people improve their sleep through smart, science-based tools built right into their phones.

- First, it tracks sleep cycles — things like how long you sleep and how much time you spend in light, deep, and REM sleep. By understanding those patterns, users can adjust their bedtime routines for better rest
- Next, it provides helpful resources — from quick articles and videos to practical tips about habits that affect sleep, like caffeine, light exposure, or screen time.
- SleepSync also uses your phone's 'warm screen' feature to automatically reduce blue light at night. That helps your body get ready for sleep by limiting light that keeps your brain alert
- And finally, all of these advanced sleep tools are completely free to users — no subscriptions or hidden costs.

So overall, SleepSync makes it easy and affordable for anyone to manage their sleep and build healthier habits

[NEXT SLIDE]

Slide 23

Now that we've talked about what SleepSync can do, it's also important to explain what it won't do — just to keep expectations clear.

- First, it won't diagnose or treat medical sleep disorders like insomnia or sleep apnea — those require professional healthcare treatment.
- It also won't guarantee instant results. Better sleep takes time and consistency, not a one-time fix.
- SleepSync isn't meant to replace all wellness apps. It focuses specifically on sleep health — not fitness, diet, or mental health tracking

- And lastly, it won't sync data from other apps. Everything you need is built directly into SleepSync, which keeps things simple and secure."

So, while SleepSync gives users powerful tools for better sleep, it stays within a focused, safe scope

[NEXT SLIDE]

Slide 24

Here on our competition matrix, I want to start by highlighting what SleepSync offers.
SleepSync includes all of our core features — calculating bedtime, sending wind-down reminders, providing sleep-aid resources, and letting users set a personalized sleep schedule — all with no restrictions and no paywall. We also offer sleep-debt tracking, a calming interface, and 100% free content. Everything you see marked under SleepSync is available to every user at no extra cost. Now, you may be wondering about the other apps. While they do offer some of these features, most only provide them partially — and many place their best tools behind a paywall. Overall, SleepSync offers the same key features as competitors — but without limits or paywalls. Our goal is to make healthy sleep simple, accessible, and completely free for every user

With a clear picture of SleepSync's capabilities and boundaries, the next step is understanding what challenges or risks might come with developing and using it.
Addie will now take us through our risk matrix to show how we've analyzed those factors

[NEXT SLIDE] **Slide 25**

Addie:

Thanks, RJ. Developing an application comes with several risks, and a risk matrix helps us visualize their likelihood and impact so we can plan mitigation strategies. We'll be looking at three main categories: user risks, customer risks, and technical risks.

User risks involve challenges the people using the application may encounter. One major concern is data privacy—because SleepSync relies on user input to provide accurate insights, users need reassurance that their information won't be misused. We address this by requiring an electronic legal agreement during sign-up, which outlines how data is used and protects user privacy. This holds SleepSync accountable and helps build trust. Another user risk is human error, since the app depends on accurate sleep logging. To reduce this, we focus on a clear, visually friendly interface—such as a dark background with light text, large buttons to prevent misclicks, and minimizing the number of steps required to access features.

[CHANGE SLIDE] **Slide 26**

Customer risks arise when SleepSync is recommended by a third party, such as a therapist. In these cases, customers may lack the professional insight or technical familiarity needed to download or navigate the app. We can address this by providing a short, clear How-To video on

platforms like YouTube, Facebook, and TikTok. Another risk is skepticism about SleepSync's effectiveness, especially in a culture that often undervalues sleep. To counter this, we can highlight that the app is free and offers well-cited resources that emphasize the importance of healthy sleep habits. Ensuring all sources are properly credited also helps avoid copyright issues. **[CHANGE SLIDE]** **Slide 27**

Technical risks involve challenges in design and engineering. SleepSync's biggest limitation is the lack of wearable technology, which can track sleep cycles more accurately but is costly. To compensate, SleepSync emphasizes its free resources—manual sleep logging paired with helpful articles, music, and sleep advice that can still improve sleep quality without expensive devices. Another technical risk is data security. To protect users, SleepSync will follow cybersecurity guidelines, like PIN authentication, biometric login, and data encryption to safeguard information from cyberattacks.

Grant is gonna go ahead and explain our User Roles. Take it away, Grant. **[CHANGE SLIDE]** **Slide 28**

Grant:
Slides: 29-30
Slide 29: User Roles
Thanks Addie, so next up let's look at our user roles. Our users are primarily sleepers, but there are different kinds of sleepers. Heavy sleepers struggle waking up, light sleepers wake up easily, restless sleepers struggle staying asleep and consistent sleepers keep good schedules and sleep better. These sleepers are typically students, shift workers, and night owls, all of whom need different things out of sleepSync. We also will have creators who have a desire to create and share content, and health conscious users who are already on track and just need sleep data as a part of broader health goals. **[CHANGE SLIDE]**

Slide 30: Feature Table
So now let's talk about our feature table. Broadly, our features can fall into 4 categories, Account Management, things like Account creation, login, and profile customization, all of which are features that Users, content creators, and devs will have. Sleep tracking, like quality scoring and sleep debt data for users, bedtime optimization with things like smart alarms, wind down, and resources, primarily for users, but resources for content creators as well, and finally analytics, with report insights and trend analysis for users. Now I will hand it over to Alexa who will talk about our sprints. **[CHANGE SLIDE]**

Alexa:
Sprint Slide 1

Slides 31

Thank you, Grant!

Sprint 1 will focus on creating a basic setup for our application. Heavy sleepers will have the ability to set multiple alarms, and night owls will have synced bedtime reminders across all their devices.

Sprint 2 is about adding control options for users. Light sleepers will have the ability to customize their sounds and notifications received, and night owls will be able to automate notification silence and control brightness and blue light output.

Sprint 3 is about tracking user sleep data. Restless sleepers will have the recommended amount of sleep calculated, have sleep audio recorded, and use personal information to personalize their sleep schedule. Health-conscious users will be able to track their sleep consistency over time and compare it to previous sleep consistency scores.

I'm going to hand it over to RJ, who will be talking about the 2nd slide of our full sprint schedule. **[CHANGE SLIDE]**

RJ:

Slide 32

Thank you, Alexa!

Sprint 4 focuses on making the app feel personalized. Restless and consistent sleepers get a calming interface, and shift workers get tools to match their rotating schedules, so recommendations adjust automatically

Sprint 5 is about motivation and support. A restless sleeper can connect with others facing similar issues. Consistent sleepers get guidance for maintaining good habits. And everyone receives reminders about why sleep matters when they fall off track.

Sprint 6 focuses on integrating SleepSync into daily life. Students get study-related sleep reminders and optional app lockouts during sleep hours. Creators can share their sleep-aid content. Parents can manage separate sleep accounts for themselves and their child.

Overall, these sprints help us transition from a basic sleep app to a truly adaptive system, one that understands diverse lifestyles, promotes healthy habits, and provides every user with a personalized path toward improved sleep.

Riley:

Algorithms

Slides 33-35

Slide 33 - Ideal Amount of Sleep Based On Given Bed/Wake Up Time

- "Thank you RJ!"
- "To figure out how much sleep someone should be getting, we built an algorithm that handles the math for them."
- "When a user enters either a desired bedtime or wake-up time, SleepSync calculates the corresponding time they should wake up or go to sleep to hit their ideal amount of rest."
- "If they have enough time before bed, SleepSync will also suggest wind-down reminders to help them ease into sleep."
- "Which brings us to our next calculation…"

Slide 34 - Sleep Quality Scoring

- “Knowing how well you slept is super important when you’re trying to fix your sleep habits — and SleepSync handles that automatically.”
- “Depending on what features the user turns on, their sleep quality score is calculated using either their personal feedback or audio tracking from overnight.”
- “And if someone gets a low sleep quality score… don’t worry, the next algorithm has their back.”

Slide 34 - Sleep Debt Tracking

- “Sleep debt tracks how much rest someone is missing so they can actually see what they need to catch up on.”
- “If a user tracks their sleep through SleepSync, the system calculates how much sleep they’ve gained, or missed over time.”
- “And if they use audio tracking as well, the sleep debt calculation becomes even more accurate thanks to the extra data.”
- “Now that you’ve seen how our algorithms work behind the scenes, Thomas will explain the database these algorithms pull from.”

Thomas:

Slide 36 - Database Schema:

Thank you, Riley!

Our database is organized around several tables that work together to support the app’s functionality. At the center, we have the User Table, which acts as the main hub connecting to all the other data points through foreign key relationships.

The Profile table stores essential user information, including UserID, Sex, Height, Weight, Age, BadgeList, BirthDate, and JoinDate. This connects to our Badge table, which tracks BadgeName, BadgeDescription, and WasAwarded status, allowing users to earn achievements for following their sleep plans.

The User table links each user to their Profile, SleepDebt tracking, IdealSleep calculations, SleepSchedule, Alarm settings, and Badge progress.

The IdealSleep table calculates personalized sleep needs based on Sex, Height, Weight, Age, Pregnancy status, and MedicalStatus, ensuring our recommendations are tailored to each individual.

The SleepSchedule table stores BedTime, WakeTime, ActivityLevel, and DayOfWeek, allowing us to create customized schedules that fit users’ unique lifestyles.

For wake-up functionality, the Alarm table contains AlarmTime and connects to our Sounds table. The Sounds table includes ColorNoise options and Ambiance settings, giving users their own choice. Now let me hand it over to Addie, who will walk us through an example mockup of what SleepSync could look like. **[CHANGE SLIDE]**

Addie:

Thanks, Thomas. So our focus on User Interface involved a few key aspects: clarity, accessibility, and efficiency. We want to use big, bold buttons so users don’t misclick or find it difficult to set alarms. Also, using a dark background does a couple things. It creates a calming appearance, so users aren’t hit with bright lights before bed. It is also easier to read light fonts

on a dark background, especially if users have vision impairments. The efficiency of the UI is so that everything is readily available, and users don't have to click through multiple pages to get to one function. For example, setting alarms, viewing badges, and viewing informative articles can all be accessed via one click. Users can also view their current wind down and wake up times easily from the homepage instead of switching to another page. **[CHANGE SLIDE] Slide 38**

Outro:
The last few slides contain our resources. This was Team Sapphire presenting SleepSync, and thank you for your time.