



muse®

Contact: press@choosemuse.com

Introducing Muse S Athena: A New Era of Mental Fitness

Muse S Athena (Gen 3) is the first consumer wearable to integrate **EEG** (brain activity) and **fNIRS** (blood flow) sensors for real-time neurofeedback experiences.

Designed to enhance focus, mental endurance, and cognitive resilience, Athena builds on the award-winning features of Muse 2 and Muse S (Gen 2) - offering brain-powered meditation, sleep support, and now **eyes-open brain training**.

With its interactive, eyes-open training mode, Athena helps users actively engage their brains through dynamic neurofeedback, using their mind to power an owl in flight within the Muse app



Product information

Key Features & Benefits

- ✓ **EEG + fNIRS Technology:** Measures brain activity (EEG) and blood oxygenation (fNIRS) into one device for the first time, for deeper, more dynamic cognitive insights.
- ✓ **Real-Time Neurofeedback:** Dual-brain sensor neurofeedback with AI-powered analysis.
- ✓ **Biofeedback**
Mind/Body/Heart/Breath Training (Eyes-closed): Muse uses biofeedback to monitor your brain and body activity during focused attention training sessions, providing audio cues so you know when you're in the zone or when your mind starts to wander.
- ✓ **Mental Strength Training (Eyes-open):** Unlike previous Muse devices, Athena is designed for active, engaged brain exercises. The owl speeds up or slows down based on cognitive effort, providing immediate training feedback.
- ✓ **Personalized Cognitive Insights:** Tracks mental effort, strength and resilience over time.
- ✓ **Sleep Tracking:** Personalized EEG-powered insights including sleep stages, deep sleep, and position tracking with lab-grade precision.
- ✓ **Smart Wakeup:** Reads your brain in real time to gently wake you during your lightest sleep phase, naturally.
- ✓ **Sleep Assist:** Smart fade audio technology designed to cue your brain to sleep and help you fall back asleep if you've woken up during the night.
- ✓ **Deep Sleep Boost:** EEG-timed audio cues, like soft pink noise, sync with your slow-wave sleep to reinforce deep sleep.
- ✓ **Enso:** Personalized AI Brain Coach that interprets brain and sleep data into plain-language insights, and delivers personalized coaching to improve sleep, focus, and resilience.
- ✓ **Sleek & Comfortable Design:** Wearable, consumer-friendly form factor for everyday use.

Product name:

- ✓ **Muse S Athena**

Color options:

- ✓ **Carbon & Opal**

Hardware only MSRP:

- ✓ **US:** \$474.99 USD
- ✓ **Canada:** \$574.99 CAD
- ✓ **Europe:** €424.99
- ✓ **International:** \$474.99 USD

Bundle MSRP

- ✓ **Hardware + Subscription:** \$494.98 USD

Compatibility:

- ✓ iOS & Android via the Muse App

Availability:

- ✓ **Retail Availability:** Muse S Athena is available at www.choosemuse.com



Choose your Muse

Muse 2

- The simplest way to train your mind with EEG neurofeedback.
- **Best for:** building a consistent meditation practice, focus training, and everyday calm.

Experience the power of Muse 2, an advanced EEG biofeedback device designed to enhance your mental well-being through cutting-edge multi-sensor technology.

By monitoring brain activity, heart rate, breath, and body movements, Muse 2 provides real-time feedback and personalized insights to train your brain and promote a calmer, more focused mind.

Muse S Athena

- A full mental fitness system that combines EEG + fNIRS with a complete sleep toolkit.
- **Best for:** deeper brain insights, cognitive performance training, and sleep optimization.

Muse S Athena is a brain-sensing headband that helps you refocus during the day and recover overnight with fNIRS and EEG-powered brain training and sleep tracking.

Using advanced fNIRS sensors and EEG technology to respond to your mind, heart, and breath, Muse S offers the same biofeedback experiences as Muse 2 as well as eyes-open focus training and overnight tracking. With stretch fabric that is travel-friendly and anti-bacterial, Muse S is so comfortable, you'll love using it day and night.



muse S ATHENA

-  Deep Sleep Boost + Sleep Assist + Smart Wakeup
(EEG + PPG + Smart-Fade Technology)
-  Overnight Tracking & Insights
(EEG, PPG, Accelerometer, Gyroscope)
-  Mind
(EEG)
-  Mental Strength
(fNIRS)
-  Heart
(PPG, Pulse Oximetry)
-  Body
(Accelerometer, Gyroscope)
-  Breath
(PPG, Accelerometer, Gyroscope)
-  Tot 10 uur batterijduur
(oplaadbare Li-ion)
-  1 headband, meerdere gebruikers
-  Draadloze verbinding: BLE 5.3, 2.4 GHz
-  USB-C port (cable included)
and LED indicator
-  Muse App Compatibility
(iPhone 12 or later, Android Pixel 6/equivalent
or higher)
-  Comfortabele, rekbaar stof voor
dragen 's nachts
-  Past op meer hoofdmaten
(hoofdomtrek 43 tot 63 cm)

muse²

-  Mind
(EEG)
-  Heart
(PPG, Pulse Oximetry)
-  Body
(Accelerometer)
-  Breath
(PPG, Gyroscope)
-  5 uur batterijduur
(oplaadbare Li-ion)
-  1 headband, meerdere gebruikers
-  Draadloze verbinding: BT 4.2
-  USB-C port (cable included) and LED
indicator
-  Muse App Compatibility
(iOS 11, Android 5 or higher)





How to get the best experience

To ensure accurate readings and a smooth experience, follow these quick setup tips:

- ✓ **Pull Back Long Hair:** Ensure no hair is between the sensors and your skin, including behind your ears and on your forehead.
- ✓ **Proper Fit is Key:** Adjust the headband snugly on the center of your forehead. If needed, make minor position adjustments and wait 30-60 seconds for sensor signal check. Ensure the band is correctly facing up, with gold sensors touching behind your ears and the power button facing downward.
- ✓ **Optimal Environment:** Use in a quiet space without distractions and with headphones for the best results.

Visit the full [Muse S fit guide here.](#)

How to test Athena's new fNIRS neurofeedback features

Interactive fNIRS Neurofeedback (Owl Flight Mode)

1. Open the Muse app and launch the Strength session.
2. Focus and concentrate to help the owl fly faster and farther. The more oxygenated blood detected (a sign of your mental effort), the further the owl flies and the higher your Strength Score will be.
3. At the end of your session, you'll receive a Strength Score out of 100 - a higher score means you maintained high mental effort and high HbO2 for a longer duration of your session.

Tips and Tricks

1. Delay at start? It takes about 4-6 sec before you see any effect as Muse measures the blood flow and oxygenation to your prefrontal cortex.
2. Difficult to gain scores? Breathe regularly. Try to relax as you start your training session. Also try to keep movement to a minimum during your session. Avoid touching your Muse headset. Now relax completely. Do not think about anything. Only focus on your owl moving to the horizon, focus on pushing it forward.
3. Whenever you get a bird and swipe up the screen, you get a boost. The faster you swipe up the faster the boost!
4. Owl stuck at bottom of screen? Recover faster by counting back from 100 towards 0 in your head.



Key benefits of Athena

- ✓ **First-of-its-kind consumer-grade fNIRS wearable** for brain health. Tracks both brain activity (EEG) and blood oxygenation (fNIRS) for a complete picture of mental performance.
- ✓ Delivers two types of real-time neurofeedback to measure and train mental effort & sharpen your focus.
- ✓ Monitor how EEG tracks **cognitive agility and focus shifts**.
- ✓ Watch fNIRS data for **oxygenation levels and endurance tracking**. Improved oxygenated blood flow (HbO₂) to the prefrontal cortex improves your brain's capacity for sustained mental performance and self-regulation, fighting cognitive fatigue.
- ✓ Provides deeper insights into mental effort, focus, and endurance.
- ✓ Compare results over multiple sessions to observe trends in mental strength and fatigue.

Key performance claims

1. Optimize cognitive performance:

- Strengthens executive function skills such as problem-solving, attention, and planning.
- Helps users build mental endurance and resilience over time.

2. Fight cognitive decline:

- Offers targeted brain training to address early signs of cognitive decline.
- Provides insights into brain oxygenation to support interventions for mild cognitive impairment (MCI).

3. Empowers sleep diagnostics

(For researchers & clinicians):

- Tracks brain oxygenation and SpO₂ levels to aid in identifying potential sleep apnea.
- Enables personalized strategies for improving sleep quality and recovery.

4. Lightweight and user-friendly:

- Sleek, comfortable design for all-day wear.
- Accessible for everyday users, researchers, and clinicians.

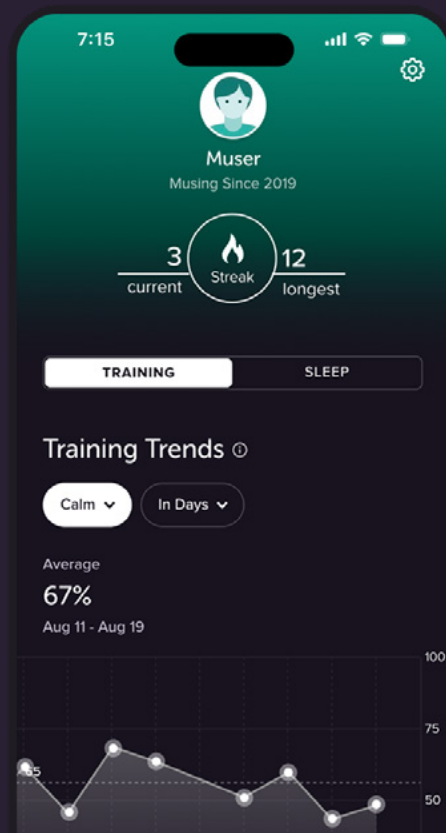
The Muse app

The Muse: Brain Health & Sleep app works in tandem with our headbands giving you real-time feedback on your changing state. Measure your sessions, track your progress, and improve over time. Personalized charts, graphs, and journals are available after each session.

Muse uses biofeedback to monitor your brain activity during focused attention training sessions, providing audio cues so you know when you're in the zone or when your mind starts to wander. With Muse, you get access to four unique EEG biofeedback experiences for Mind, Heart, Body and Breath and fNIRS powered biofeedback training and insights.

Explore the app for free or upgrade to our premium subscription.

Here's how they compare:



Features	Free App	Premium Subscription
Core Biofeedback Experiences (Mind, Body, Heart, Breath)	✓	✓
Comprehensive Insights (Brainwaves, Mind, Body, Heart, Breath)	✓	✓
EEG-Powered Sleep Tracking (Muse S only)	✓	✓
Digital Sleeping Pills: Deep Sleep Boost, Sleep Assist, Smart Awake (Athena only)	✓	✓
Real-Time Brainwave Visualization	✓	✓
Select Neuroscience Programs & Meditation Collections	✓	✓
fNIRS Powered Biofeedback Training & Insights	✓	✓
Over 500 Guided Meditations and Soundscapes	✗	✓
External Audio (Pair Muse with other meditation apps, music players, audiobooks)	✗	✓
All Curated Brain-Training Programs	✗	✓
Enso: AI-powered personalized brain coach	✗	✓
Cognitive Performance Score: Alpha Peak, Brain Recharge	✗	✓

How to test Muse's Biofeedback sessions

Muse uses biofeedback to monitor your brain activity during focused attention training sessions, providing audio cues so you know when you're in the zone or when your mind starts to wander. With Muse, you get access to four unique EEG biofeedback experiences for Mind, Heart, Body and Breath.

True understanding starts in the brain.

Muse uses an advanced AI-powered algorithm that combines unique brainwave patterns to provide results for calm, active, and neutral states, giving you an easy-to-understand snapshot of your brain's activity patterns.

How fNIRS and EEG work together for brain training and tracking

Muse measures three essential components of mental performance:

Mental Strength (fNIRS)

- ✓ How much energy your brain is using.

Mental Clarity (EEG)

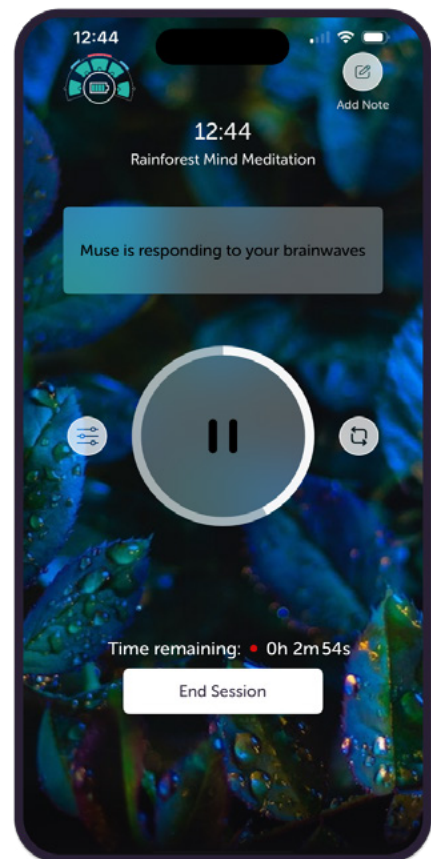
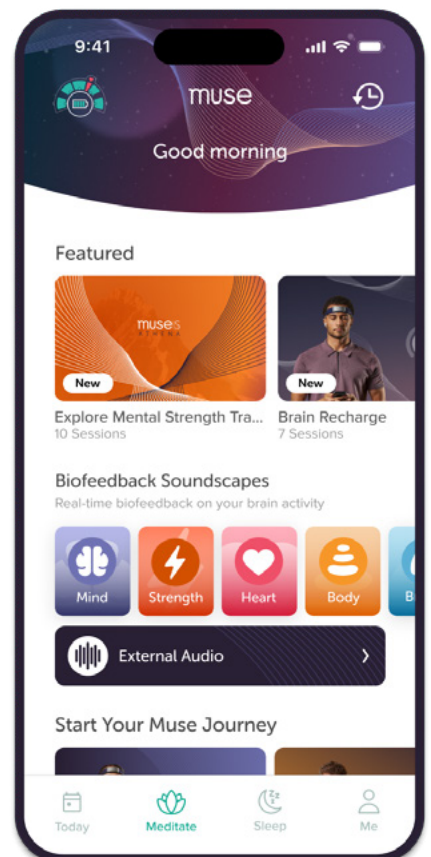
- ✓ Your ability to focus, stay present, and shift between mind states with ease.

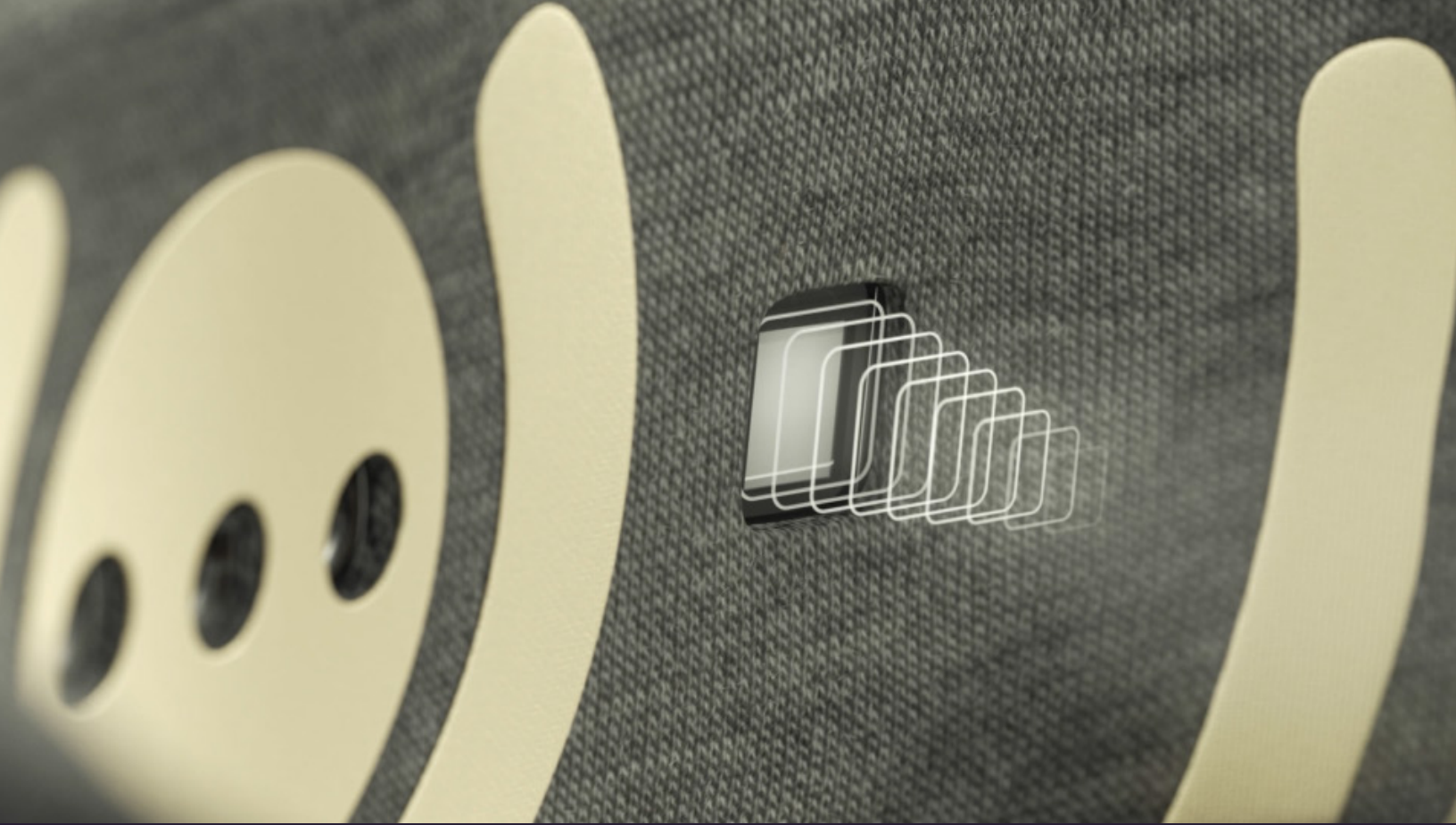
Improving both strength and clarity allows your brain to become more mentally efficient.

Why it matters:

- ✓ **High efficiency** = Your brain stays focused with less effort, making tasks feel easier.
- ✓ **Low efficiency** = Your brain is either working too hard for little gain or struggling to engage.

Tracking these insights helps **optimize cognitive performance**.





High effort vs. High efficiency:

When to push vs. When to recover

High effort & High focus (Mental Strength Training)

When learning, problem-solving, or concentrating deeply, your brain works harder and needs more oxygen to stay engaged.

- ✓ fNIRS measures oxygenated blood flow to your prefrontal cortex, showing how much energy your brain is using.
- ✓ EEG tracks how efficiently your brain processes the task through changes in brainwave activity.

Think of this like lifting weights for your brain—you push yourself to sustain effort and build endurance over time.

Low effort & High focus (Active Recovery & Mental Clarity)

When meditating or relaxing, your brain reduces oxygen demand while still staying engaged.

- ✓ fNIRS shows less energy use (ie lower oxygenated blood), meaning your brain is shifting into a recovery state.
- ✓ EEG picks up theta waves, which indicate deep relaxation and attentional clarity.

Think of this like cooling down after a workout—your brain stays active but recovers efficiently.

Meet Enso, your AI brain coach

Enso turns your brain and sleep data into guidance you can actually use. It reads your brain and sleep patterns, spots what matters, and gives you simple, personalized feedback. No guesswork. No jargon. Just clear coaching built on your own signals.

What Enso does

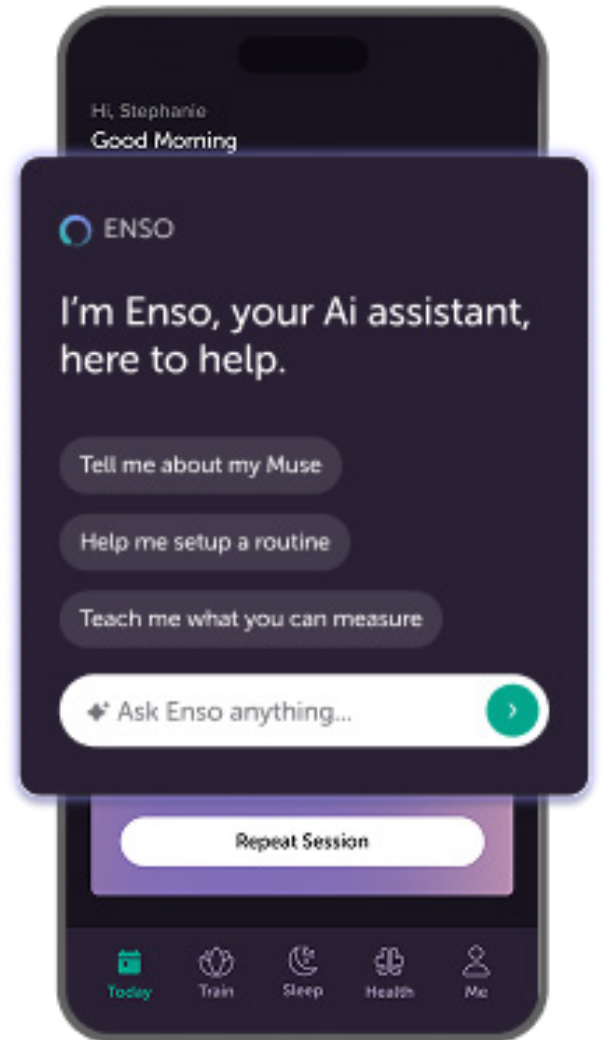
- ✓ Translates brain and sleep activity into plain-language insights
- ✓ Highlights daily patterns that influence focus, stress, and recovery
- ✓ Offers tailored suggestions to improve mental performance and sleep quality

How it works

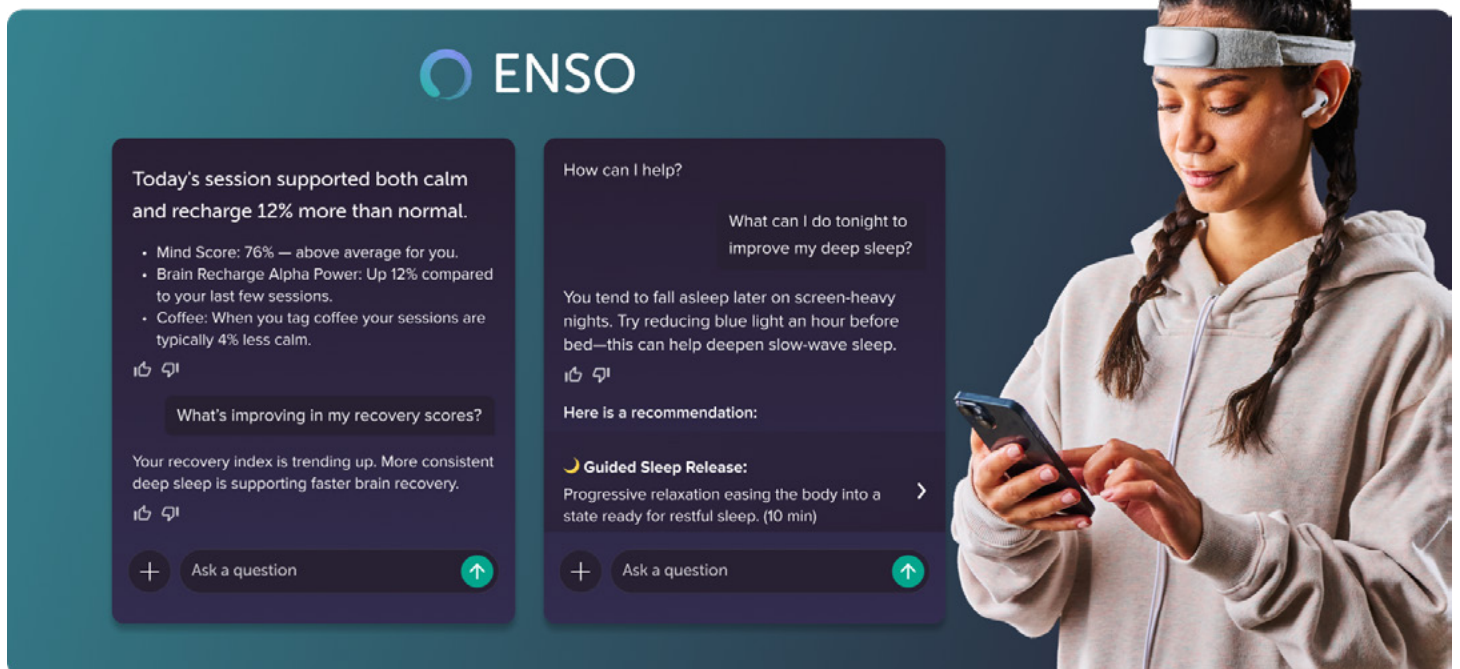
Enso analyzes EEG, heart rate, breath, and movement data. It identifies trends, inflection points, and changes in your cognitive and sleep profile. Using that, it provides concise, actionable guidance you can apply immediately. Think of it as a personal trainer for your brain, always on call.

The outcome

Clear insights, smarter habits, better brain days. Enso helps you understand your mind, then trains it with you.



[Learn more](#)

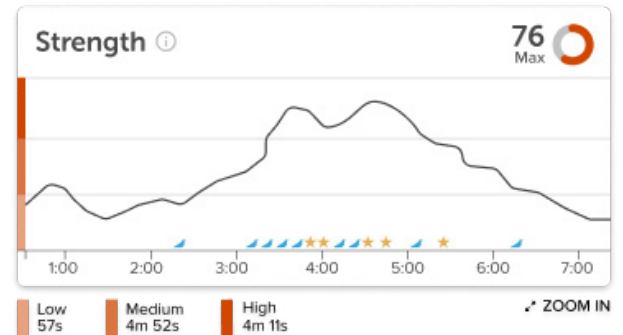


Understanding your Muse scores

Mental Strength Score:

A measure of your brain's ability to sustain mental effort and endurance, powered by fNIRS biosensors. It tracks oxygen use in the prefrontal cortex to show how well your brain stays engaged during challenging tasks.

A higher score means you maintained high mental effort for longer, helping to build focus, cognitive stamina, and resilience under pressure.



Blood Oxygenation Graph:

This graph shows how your brain directs energy during Mental Strength Sessions by tracking blood oxygen levels in the prefrontal cortex—the area responsible for focus and decision-making.

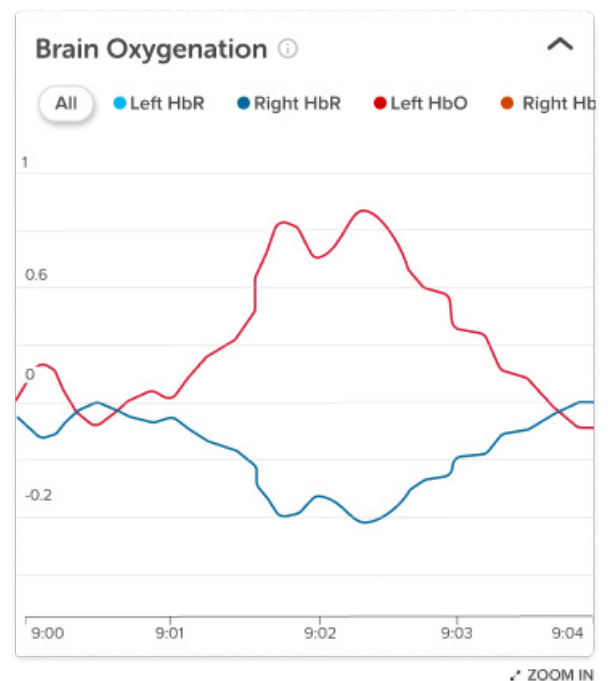
Oxygenated blood (red line):

Increases when your brain is working harder, delivering more energy for sustained mental effort.

Deoxygenated blood (blue line):

Decreases as your brain efficiently uses oxygen to maintain focus and endurance.

When the red line rises and the blue line falls, it means your brain is successfully increasing effort and optimizing cognitive performance.



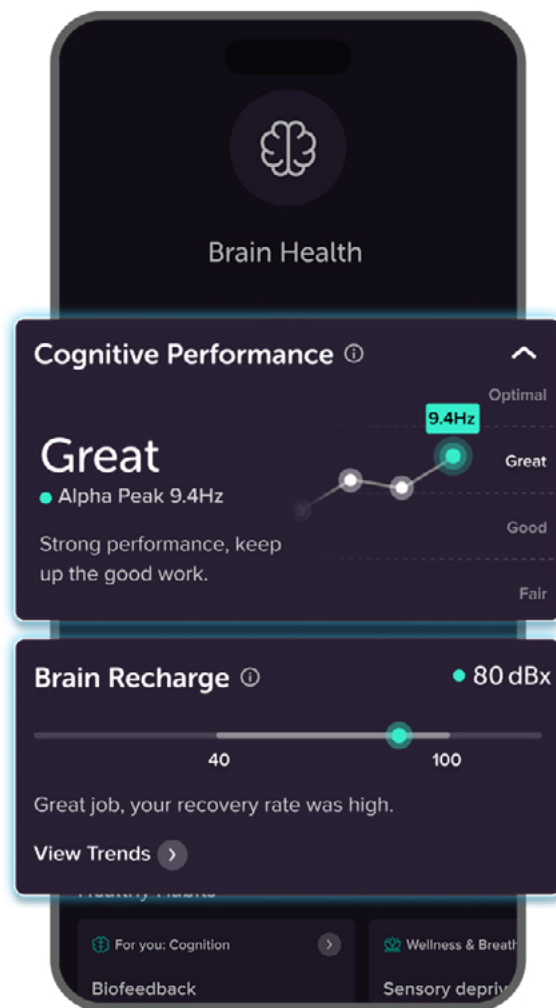
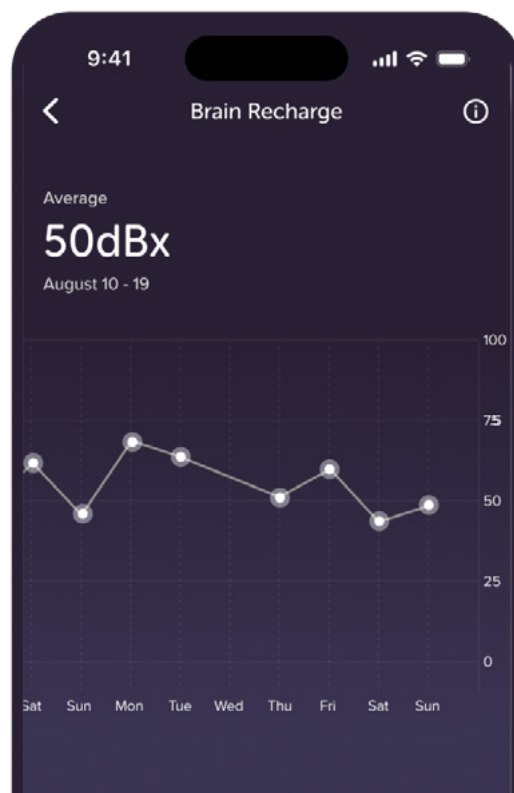
Cognitive Performance Score (Alpha Peak):

Measures your brain's peak alpha wave frequency—a key indicator of overall cognitive performance.

Cognitive performance refers to the speed, accuracy, and efficiency with which the brain performs tasks involving thinking, learning, memory, and problem-solving. The score reflects the highest frequency magnitude within your brain's 8-12 Hz range, where a higher score correlates with faster processing, sharper memory, and greater cognitive capacity.

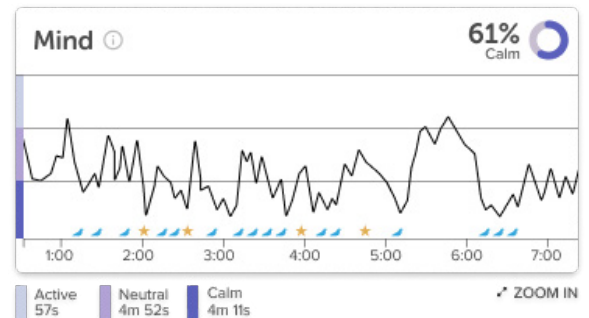
Brain Recharge Score:

Measures your brain's ability to rest and recover, based on decades of neuroscience research. It tracks alpha brainwave activity—a key indicator of relaxation and resilience—and monitors these patterns over time to prevent mental strain and support recovery. The score reflects how effectively your brain enters a restorative state, highlighting its capacity to recover from cognitive load, stress, and fatigue, offering insights into overall mental rejuvenation and relaxation.



Mind / Calm Score:

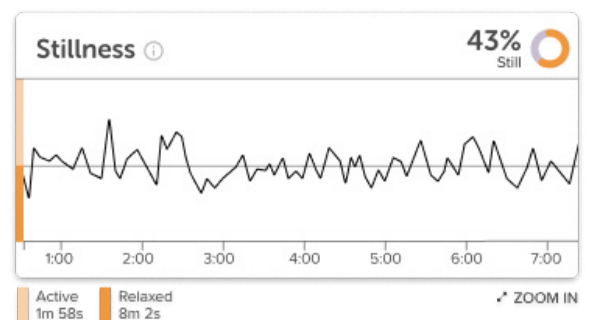
Through a proprietary algorithm, Muse uses a unique and complex combination of the brainwaves in order to provide the results for calm, active, and neutral states. Muse helps by interpreting them beyond isolated bands, so that you can understand and respond to your brain's activity patterns without needing a degree in neuroscience. Your percentage of calm is a key metric, indicating the portion of your session spent in a state of focused calm.



Body / Stillness Score:

Muse's motion sensors (accelerometer, gyroscope) capture any subtle movements of your head and core, to help you learn in real-time how much you're fidgeting and changing your posture. It reflects your body movement throughout a session by measuring the overall percentage of time you remained still.

A higher score indicates greater physical stillness, supporting deeper focus and relaxation during a session.

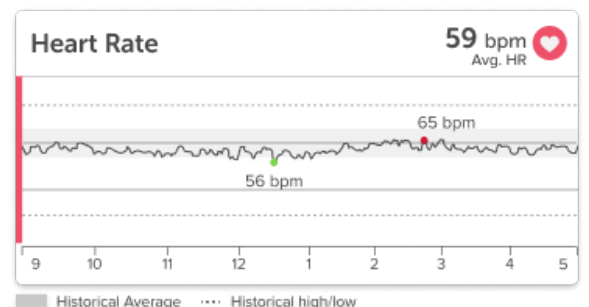


Heart Rate Score:

Muse Heart meditations provide real-time heartbeat feedback to help you tune into your body's signals, find calm, and improve interoception—the sense that helps you recognize internal cues like heart rate, breathing, and hunger. After each session, your heart graph shows your heart rate in beats per minute (BPM), including average, lowest, and highest rates.

Your average BPM reflects your ability to regulate heart rate over time.

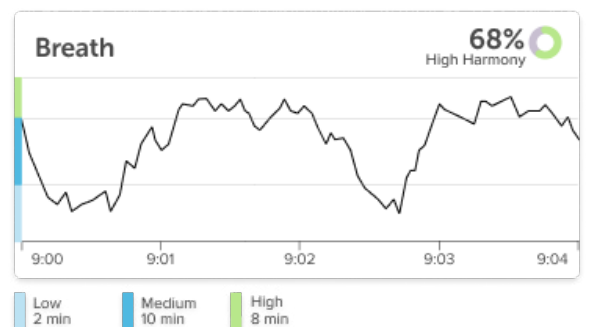
Measured with a PPG sensor, heart biofeedback helps you recognize when adjustments, like deeper breathing, can restore calm.



Breath Score:

Your Breath session results show how effectively you synchronized your breathing with the audio guide. The harmony score is based on your respiratory sinus arrhythmia (RSA), which measures the natural rhythm between your heart rate and breathing patterns.

This data reflects your relaxation level and how efficiently you followed the guided breath patterns. The coherence score combines insights from your heartbeat, body movements, and breathing, measured using an accelerometer and gyroscope.



Understanding Birds, Recoveries, Distance, & Boosts:

Rewards	Mental Strength Session	Mind Biofeedback Session
Birds	Awarded when you have 5 consecutive seconds of mental strength increasing. You need to wait 5 seconds before you can get another bird.	Awarded when your mind has settled into a calm state for an extended period of time. This represents your ability to maintain a focused and tranquil mental state, indicative of an effective focus on your breath.
Recoveries	Awarded when you have 5 consecutive seconds of mental strength increasing. You need to wait 5 seconds before you can get another bird	They signify times when your mind transitions from an active state to calm. These transitions mark the moments you've successfully noticed your distractions and regained your focus.
Muse Points	Related to the length of your session. The longer your session, the more points awarded.	You're awarded points for every second spent in neutral and calm states. You receive 1 point per second in neutral and 3 points per second in calm.



66
Birds



537
Recoveries



1956
Muse Points

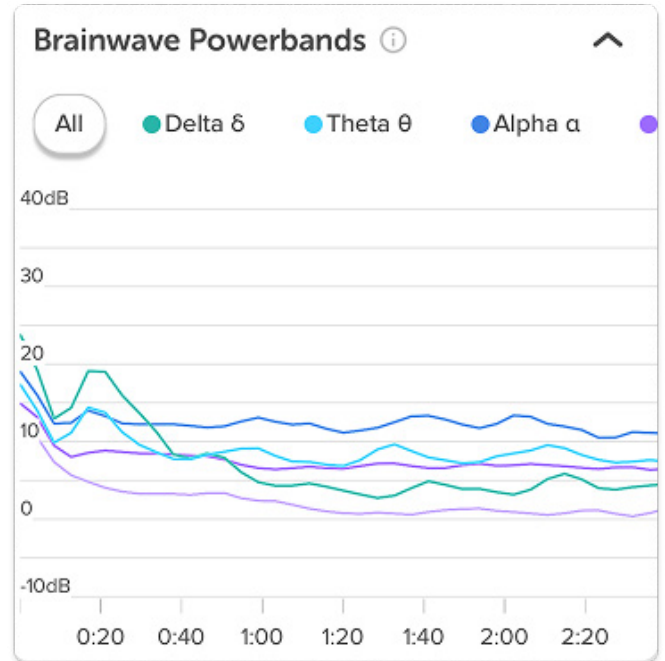
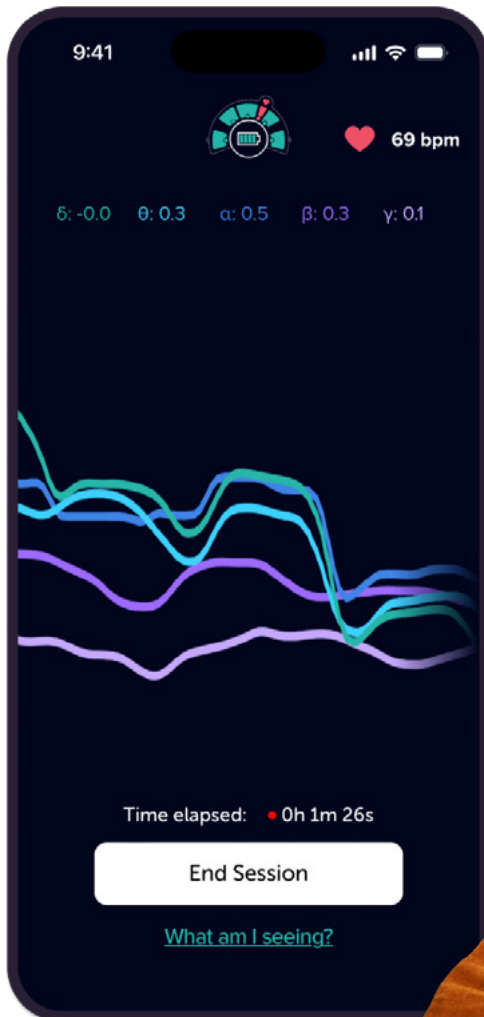
Watch your brainwaves in real-time

Muse now lets you visualize your brainwaves in real-time during your self-guided experience. Observe your brain's responses to various activities and identify when your mind reaches peak states like Alpha or Beta.

- **Delta δ** - Deep sleep, not dreaming
- **Theta θ** - Sleep, deep relaxation, and visualization
- **Alpha α** - Relaxed and calm
- **Beta β** - Actively thinking or problem-solving
- **Gamma γ** - Hyper brain activity, great for learning

Additionally, after each biofeedback and guided meditation session, you'll receive post-session reports of your brainwave powerbands to identify patterns and optimize your practice.

[Learn more](#)





Understanding the Sleep Section

A sleep lab from the comfort of home

While wrist wearables and motion-trackers can give you a pretty good guess on how long you're spending in each sleep stage, measuring brain activity is the only way to truly see what's going on in your brain while you sleep.

Enso helps explain what changed night to night and what to do next, based on your sleep and brain signals.

With Muse S Athena, explore personalized EEG-powered insights with lab-grade precision.

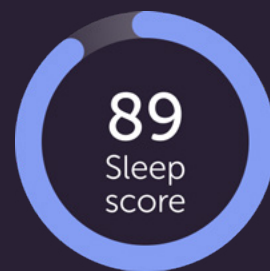
Sleep Score

Our Sleep Score is a numeric representation of your overall sleep quality, rated out of 100. It helps you track changes in your sleep over time without analyzing individual overnight data.

Your score is first adjusted based on your age and gender demographic group. Key factors influencing your score include:

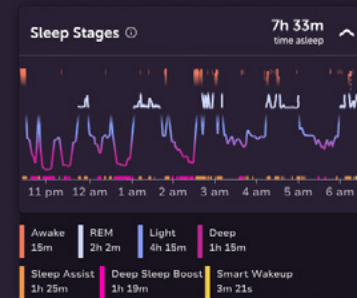
- ✓ How quickly you fall asleep and total sleep duration
- ✓ How often you wake up during the night
- ✓ The amount of time spent in each sleep stage

An average Sleep Score is around 75. Scores above 75 suggest a well-rested night.



Sleep Stages

Learn how quickly you fall asleep and how deep your slumber is. See the amount of time you spend in each sleep stage (Awake, REM, Light, and Deep) as well as your sleep depth patterns.



Sleep Position

Track how often you change sleep positions, how long you were in each, and which is your dominant position. Discover patterns in how your sleep position can impact your sleep quality.



Deep Sleep Intensity

Gain insight into how deeply your brain rested during this stage based on changes in your slow-wave (delta) activity. Measure the total quantity and intensity of your deep sleep with points.



Heart Rate

See your heart rate measured in Beats Per Minute (BPM) throughout out your session as well as your overall heart rate average.



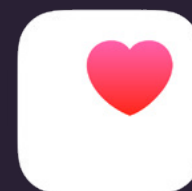
Stillness

View how much and to what degree you moved while you slept. The score shows the percentage you were still during sleep the graph will indicate the intensity of your movement.



Apple Health Integration

Achieve continuous tracking. Let your wrist wearable recharge while you sleep, and have Muse S fill in the gaps for a 360 view of your health & wellness.



Deep Sleep Boost

Deep sleep supports physical recovery and overall restfulness through slow-wave activity in the brain.

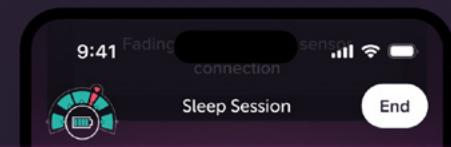
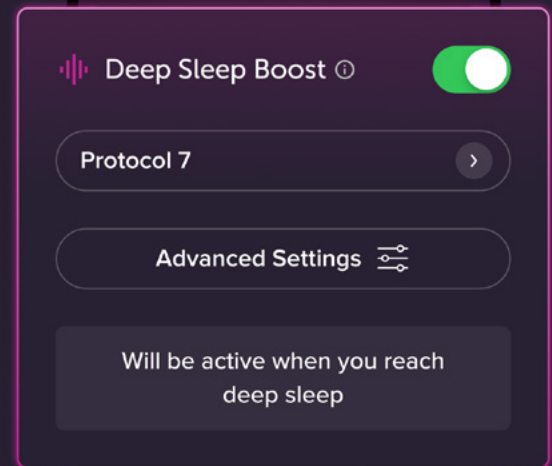
That activity can organize into sustained sequences or break up into shorter, fragmented bursts across the night, which can affect the quality of rest.

Deep Sleep Boost is designed to support more stable slow-wave activity during sleep, which is associated with more restorative rest and improved recovery.

Early beta signals (directional, varies by user):

- ~24% longer slow-wave trains
- ~42% more slow-wave trains per minute
- ~76% more slow waves occurring within trains

[Learn more](#)



↑24%

24% longer slow-wave trains*

Meaning users stayed in continuous deep sleep rhythms for longer stretches

↑42%

42% more slow-wave trains* per minute

Indicating more frequent opportunities for sustained deep sleep

↑76%

76% more slow waves occurring within organized train*

Reflecting deeper, less fragmented slow-wave activity



*Slow-wave trains

These trains represent sustained periods where the brain remains in a stable slow-wave state

How it works (high-level)

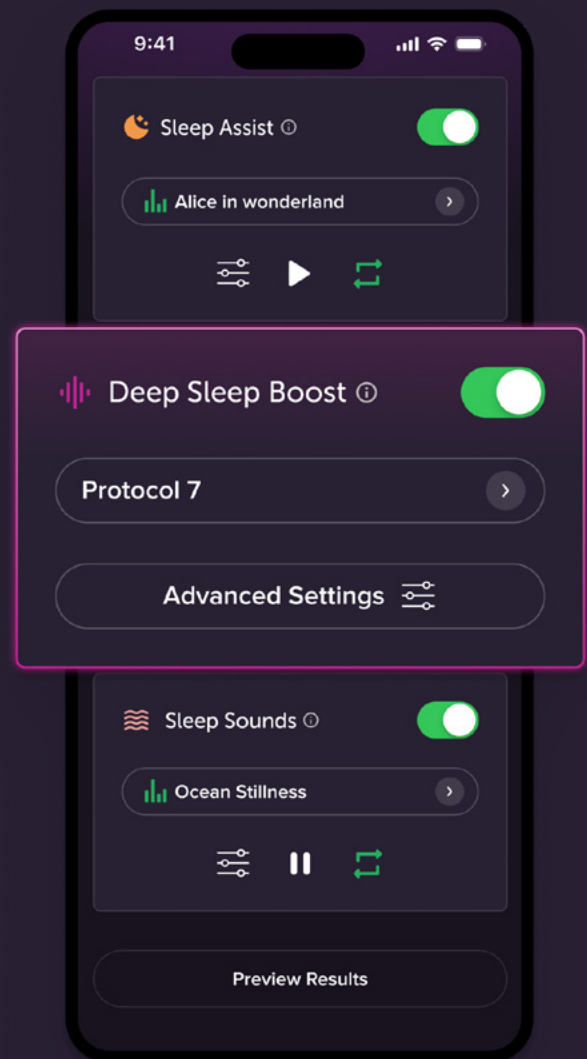
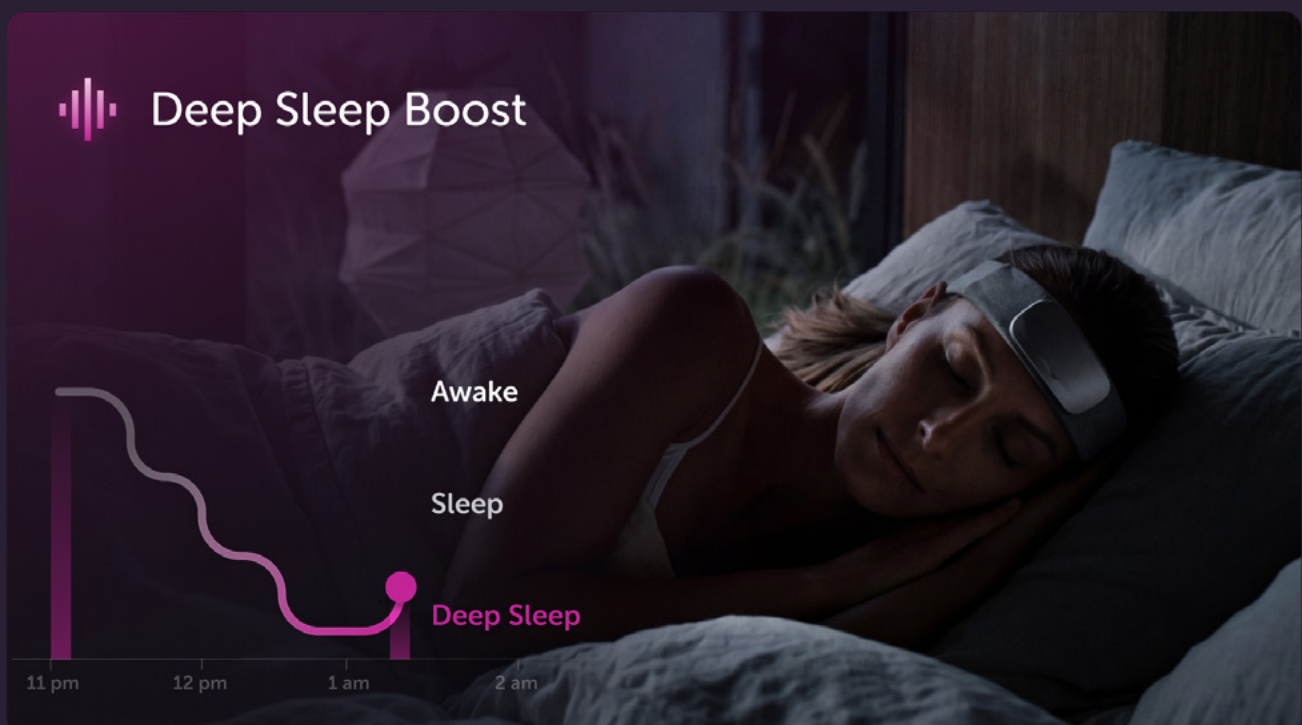
Muse uses EEG to track sleep stages and detect deep sleep in real time. During deep sleep, the brain produces slow waves (delta activity). Deep Sleep Boost delivers softly timed audio cues that are phase-locked to this slow-wave rhythm, with the goal of reinforcing stable slow-wave activity without waking you.

How to try it

- Wear Muse S Athena comfortably overnight with good sensor contact.
- Use in a quiet sleep environment; keep external audio low.
- Start with recommended sessions in the Muse app and follow in-app guidance.

Important notes

- Deep Sleep Boost is a wellness feature. It is not intended to diagnose, treat, cure, or prevent any disease.
- Results vary by person and by night.
- If you have a diagnosed sleep disorder or concerns about your sleep, consult a qualified clinician. Important notes: consumer wellness feature, not medical/diagnostic; outcomes vary; avoid overstating claims.



Sleep Assist

Muse cues you to sleep with responsive audio.

Choose your own bedtime journey from a growing library of stories and soundscapes that help you fall asleep and get back to sleep faster.

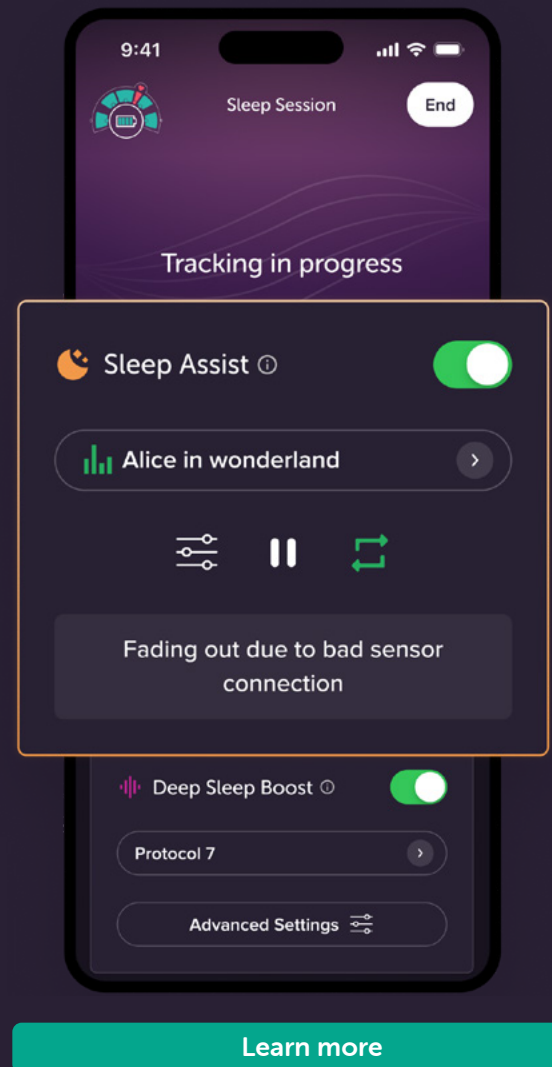
When you fall asleep your brain activity changes, and Muse detects those changes in real time, gently lulling you to sleep and fading the audio out as it notices you drifting off.

Unlike generic sleep sounds or white noise apps running on a fixed timer, the experience is unmatched in its precision, easing in and adjusting as your brain settles into rest.

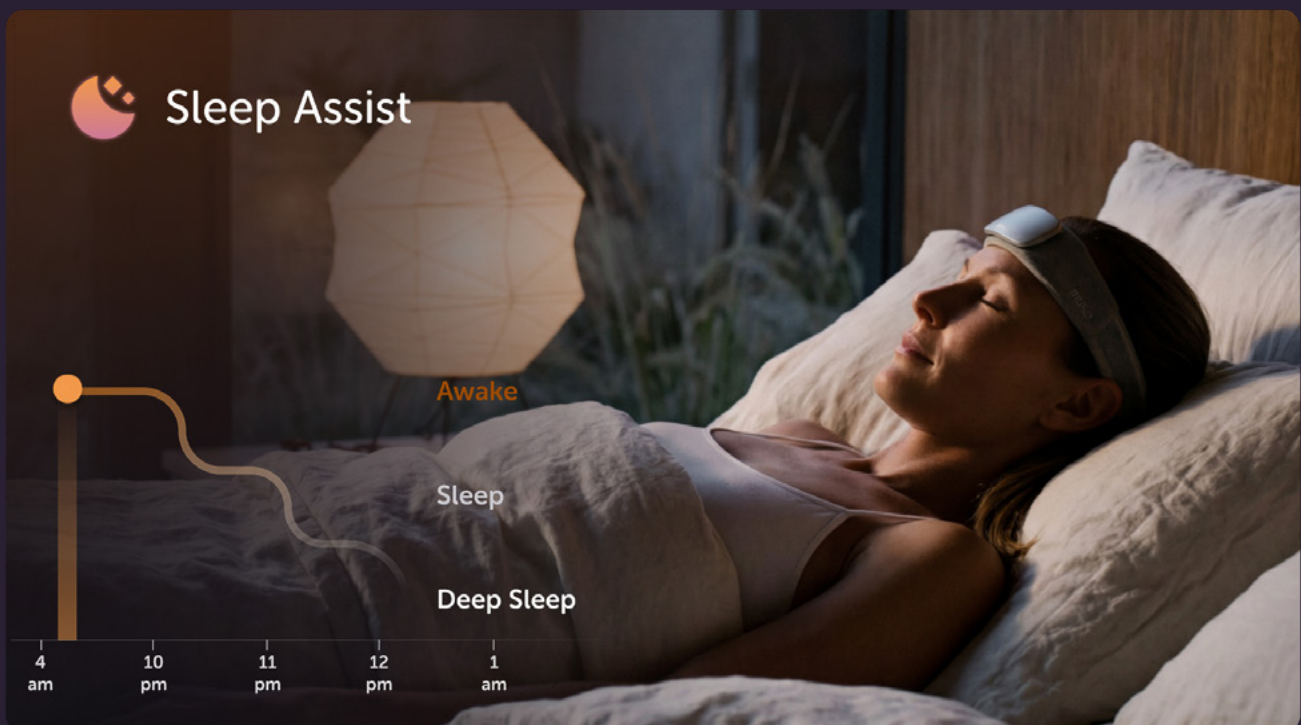
Muse has shown users improve sleep quality by 20%* and fall asleep 55% faster** using Sleep Assist. Wake in the night, and Sleep Assist gently cues you back to sleep, no need to reach for your phone.

*2021 study led by Western University, Cambridge Brain Science, Hatch, and Interaxon, using Muse S EEG sleep support technology; 20% improvement in Pittsburgh Sleep Quality Index relative to controls seeking to improve sleep.

**Based on 160 participants and 1,100+ sleep sessions tracked via Muse's Citizen Science Platform; up to 55% faster time-to-sleep over first three nights of use, effect grew with repeated use.



[Learn more](#)



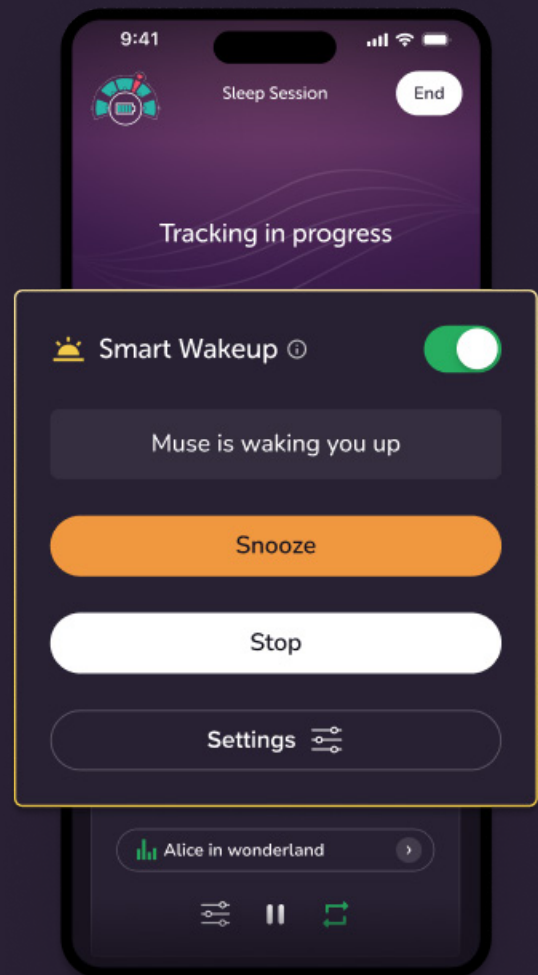
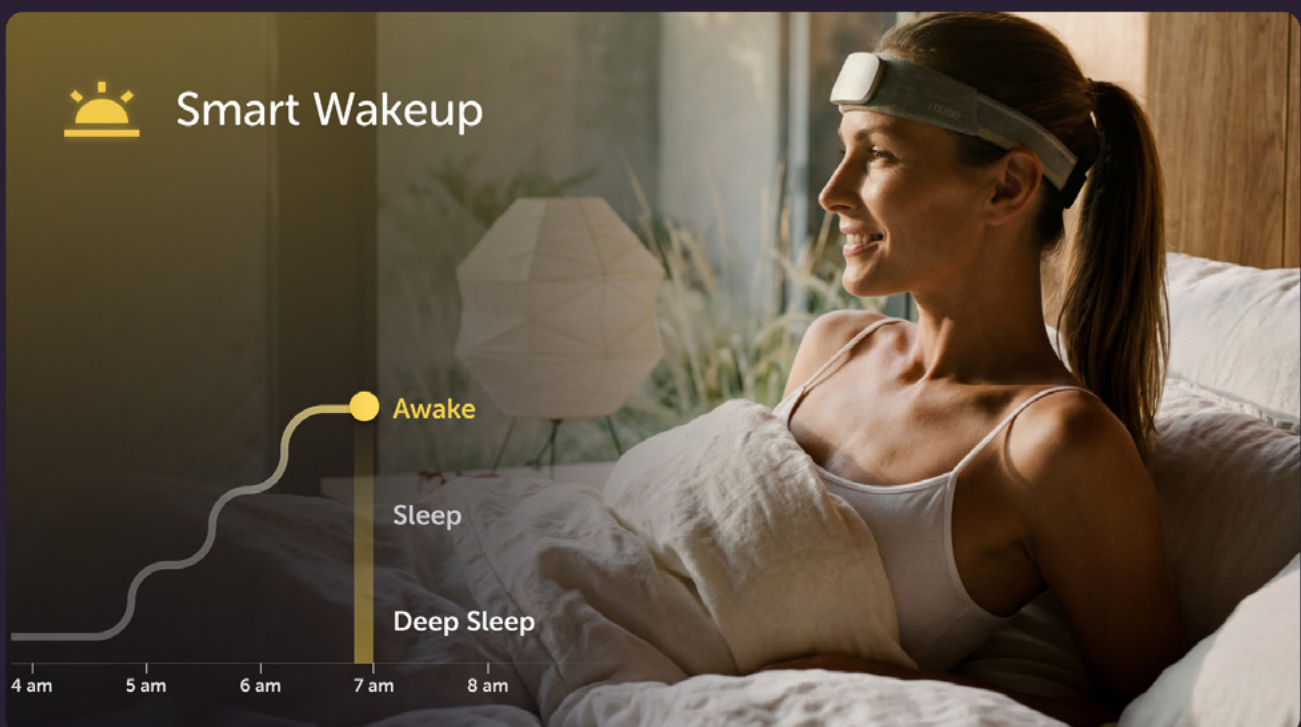
Smart Wakeup

Waking up groggy usually comes down to timing. Alarms pull you out of deep sleep at a fixed moment, regardless of where your brain actually is, and that jolt is what causes sleep inertia, the fog that can follow you for the first hour of your day.

Smart Wakeup fixes this by reading your brain in real time and waking you at the lightest point in your final sleep cycle, the exact moment it's naturally closest to waking, rather than guessing from movement or heart rate like wrist and ring wearables do.

Built on roughly 6,200 nights of real EEG data from 1,150 Muse users, the same precision works for naps too.

[Learn more](#)



Frequently asked questions

What makes Muse S Athena different from other wearable devices?

Athena is the first wearable to combine EEG and fNIRS technologies, offering a more comprehensive view of brain performance by measuring both electrical activity and oxygenation. This dual-modality approach provides deeper insights than traditional EEG devices alone.

What is fNIRS, and why is it important?

fNIRS (Functional Near-Infrared Spectroscopy) measures blood oxygenation levels in the brain, providing insights into how efficiently the brain is resourced during tasks. It's like VO₂ max for the brain, offering a measure of mental endurance and capacity.

What is EEG, and why is it important?

EEG (electroencephalogram) measures electrical activity in the brain. Our EEG technology captures your brainwaves directly, providing precise insights into your mental states. This accuracy far surpasses the guesswork of heart rate proxies used by ring and wrist wearables and other mindfulness apps.

How do fNIRS and EEG work together?

Your brain uses energy differently when focused or relaxed. To measure mental efficiency—how effectively your brain uses energy—scientists combine two tools:

- ✓ **fNIRS (functional near-infrared spectroscopy):** Measures blood flow and oxygen levels in the prefrontal cortex of the brain, showing how much energy your brain uses.
- ✓ **EEG (electroencephalography):** Tracks electrical activity, revealing changes in mental states (ie going from distracted to focused)

Together, fNIRS reveals how the brain manages energy, while EEG shows how quickly it adapts. This combination offers a complete view of mental efficiency, supporting cognitive performance, recovery, and brain health.

How does the neurofeedback system work?

Athena's neurofeedback uses EEG and fNIRS data to provide real-time feedback on mental effort and focus. Users can engage in guided exercises that train their brain to optimize performance and resilience.

Can Muse S Athena help with cognitive decline?

Yes, alongside a healthy lifestyle Athena offers tools to monitor and support executive function, helping address early signs of cognitive decline. Its targeted brain training programs are designed to enhance focus, memory, and problem-solving skills.

Who is Muse S Athena designed for?

Athena is ideal for:

- ✓ Everyday users seeking to improve focus, relaxation, and mental endurance.
- ✓ Professionals and students aiming to optimize cognitive performance.
- ✓ Older adults looking to maintain brain health and combat cognitive decline.
- ✓ Researchers and clinicians requiring advanced tools for brain health studies.

How does Muse S Athena support sleep health?

Athena tracks brain oxygenation and SpO₂ levels, providing insights into potential sleep issues like sleep apnea. These insights are specifically designed for researchers and clinicians guiding personalized interventions to improve sleep quality and recovery for their patients.

Is Muse S Athena comfortable to wear?

Yes, Athena features a lightweight, ergonomic design inspired by the Muse S headband. It's comfortable for extended wear during daily activities or sleep.

How can I access Muse S Athena's features?

Athena connects to the Muse app, where users can access neurofeedback exercises, cognitive training programs, and sleep insights.



What devices are compatible with Muse S Athena?

Muse S Athena is compatible with iOS and Android devices. The Muse app can be downloaded from the App Store or Google Play to access its full suite of features.

How does Muse S Athena integrate with the Muse ecosystem?

Athena seamlessly connects with the Muse app, complementing existing features like meditation guidance and sleep tracking while adding advanced cognitive and mental fitness tools.

Can Muse S Athena be used for clinical research?

Yes, Athena's advanced EEG and fNIRS capabilities make it suitable for clinical research. Researchers can use it to gather high-quality data on brain activity and oxygenation for studies on mental performance, cognitive decline, and sleep health.

Is there a subscription required to use Muse S Athena?

Athena offers core features out of the box, but a premium subscription unlocks access to advanced neurofeedback exercises, personalized training plans, and in-depth analytics.

How does Muse S Athena benefit mental fitness?

Athena trains the brain like physical fitness trains the body. By combining EEG and fNIRS, it helps users build focus, resilience, and endurance while providing feedback to fine-tune mental performance.

How long does the battery last?

Athena is designed for extended use, offering up to 10 hours of continuous operation on a single charge. Charging is fast and convenient with the included USB-C cable.

Does Muse work?

Over 200 third-party research papers have been published featuring Muse as an accessible, low-cost brain research platform, highlighting its effectiveness in supporting mindfulness, improving sleep, and enhancing cognitive performance.

EEG Research

A series of studies from Prof. Michela Balconi's laboratory at the Catholic University of Milan [1] explored the impact of daily Muse use compared to a simple relaxation exercise. The findings demonstrated strong evidence that technology-assisted mindfulness, specifically with Muse, can significantly support the acquisition of contemplative practice skills and their associated benefits.

Similarly, a 2023 Mayo Clinic study [2] involving 40 healthcare professionals using Muse S devices over 26 weeks showed a 54% reduction in stress and burnout, with notable improvements in resilience ($P=.02$), quality of life ($P=.003$), and cognition ($P<.001$). Impressively, 91.9% of participants felt more relaxed after use, and 73% planned to continue using Muse S, underlining its potential for promoting mental well-being in high-stress environments.

Additionally, a 2021 study led by Western University, Cambridge Brain Science, Hatch, and Interaxon [3] demonstrated that Muse S EEG-sleep support technology improved Pittsburgh Sleep Quality Index scores by 20% compared to control groups, indicating its effectiveness in enhancing sleep quality.

Who or what is Enso?

Enso is Muse's AI Brain Coach. It analyzes your individual brainwave and sleep data, explains what signals mean, highlights important patterns, and gives personalized, actionable guidance to improve sleep quality, mental clarity, recovery, and overall brain health.

fNIRS and EEG Integration

Muse combines EEG (which tracks electrical brain activity) and fNIRS (which measures blood flow in the brain) to deliver a comprehensive picture of how your brain functions. This advanced integration allows for more precise brain monitoring and training, supporting cognitive performance, brain fitness, and neuroplasticity. Research shows that this combination can achieve up to **98.42%** accuracy in identifying mental tasks, such as solving math problems ^[4].

Here's how this technology supports brain health:

Improved cognitive training and neuroplasticity

EEG-fNIRS systems provide real-time feedback on both brainwaves (EEG) and blood flow (fNIRS) during cognitive activities, giving a complete view of how the brain learns and adapts. ^{[6][7]}

Early detection of cognitive changes

In larger scale systems where research has been produced, the combined power of EEG and fNIRS

helps detect early signs of cognitive decline by identifying changes in brain activity and blood flow patterns linked to conditions like mild cognitive impairment (MCI) and Alzheimer's disease ^{[6][9][10]}.

Studies show this multimodal approach more accurately differentiates between normal aging and early cognitive issues, offering critical insights for early intervention ^{[9][10]}.

Personalized neurofeedback for Brain Fitness

Research indicates that this dual-feedback system leads to better cognitive outcomes compared to single-modality approaches, thanks to richer data for customized brain training ^[7].

How is machine learning being used in Muse?

Brain research is undergoing a revolution in the handling of neuroscience data. Muse's work in the field of neuroinformatics, the handling and analysis of very large scale brain data, has been featured at leading international research meetings. Additionally, many of the company's research partnerships focus on new techniques for machine learning with what has now grown to become the world's largest database of EEG recordings.

The company regularly publishes new insights into brain health derived from users' voluntarily shared research data — and importantly, this research option is presented clearly to users to allow them to choose whether and how their data are used.



The core features of the Muse: Brain Health & Sleep app extensively apply machine learning both in the app and in the data cloud to improve users' experience and give users more value in their technology.

Deep Learning is still relatively uncommon in the field of EEG data, but advances in data labelling offer significant opportunities for dramatic improvements in the technology and new measures of brain health throughout the life course.

Athena transforms real-time brain activity into actionable insights, personalized training, and measurable progress. It's powered by Muse's AI-driven Foundational Brain Model (FBM), which is trained on 80,000 curated sessions from the world's largest EEG database.

What is calibration and why do I need to do it?

The results of a Muse session are dependent on the quality of the calibration before your session. Discrepancies in your sessions are generally tied to the calibration stage. This stage is important, as it provides Muse with a picture of your active brain to compare against during the session. Any sharing of your account, testing during the calibration, calibrating with your eyes open, being overly active, moving, or visualizing things during the calibration could potentially skew your data, creating an inaccurate baseline for your sessions to compare against, generally resulting in a higher calm score. Our application takes each unique session's calibration as a baseline for the corresponding session.

During a biofeedback session, it is very important that you are sitting in a comfortable position with your eyes lightly closed when using Muse, as having open eyes will impact the experience session. Muse is very sensitive and will pick up electrical activity from muscles around the eyes, jaw, and brainwaves

from visual processing. Even the most advanced machine learning and signal processing techniques for EEG data cannot remove all sources of noise, so getting good electrode contact and reducing body and movement is an important part of using Muse effectively.

Your new Mental Strength sessions on Muse S Athena are designed for an eyes-open experience. For the best results, we recommend staying as still as possible, as movement can affect the session."

Should I open or close my eyes while using Muse?

For Mind, Heart, Body, and Breath Biofeedback sessions, as well as guided meditations, we recommend keeping your eyes closed.

For Mental Strength sessions and select neuroscience programs, the experience is designed for eyes-open practice.

How do my scores compare to other Musers?

Scores such as Cognitive Performance and Brain Recharge are personalized based on your baseline after 10 sessions and influenced by factors like age and gender. Other scores depend on your calibration.

Join the Muse Community to connect with fellow Musers. It's a supportive space to share results, exchange tips, and explore new experiences together

What about data privacy?

As a Muse user, you own the data you generate with the Muse app and headband. Your data is securely stored and can be deleted whenever you request. Muse is EU GDPR-compliant for data security and privacy, and our company follows strict ethical guidelines around data. Please feel free to consult our published privacy policy. and privacy, and our company follows strict ethical guidelines around data. Please feel free to consult our published privacy policy.

Is there a minimum age for the Muse Headbands?

Muse is recommended for ages 16+.

Can Muse read my thoughts?

No, EEG (electroencephalography) and fNIRS (Functional near-infrared spectroscopy) systems like Muse are not mind-reading devices.

Is Muse safe?

Muse has been tested and certified in accordance with US, Canadian and European safety standards (FCC, UL, CE). Data is transmitted via Low Energy Bluetooth, just like smart watches and fitness trackers.

What languages does Muse support?

Muse is currently supported in English only.

What are the technologies in the sensors that allow it to detect mental activity, heart rate, breath and body movement?

Electroencephalography sensors — of which there are 5 in Muse 2 and Muse S — measure tiny fluctuations in voltage on the head (directly on the skin). This can be filtered and analyzed to reflect changes in brain state, responses to stimuli, and neuroplastic changes in the brain. The same technology is extensively used in brain research.

Functional Near-Infrared Spectroscopy (fNIRS) sensors — measure changes in blood oxygenation levels in the brain. By emitting near-infrared light into the skull and detecting how much light is absorbed, fNIRS tracks how hard the brain is working and how efficiently it's being fueled. This provides insights into cognitive effort, mental endurance, and recovery. The combination of fNIRS with EEG offers

a comprehensive view of both brain activity and brain oxygenation, making it possible to understand cognitive performance in real time.

Other sensors in Muse, including cardiac and movement sensors, monitor blood flow, breathing, and motion in the same way Fitbit and the Apple Watch do (PPG and MEMS). One important distinction is that there are advantages to measuring movement and aspects of cardiovascular physiology on the head, because the head reflects aspects of behaviour and physiology that the wrist does not.

How do I wear my Muse S Athena?

Ensure the Muse Logo is right side up and the ear sensors are facing down. Fasten the clasp at the back of your neck and then slide the band up to your forehead. Ensure the pod sits at the centre of your forehead, pod facing forward. Adjust the length of the strap for a comfortable fit.

Be careful not to stretch the band as this can damage the sensors. Remove any hair behind your ears, as it is important that both ear sensors make direct contact with the skin behind your ears. Visit this page for more detailed starting guides.

How do I care for my Muse S Athena?

We recommend storing your Muse S in the same box you received it in. If you wish to handwash your Muse S headband, it is important that you disconnect the Muse S pod prior to doing so.

Your Muse S headband must be hand washed with a mild, scent-free detergent. After gently towel drying out your Muse S, it should be dried flat. Reconnect the Muse S pod once the Muse S Headband is completely dry.



Is Muse S Athena safe to sleep with overnight?

Yes, Muse S Athena was designed with comfort in mind and is safe to be worn overnight after being lulled to sleep by one of our Go-to-Sleep Journeys. Muse S Athena transmits data via Low Energy Bluetooth, just like smart watches and fitness trackers. Once you have completed your Go-to-Sleep Journey, Bluetooth will disconnect and your Muse S Athena will power off.

What are Muse Sleep Journeys?

Sleep Journeys are designed to take you on an imaginative experience to settle your busy mind and give you open space to drift off and fall fast asleep. They seamlessly blend soothing voice guidance with a responsive soundscape to form truly personalized Sleep soundtracks.

Guided by the calming voice of your selected meditation teacher, you'll be taken through a soothing and responsive journey designed to move your wandering mind away from the busy thoughts that keep you awake, and lull you to a restful slumber.

We offer a variety of Sleep Journeys with different relaxation techniques, all designed to help you fall asleep. Some journeys will be more physical, other journeys more immersive and imaginative. Every person is different and we invite you to explore a variety of techniques and discover what works best for you.

How are Muse Sleep Journeys different from other Muse® experiences?

With Muse S Athena Sleep Journeys, it's the first time we've combined guided instruction with real-time soundscapes for a truly unique relaxation experience. Muse S Athena Sleep Journeys are different from traditional Muse experiences, in that they allow the listener to fall slowly into a more relaxed state without having a central point of concentrated focus and effort.

Muse Mind, Body, Heart, and Breath meditations are training for deeper meditation practice. You are actively using biofeedback to strengthen your mindfulness muscle. Our Sleep collection was created specifically for rest and recovery, where you do not need the same amount of mental effort, and the goal is deep relaxation leading to sleep.

How should I interact with the biofeedback in a Muse Sleep Journey?

As you begin to explore the journeys, we recommend that you let the teacher be your guide and keep your focus on their soft and gentle voices. During your Sleep Journey, you'll hear shifts in volume and pace within your soundscape that reflect your mental and physical states. The invitation is to listen for yourself in the sounds, rather than train yourself using the sounds.



What are Muse Sleep Soundscapes?

Soundscapes are audio environments made up of individual sounds that reflect different feedback centers including brain activity, heart rate, breath and movement. These individual feedback sounds are layered to create a personalized soundscape that will reflect your changing physical and mental state... think of it as your personal Sleep soundtrack, shaped by you in real-time! Expect your Soundscape to tune to your body—adjusting to what you need in a specific moment to prepare you for rest.

You will have access to Soundscapes within the Sleep Journeys, as well as 8 individual, stand-alone Soundscapes. Within a Sleep Journey, your soundscape is your backdrop, a relaxing audio environment to complete the Journey experience and make it truly unique. When you listen to a stand-alone Soundscape, expect it to be both your background and foreground as it washes over you.

What are Muse S Sleep Guidances?

With Muse S Athena, you gain access to a growing collection of Guided Meditations specifically designed to help you relax, settle your busy mind and rest better. All of our Sleep meditations are led by world-renowned meditation instructors and cover a variety of techniques, subjects and themes. After each meditation, you'll receive post-session results that show your brain, heart and body activity during that session.

What is the Muse Sleep Score?

Your Sleep Score is a numeric representation of how your night of sleep was, out of 100. This score is used to provide our users with a value summed from various things that affected your night of rest. This can then be used to provide insight into how your sleep is improving over time without having to look into your data between overnight sessions. Your score is calculated according to your age and gender demographic group using a few different data points. Factors that influence your score include time spent in bed awake vs sleeping (sleep efficiency), total sleep time, and time spent in deep sleep and REM stages.

What are Digital Sleeping Pills and how do they work?

Sleep has a profound effect on our mental, physical, and emotional health. Busy days often mean a busy mind at night and restless sleep. Muse Digital Sleeping Pills are AI-powered sleep technology designed to help support falling asleep, staying asleep, and improving sleep quality over time.

A **Digital Sleeping Pill (DSP)** is Muse's AI-driven sleep technology that responds in real time to your brain activity during sleep. Using an intelligent algorithm, DSP technology detects changes in your brain's state as you transition from wakefulness into sleep and as your sleep naturally shifts throughout the night. This technology adapts the sleep experience based on how your brain is responding, rather than following a fixed script.

Imagine drifting off to sleep like landing an airplane. During the day, we are in flight, navigating turbulence. At the end of the day, to land safely, we need to slow down and shut off the engine. Digital Sleeping Pill technology is designed to support this landing process by responding to your brain's rhythms and helping signal when it's time to disengage and rest. As you fall asleep, your brain activity naturally changes.

Muse can detect these changes and use them to adjust sleep experiences in real time, cueing your brain toward rest and supporting healthy sleep patterns throughout the night. Digital Sleeping Pill technology powers multiple sleep experiences, including **Sleep Assist** and **Deep Sleep Boost**, each applying the same AI-driven DSP system in different ways to support specific stages of sleep.

This adaptive, AI-based approach may feel unfamiliar at first, since the experience changes in response to your brain rather than playing straight through. Once you get used to DSP technology responding to you, the experience becomes intuitive and aligned with your natural sleep rhythms.

What is Sleep Assist

Sleep Assist is a Digital Sleeping Pill experience designed specifically to help you fall asleep and return to sleep if you wake during the night.

Powered by DSP technology, Sleep Assist uses stories and soundscapes that dynamically respond to your brain activity. As your brain begins to transition into sleep, the audio softly fades away, helping signal that it's time to rest. If you wake during the night, the audio gently rises again to help lull you back to sleep.

Sleep preferences vary widely from person to person. Some people find that engaging stories help prevent ruminating thoughts, while others prefer softer soundscapes or guided meditation. Sleep Assist offers a range of content styles so you can choose what best supports your own sleep needs, all powered by the same AI-driven Digital Sleeping Pill technology.

This "smart fade-out" experience may feel a bit strange at first because you may still be partly awake as the audio fades out. But don't worry, once you get used to Sleep Assist responding to you, you'll hear the audio start to fade out and drop into sleep shortly after.

Sleep content preferences can vary widely from person to person. Some people are looking for a more engaging story to keep their mind from getting stuck in ruminating thoughts, while others may find a story

too exciting to fall asleep to and prefer a softer, guided meditation or ambient soundscape. Depending on what type of content helps you fall asleep best, you can select a variety of different Sleep Assist content to help you on your journey including all-new:

- ✓ Original, Classic, and Adventure Sleep Stories that have a voice narration of some of your favorite childhood stories & a variety of new original stories.
- ✓ Ambient Sleep Soundscapes that offer soothing ambient music and harmonized sounds without a voice narrative.
- ✓ Biofeedback Sleep Soundscapes that offer nature sounds and music that respond to biofeedback without a voice narrative.
- ✓ Guided Sleep Meditations that have a meditation teacher guide you through a relaxing sleep meditation.



What does Deep Sleep Boost do?

Deep Sleep Boost leverages EEG data during overnight sleep with Muse S Athena. When the headband detects you are in deep (slow-wave) sleep, it plays subtle, carefully timed audio cues (like pink noise) aimed at reinforcing deep-sleep quality. If the system detects disruption or instability, it automatically pauses, ensuring sleep is undisturbed. The goal: boost restorative sleep, improve memory consolidation, recovery, resilience, and brain fitness over time.

What sleep data do I get with Muse S Athena?

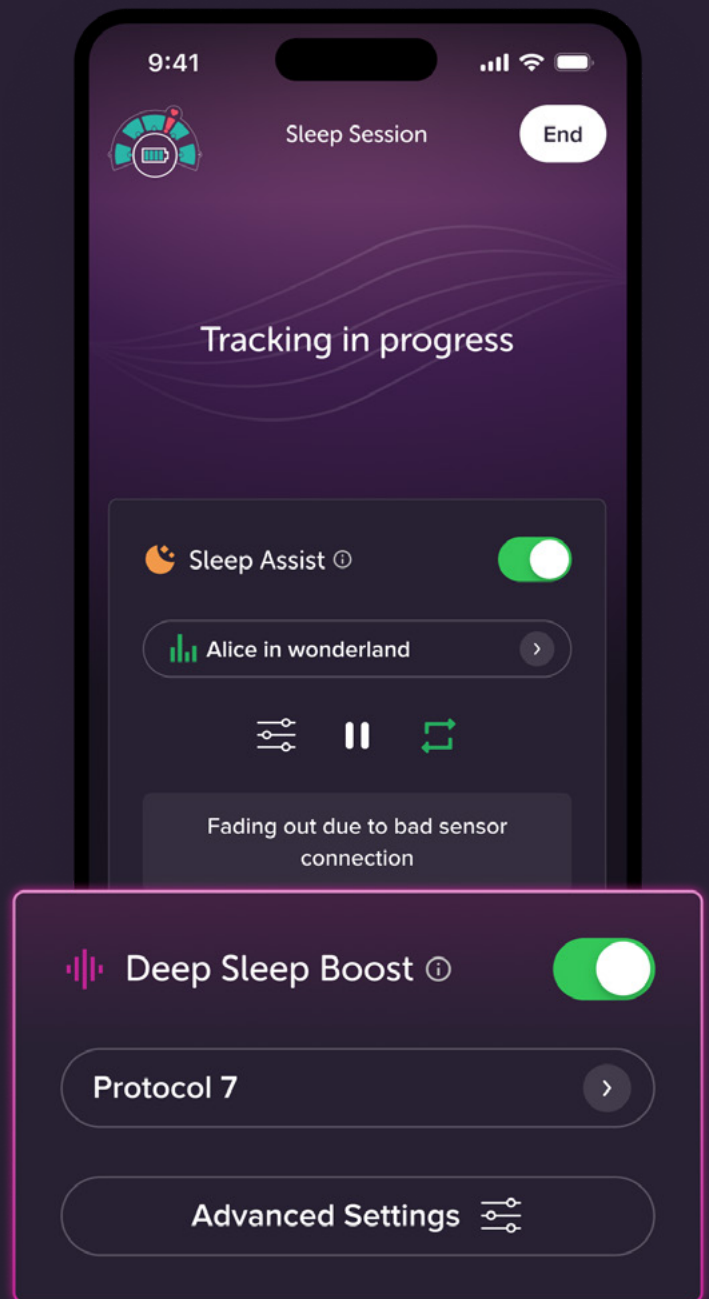
Explore EEG-powered sleep tracking insights including sleep stage visualization, deep sleep intensity and point, sleep position tracking, and a personalized sleep efficiency score. The lab-grade sensors can track everything from your sleep position to heart rate, giving you baseline data and personalized insights from which you can set goals and measure progress.

What is the optimal setup for using Muse S Athena for sleep?

We recommend using Muse S Athena at bedtime 2-3 times a week and at least 1-2 daytime sessions with the Mind biofeedback experience. To start off, learn about our sleep experiences through the 'Intro to Sleep' program found in the Sleep Section of the Muse App.

Exploring our sleep experiences & DSP (Sleep Assist + Deep Sleep Boost):

Each night, feel free to try different content within the experience collections, select from 'Sleep Stories & Meditations' or 'Music and Nature Biofeedback'. Make sure to try out our most popular Sleep Assist content: Slice of San Francisco, Alice in Wonderland from the 'Sleep Stories' collection.



Additional Resources

High-resolution images & product specs:

Media kit

Affiliate Partnership:

Sign up at partners.choosemuse.com to create your unique affiliate link. Share a 15% discount with your readers and earn a 10% commission on every sale made through your link.

Media Contact:

Max Borges Agency, muse@maxborgesagency.com

For any technical issues or feedback, please reach out to our team at customer@choosemuse.com.

We appreciate your insights and look forward to your review!

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