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Reset: The Complete Science of Sleep Optimization

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Introduction

Why do so many smart, motivated people struggle with something as fundamental as sleep? For most of human history, the sun and our social rhythms aligned to make sleep nearly inescapable. Today, light is a switch, work never quite stops, and our bodies pay the bill. Poor sleep hides in plain sight: it blunts our focus, frays our moods, erodes metabolic and cardiovascular health, and amplifies pain and anxiety. It also undercuts the very traits we rely on to improve—motivation, patience, and self-control. If you’ve ever stared at the ceiling at 2 a.m., nodded off in an afternoon meeting, or felt your patience vanish after a short night, you know the stakes are personal. They’re societal, too. Sleep loss strains families, workplaces, and communities. Reset is a practical, evidence-based roadmap to reclaiming sleep so that energy, clarity, and health become everyday defaults—not occasional surprises.

This book blends clear science with step-by-step practice. You will learn how sleep works—circadian timing, homeostatic sleep drive, and the stages of sleep—so the “why” behind each recommendation is transparent. Then you’ll put that knowledge to work through checklists, scripts, and short experiments. You’ll hear from sleep researchers, physicians, behavioral sleep therapists, occupational health specialists, and elite coaches who translate lab findings into real-world change. Throughout, we minimize jargon, define necessary terms in plain language, and point you toward clinicians when medical evaluation is the safest next step. The goal is not to chase perfection; it is to secure reliable, sufficient, good-quality sleep that sustains your life.

How to use this book. Although you can read straight through, you may prefer a targeted approach:

- Start with the brief self-assessment below to identify your biggest obstacles.
- Skim Chapters 1–3 to learn the essential science.
- Use Chapters 4–10 to tune timing, light, and environment.
- Apply skill-based strategies in Chapters 11–16 to align movement, nutrition, substances, and technology with your sleep goals.
- Consult Chapters 17–23 for medical considerations, special circumstances, and tailored plans.
- Commit to Chapter 24’s 90-day Reset Plan to build durable habits and measure progress.
- Glimpse what’s next in Chapter 25 and set realistic expectations for continued improvement.

Before we begin, a word on safety and scope. This book offers education and frameworks, not personal medical advice. If you experience loud habitual snoring, witnessed breathing pauses, waking gasping or choking, overwhelming daytime sleepiness, frequent drowsy driving, leg discomfort that compels you to move at night,

parasomnias with risk of injury, or if you use sleep medications, opioids, or sedatives, consult a qualified clinician. Use the screening pointers in Chapters 5, 6, and 17 to decide when to pursue formal testing and treatment. Behavioral strategies are powerful—especially core components of CBT for insomnia (CBT-I)—but they work best when serious medical issues are identified and managed.

A quick self-assessment: Where should you focus first?

- Sleep opportunity: In the past two weeks, how many nights did you allow at least 7.5–8.5 hours in bed?
 - 0–3 nights = major limiter; prioritize schedule changes (Chapters 2, 9).
- Sleep timing: Do you wake and go to bed at roughly the same times (± 30 –45 minutes) most days?
 - If no, address social jet lag and anchoring cues (Chapters 3, 9, 10).
- Daytime sleepiness: Do you struggle to stay awake in passive situations (meetings, reading, driving)?
 - If yes, screen for sleep debt and disorders (Chapters 5, 6).
- Snoring/apneas: Has anyone noticed loud snoring or breathing pauses? Do you wake with a dry mouth or headache?
 - If yes, prioritize medical evaluation for sleep apnea (Chapters 5, 17).
- Mind racing or stress at night: Do worry, rumination, or a “tired-and-wired” state keep you awake?
 - If yes, focus on stimulus control, wind-down routines, and CBT-I skills (Chapters 14, 15).
- Evening substances: Do you rely on alcohol or cannabis to fall asleep? Do you use caffeine after noon?
 - If yes, plan structured taper/adjustments (Chapter 13).
- Environment: Is your bedroom quiet, cool, dark, and comfortable? Is light from screens present in the evening?
 - If no, implement an environment makeover (Chapters 7, 8, 10).
- Irregular work or travel: Do shift work or frequent time-zone changes disrupt your week?
 - If yes, use tailored timing and light strategies (Chapters 9, 22, 23). You don’t need a perfect score to begin. Choose the two highest-impact targets and let the program compound gains over time.

What you’ll find inside. Each chapter follows a consistent structure to make learning and application efficient: a brief opening vignette; the core science in plain language; step-by-step guidance; short case studies; an end-of-chapter checklist; a “Quick Tips” box; a “Common Mistakes” sidebar; and one “If you only do one thing” action. You will also see clear signposts for when to seek medical care, simple definitions for technical terms, and suggestions for further reading. Figures—such as a visual of sleep stages, a 24-hour circadian curve, and sample tracker outputs—make key concepts tangible. Downloadable templates (sleep diary, experiment log, and a 90-day habit tracker) help you translate ideas into daily practice.

The 90-day Reset approach. Change sticks when it’s specific, measurable, and paced. Chapter 24 lays out a progressive plan that pairs weekly objectives with simple

metrics. The plan moves through four phases:

- Weeks 1–2: Baseline and Setup. Establish your schedule anchors (fixed wake time and light exposure), complete a two-week sleep diary, and audit your environment. Begin small wins—caffeine timing, consistent wind-down, and device dimming.
- Weeks 3–6: Foundations. Implement stimulus control, refine timing (bedtime matched to actual sleepiness), and introduce movement and meal-timing routines aligned with your chronotype. Track daytime energy, mood, and concentration.
- Weeks 7–10: Precision and CBT-I Core. Calibrate time in bed to consolidate sleep, address unhelpful sleep thoughts, and practice stress-regulation skills that quiet “tired-and-wired” arousal. Troubleshoot with short, structured naps when appropriate.
- Weeks 11–13: Personalization and Resilience. Re-expand time in bed as sleep stabilizes, build travel/shift contingencies, and add performance strategies (naps, sleep extension before high-demand days). Create a relapse-prevention checklist.

Measurement without obsession. You’ll use simple tools—the sleep diary, validated questionnaires like the Pittsburgh Sleep Quality Index (PSQI) and the Epworth Sleepiness Scale, and optional data from wearables. The goal isn’t to hit a “perfect” sleep score; it’s to observe patterns and run small experiments. If a device spikes your anxiety or contradicts your lived experience, dial back the data and prioritize subjective sleep quality and daytime function. Chapter 16 offers guidance on when to trust or ignore the numbers.

Why sleep is the missing pillar. Nutrition and exercise get the spotlight, but sleep sets the stage. It tunes the brain systems that regulate attention and emotion, supports immune and metabolic health, and restores the body for physical and cognitive performance. Even modest, sustained improvements in sleep can pay outsized dividends: steadier moods, more reliable energy, sharper memory and reaction time, fewer late-night cravings, and better workouts with faster recovery. Many readers discover that repairing sleep makes other health changes finally “stick.”

What this book is—and is not. It is a rigorous, compassionate guide grounded in peer-reviewed evidence and real-world constraints. It avoids one-size-fits-all prescriptions and explains trade-offs so you can choose what fits your life. It is not a list of hacks or a promise that you’ll fall asleep instantly on command. There will be plateaus and imperfect nights. That’s normal. The program anticipates bumps and helps you adapt without derailing your momentum.

If you’re a parent, caregiver, shift worker, frequent traveler, athlete, or simply someone who wants steadier energy and clearer thinking, you will find tailored pathways in later chapters. You’ll learn scheduling strategies for night shifts, gentle and evidence-aligned options for infant and child sleep, jet-lag reset protocols, and

high-performance routines for creative and physical peak days. You'll also learn when to involve health professionals for conditions like insomnia, obstructive sleep apnea, restless legs syndrome, circadian rhythm disorders, depression, anxiety, chronic pain, and cardiometabolic disease. These conditions are common and treatable; getting help is a strength, not a failure.

A few ground rules will keep you on track:

- Protect the wake time. A consistent wake time is the most powerful anchor for your body clock. Build around it.
- Align light with goals. Morning light, dim evenings. When light can't change, use tools: brighter mornings, blue-light reduction after dusk, and strategic melatonin when indicated.
- Match time in bed to sleepy time. Go to bed when sleepy, not just when the clock says. Expand time in bed again as sleep consolidates.
- Simplify evenings. A short, repeatable wind-down routine beats elaborate rituals you won't sustain.
- Change one or two variables at a time. Measure the effect; keep what works; drop what doesn't.
- Seek help early when red flags appear. Better to rule out a medical issue than push through months of trial and error.

Finally, an invitation. Over the next 90 days, you will reset your relationship with sleep—practically, compassionately, and with science as your guide. You don't need perfect discipline or unlimited time. You need a plan that respects biology and fits your life. Let's begin by learning how sleep actually works and why that knowledge turns vague advice into pinpoint strategy.

CHAPTER ONE: The Science of Sleep: Mechanisms and Why They Matter

The alarm blares, but your body insists it's still 3 AM. You drag yourself out of bed, fueled by the vague promise of coffee and the distant memory of a good night's sleep. Your brain feels wrapped in cotton, your patience is thin, and that crucial presentation at work suddenly seems insurmountable. What happened? It's not simply that you didn't get "enough" sleep; it's that the intricate, elegant machinery of your sleep system was disrupted. Understanding this machinery isn't just an academic exercise; it's the bedrock of optimizing your sleep and, by extension, your entire waking life.

For centuries, sleep was largely a mystery—a blank slate between periods of activity. We now know it's anything but passive. Sleep is a dynamic, highly organized state essential for physical restoration, emotional regulation, memory consolidation, and cognitive repair. It's orchestrated by a complex interplay of internal clocks, chemical signals, and distinct brainwave patterns. Grasping these fundamental mechanisms allows you to move beyond generic sleep advice and implement targeted strategies that truly work.

The Circadian Rhythm: Your Inner Maestro

Imagine a tiny, internal conductor keeping time for virtually every biological process in your body. This is your circadian rhythm, a roughly 24-hour cycle that dictates when you feel sleepy, when you're most alert, when your hormones surge, and even when your core body temperature fluctuates. The term "circadian" comes from the Latin "circa diem," meaning "around a day". This internal clock isn't unique to humans; it's fundamental to almost all life on Earth, from plants to single-celled organisms.

At the heart of your circadian rhythm is the suprachiasmatic nucleus (SCN), a tiny cluster of about 20,000 neurons located in your brain's hypothalamus. The SCN acts as the master clock, synchronizing various peripheral clocks found in almost every cell and organ in your body. Think of the SCN as the conductor and your organs as the orchestra members, each playing their part in a precise, daily symphony.

While the SCN generates its own rhythm, it needs cues from the outside world to stay precisely aligned with the 24-hour day. The most powerful of these cues is light, especially bright blue light, which directly impacts the SCN through specialized photoreceptors in your eyes. When morning light hits your retina, it signals your SCN to "reset" itself for the day, suppressing the sleep-inducing hormone melatonin and ramping up alertness-promoting systems. Conversely, the absence of bright light in

the evening signals to your SCN that it's time to prepare for sleep, triggering melatonin release.

This light-dark cycle is paramount. Disruptions to this rhythm, such as those experienced during shift work or international travel, can throw your entire system into disarray, leading to fatigue, digestive issues, and impaired cognitive function—a phenomenon colloquially known as "jet lag". But it's not just extreme situations; even consistent exposure to artificial light late into the evening can subtly shift your circadian rhythm, making it harder to fall asleep at your desired time and wake up feeling refreshed.

Quick Tip: Think of bright morning light as your brain's natural "on" switch. Aim for 15-30 minutes of natural light exposure shortly after waking to help solidify your circadian rhythm.

Homeostatic Sleep Drive: The Urge to Sleep

While your circadian rhythm tells you *when* to sleep, your homeostatic sleep drive dictates *how much* sleep you need. This is essentially a pressure that builds up the longer you've been awake. The primary chemical responsible for this increasing pressure is adenosine.

Adenosine is a byproduct of cellular energy metabolism. As your brain cells burn fuel throughout the day, adenosine accumulates in the spaces between neurons. The more adenosine that builds up, the stronger the signal for sleep becomes. Imagine it like a gas tank slowly filling; once it reaches a certain level, your body demands a refill—sleep. During sleep, adenosine levels decrease, and the pressure for sleep dissipates, preparing you to wake up feeling refreshed and ready to start the cycle anew.

Caffeine, the world's most popular psychoactive drug, works by blocking adenosine receptors in the brain. It doesn't eliminate adenosine; it simply prevents it from signaling the brain to feel sleepy. This is why caffeine can make you feel more alert, but when it wears off, the accumulated adenosine can hit you all at once, leading to a "caffeine crash" and intense rebound sleepiness. This is a critical concept to grasp when considering your afternoon coffee habits.

The interplay between circadian rhythm and homeostatic sleep drive is what creates the optimal window for sleep. Your circadian rhythm drives a natural dip in alertness in the late evening, coinciding with a peak in your homeostatic sleep drive. When these two forces align, falling asleep feels natural and effortless. When they are misaligned—perhaps because you've stayed up late, overriding your natural sleep drive, or you're trying to sleep when your circadian clock is signaling alertness—sleep becomes a struggle.

Common Mistakes: Pushing through extreme sleepiness with caffeine or other stimulants. This doesn't eliminate your sleep debt; it only masks it, leading to a heavier crash later and potential disruption to your natural sleep timing.

Sleep Architecture: The Stages of a Restful Night

Sleep isn't a monolithic block of unconsciousness. It's a highly structured journey through distinct stages, each with its own unique brainwave patterns, physiological characteristics, and restorative functions. These stages cycle throughout the night, typically in 90-minute periods, with the composition of each cycle shifting as the night progresses. We broadly categorize sleep into two main types: Non-Rapid Eye Movement (NREM) sleep and Rapid Eye Movement (REM) sleep.

Non-Rapid Eye Movement (NREM) Sleep

NREM sleep is further divided into three substages:

- **N1 (Stage 1): The Drowsy Descent.** This is the lightest stage of sleep, a transitional phase between wakefulness and deeper sleep. You might experience slow eye movements, muscle relaxation, and a sense of "dozing off." If awakened during N1, you might deny you were even asleep. It typically lasts only a few minutes.
- **N2 (Stage 2): Light Sleep.** This stage makes up the largest portion of your total sleep time. Your heart rate slows, body temperature drops, and eye movements cease. Brain activity shows characteristic "sleep spindles" and "K-complexes," which are thought to play a role in memory consolidation and protecting sleep from external disturbances. If awakened during N2, you're usually aware you were asleep.
- **N3 (Stage 3): Deep Sleep (Slow-Wave Sleep).** This is the most restorative stage of sleep, often referred to as "delta sleep" due to the slow, high-amplitude delta waves observed in brain activity. During N3, your muscles are completely relaxed, blood pressure drops, and your body performs much of its physical repair and growth. This is when human growth hormone is released, and your immune system gets a significant boost. Waking someone from N3 often results in grogginess and disorientation. The majority of deep sleep occurs in the first half of the night.

Rapid Eye Movement (REM) Sleep

REM sleep is a fascinating and paradoxical state. While your brain activity during REM closely resembles wakefulness, your voluntary muscles are temporarily paralyzed, preventing you from acting out your dreams. It's characterized by rapid eye movements (hence the name), increased brain activity, vivid dreaming, and fluctuations in heart rate and breathing.

REM sleep is crucial for cognitive functions like emotional regulation, learning, and memory consolidation, particularly for procedural and spatial memories. It's thought to be a period when the brain processes emotional experiences and integrates new

information. We experience longer periods of REM sleep in the latter half of the night, meaning if you consistently cut your sleep short, you're likely depriving yourself of this vital stage.

Figure 1.1: Illustration of Sleep Stages (N1, N2, N3, REM)

[Insert Figure 1.1 here: A clear, simple diagram illustrating the progression through NREM and REM sleep stages over a typical night, showing brainwave patterns (e.g., higher frequency for wake/REM, slower for deep sleep), eye movements, and muscle tone changes. The diagram should ideally show cycles and the changing proportion of each stage across the night.]

Caption: A typical night's sleep progresses through cycles of NREM (N1, N2, N3) and REM sleep. Deep sleep (N3) predominates in the early part of the night, while REM sleep becomes longer and more frequent towards morning.

Key Neurotransmitters and Hormones: The Chemical Messengers of Sleep

The intricate dance of sleep stages and cycles is orchestrated by a symphony of chemical messengers in your brain. Understanding a few key players helps clarify how lifestyle choices impact your ability to fall and stay asleep.

- **Melatonin: The Darkness Hormone.** Often called the "hormone of darkness," melatonin is primarily produced by your pineal gland in response to declining light levels in the evening. It acts as a signal to your body that it's nighttime and time to prepare for sleep. Melatonin doesn't directly "knock you out," but rather lowers your core body temperature and reduces alertness, making it easier to fall asleep. Its production is suppressed by bright light, especially blue light, which is why evening screen exposure can be so detrimental to sleep onset.
- **Adenosine: The Sleep Pressure Accumulator.** As discussed, adenosine builds up in your brain during wakefulness, creating the homeostatic drive for sleep. It binds to receptors that promote drowsiness and inhibit arousal-promoting neurotransmitters.
- **Orexin (Hypocretin): The Wakefulness Promoter.** Orexin, or hypocretin, is a neurotransmitter produced in the hypothalamus that plays a crucial role in maintaining wakefulness and appetite. Orexin neurons are highly active during wakefulness and less active during NREM and REM sleep. A deficiency in orexin can lead to narcolepsy, a disorder characterized by excessive daytime sleepiness and sudden attacks of sleep. Conversely, overactivity in the orexin system can contribute to insomnia, making it difficult to shut off the wakefulness signal.
- **GABA (Gamma-Aminobutyric Acid): The Brain's Primary Inhibitor.** GABA is the main inhibitory neurotransmitter in the central nervous system. It reduces neuronal excitability, essentially calming brain activity. Many sleep medications, such as benzodiazepines, work by enhancing GABA's effects, promoting sedation. During natural sleep, GABAergic neurons become more

active, helping to quiet the brain and transition into sleep.

- **Acetylcholine, Serotonin, and Norepinephrine: Modulators of Arousal and Dreams.** These neurotransmitters play complex roles. Acetylcholine is crucial for REM sleep and dreaming, with higher levels during REM. Serotonin and norepinephrine, while important for mood and wakefulness, show reduced activity during deep sleep, allowing the brain to enter those restorative states. Disruptions to their balance can affect both mood and sleep quality.

Case Study: Sarah's Evening Routine

Sarah, a 35-year-old marketing manager, felt perpetually tired despite aiming for 7-8 hours of sleep. She often struggled to fall asleep, her mind racing, and would wake feeling unrefreshed. A detailed sleep diary revealed a pattern: she worked on her laptop until 10 PM, then scrolled social media on her phone in bed until 11:30 PM. She also had a strong cup of coffee around 4 PM.

Sarah's challenge wasn't a lack of sleep *opportunity*, but a disruption of her internal mechanisms. Her late-afternoon caffeine intake was blocking adenosine, delaying the build-up of her homeostatic sleep drive. More significantly, the bright blue light from her devices late into the evening was actively suppressing melatonin production, sending a powerful "stay awake" signal to her SCN, pushing back her circadian rhythm. This misalignment meant that even when she finally put her phone down, her body wasn't physiologically ready for sleep.

By understanding the roles of adenosine, melatonin, and light, Sarah made two key changes: she shifted her last coffee to 1 PM and implemented a "digital sunset" at 9 PM, switching to dim, amber-filtered lights and reading a physical book before bed. Within two weeks, she reported falling asleep faster, experiencing fewer awakenings, and feeling more alert in the mornings. Her body clock and sleep drive were finally working in harmony.

Why These Mechanisms Matter for Your Sleep Optimization

The intricate mechanisms of circadian rhythm, homeostatic sleep drive, and sleep architecture aren't just fascinating biological facts; they are the levers you can pull to optimize your sleep.

- **Consistency is King for Circadian Rhythm:** Your SCN thrives on regularity. A consistent wake-up time, even on weekends, is the single most powerful tool to entrain your circadian rhythm. This helps synchronize your internal clock with the external world, ensuring melatonin is released and suppressed at the right times.
- **Manage Your Sleep Pressure:** Be mindful of activities that interfere with adenosine buildup. Caffeine consumption, especially in the afternoon and evening, directly counteracts your homeostatic sleep drive, pushing back your natural sleep window. Conversely, ensuring sufficient wakefulness during the day helps build robust sleep pressure for the night.

- **Respect the Stages of Sleep:** Each stage of sleep has a vital function. Consistently cutting your sleep short doesn't just reduce total sleep; it disproportionately affects REM sleep (which is longer in the morning) and can diminish the amount of restorative deep sleep (which is more prominent earlier in the night). Prioritizing adequate sleep duration ensures you cycle through all stages sufficiently.
- **Harness Light Wisely:** Light is a powerful zeitgeber (time-giver). Strategic exposure to bright light in the morning reinforces your wake signal, while minimizing bright, especially blue, light in the evening prevents melatonin suppression and prepares your body for sleep.
- **Balance Arousal:** Understand that stress, anxiety, and an overactive mind flood your system with wakefulness-promoting hormones and neurotransmitters like cortisol and orexin. Developing relaxation techniques and cognitive strategies can help dampen this arousal and allow GABA to do its work.

Understanding these fundamental principles moves you from simply trying to "get more sleep" to intelligently *optimizing* your sleep. You'll be able to identify *why* certain interventions work, predict the effects of your daily choices, and troubleshoot when things go awry. In the following chapters, we will dive into practical, evidence-based strategies built directly upon this scientific foundation, empowering you to become the conductor of your own inner symphony.

End-of-Chapter Checklist/Action Items:

- Commit to a consistent wake-up time, even on weekends, within a 30-45 minute window.
- Note your last caffeine intake time today and consider moving it earlier (before noon, if possible).
- Be mindful of bright artificial light exposure, especially blue light, for 2-3 hours before your desired bedtime.
- Observe your natural periods of sleepiness and alertness throughout the day.
- Reflect on how your daily habits might be impacting your circadian rhythm and homeostatic sleep drive.

If you only do one thing: Establish a consistent wake-up time seven days a week to anchor your circadian rhythm.

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