

LEVELED BOOKS

Why We Sleep



MULTI
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Written by S. E. Virgilio

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Focus Question

How is sleep important to good health?

Words to Know

brain waves	restores
function	schedule
immune system	shuffling
monitor	triggers
reorganized	

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Introduction

Who doesn't like to curl up between soft sheets and slowly drift off into a sound sleep? Getting a good night's sleep is how we rest after a busy day at school, work, or play. People and most other animals need sleep to **function** well. Like food and water, sleep is necessary to keep minds sharp and bodies ready to go.

Wowser!

Did you know that people spend about a third of their lives asleep? That means someone who is seventy-five years old has spent twenty-five years snoozing!

What Is Sleep?

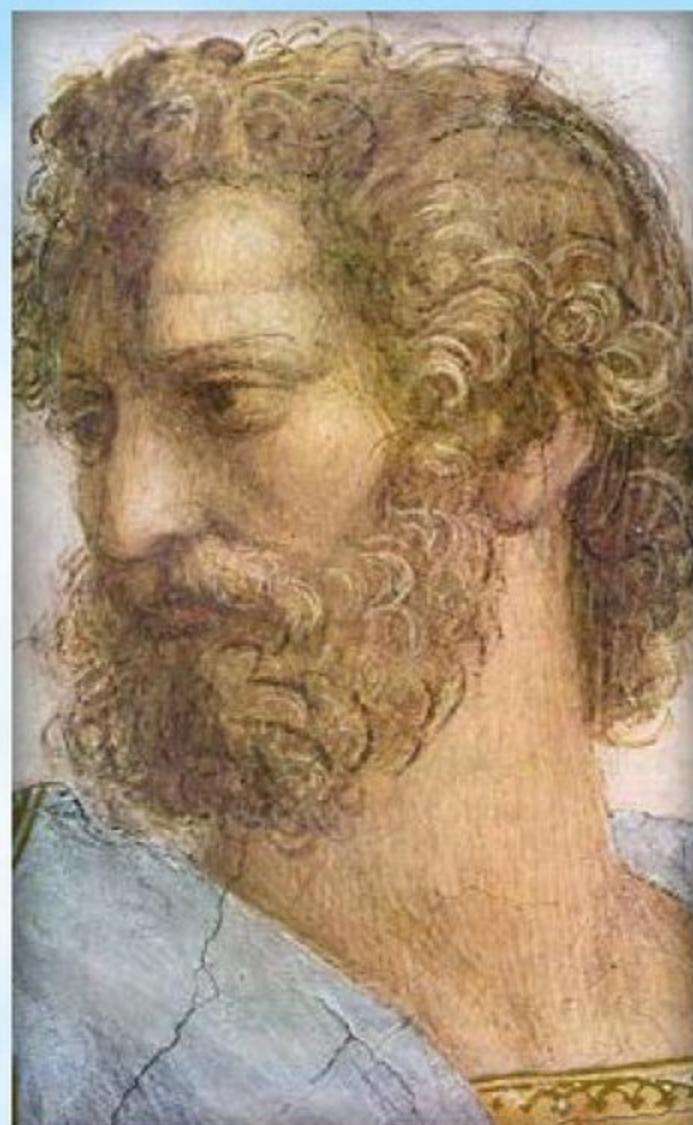
Falling asleep happens naturally and at regular times. It's also easy to stop sleeping; a loud noise is often all that is needed to wake a sleeping person.

So what is sleep, and what makes us fall asleep? People have struggled for centuries to answer these questions. An ancient Greek thinker believed that sleep was a quiet time of rest brought on by eating. That idea is not as strange as it sounds. Most people are ready for a nap after enjoying a big meal.

Do You Know?

Aristotle believed that digesting food sent warm vapors to the head. The vapors then cooled and went to the heart, causing people to feel sleepy.

While this is not true, how sleepy you feel does depend on the kind of food you eat. Some foods cause a sleepy feeling, while others, like chocolate, have caffeine. Those foods can make you perk up instead of wind down.



Aristotle

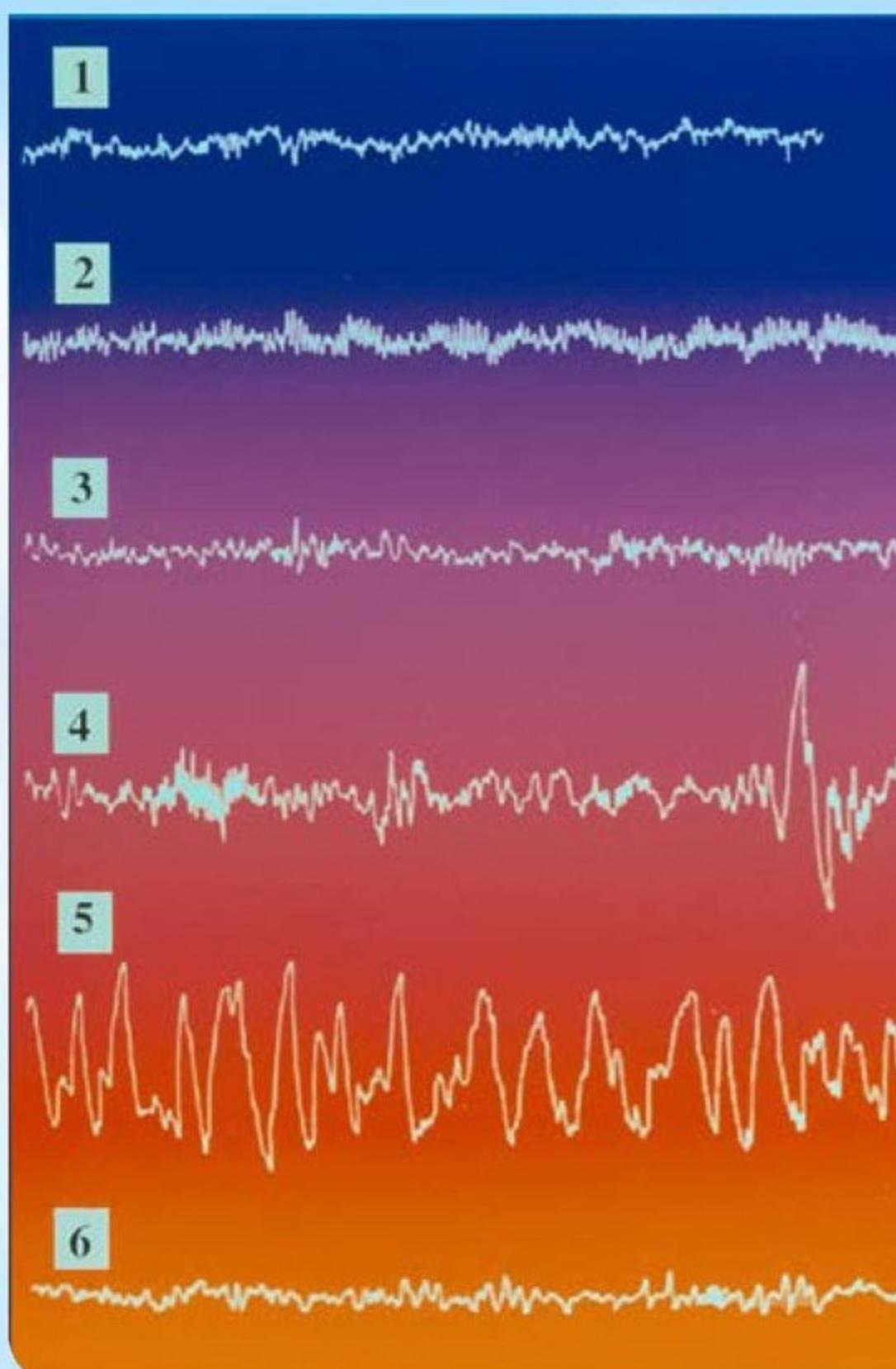


A special machine is used to record brain waves.

A better understanding of sleep came about in the early twentieth century. Studies showed that the brain does not really shut down when people snooze. Instead, brain activity changes as wakefulness shifts to sleep. The idea that the brain remains somewhat active during sleep was new. This discovery led to more sleep research.

Doctors wanted to know just what caused changes in **brain waves**. They learned that a substance called *adenosine* affects the brain and **triggers** sleep. The body produces adenosine naturally as it uses energy. During the day, more and more of this substance travels to the brain. There, it acts to slow down many body processes that are active when we are awake.

Awake and Asleep



- [1] awake
- [2] awake with eyes closed
- [3] falling asleep
- [4] asleep
- [5] deep sleep
- [6] asleep, dreaming

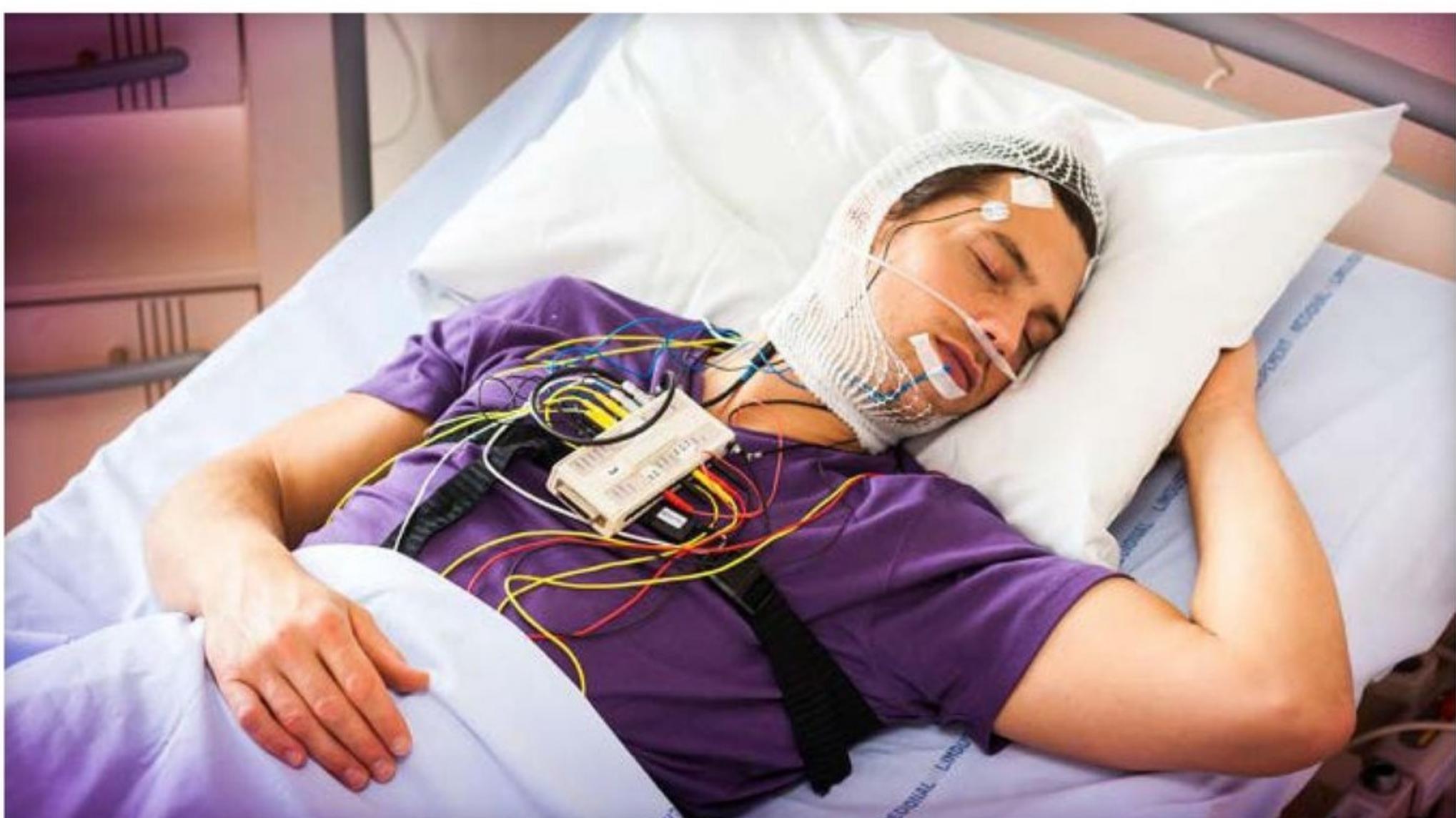
Machines that record brain activity show that a sleeping person's brain, especially while dreaming, can be just as active as it is when that person is awake. Tighter waves indicate more activity in the brain, and looser waves occur during relaxation.

Source: VEM / Science Source

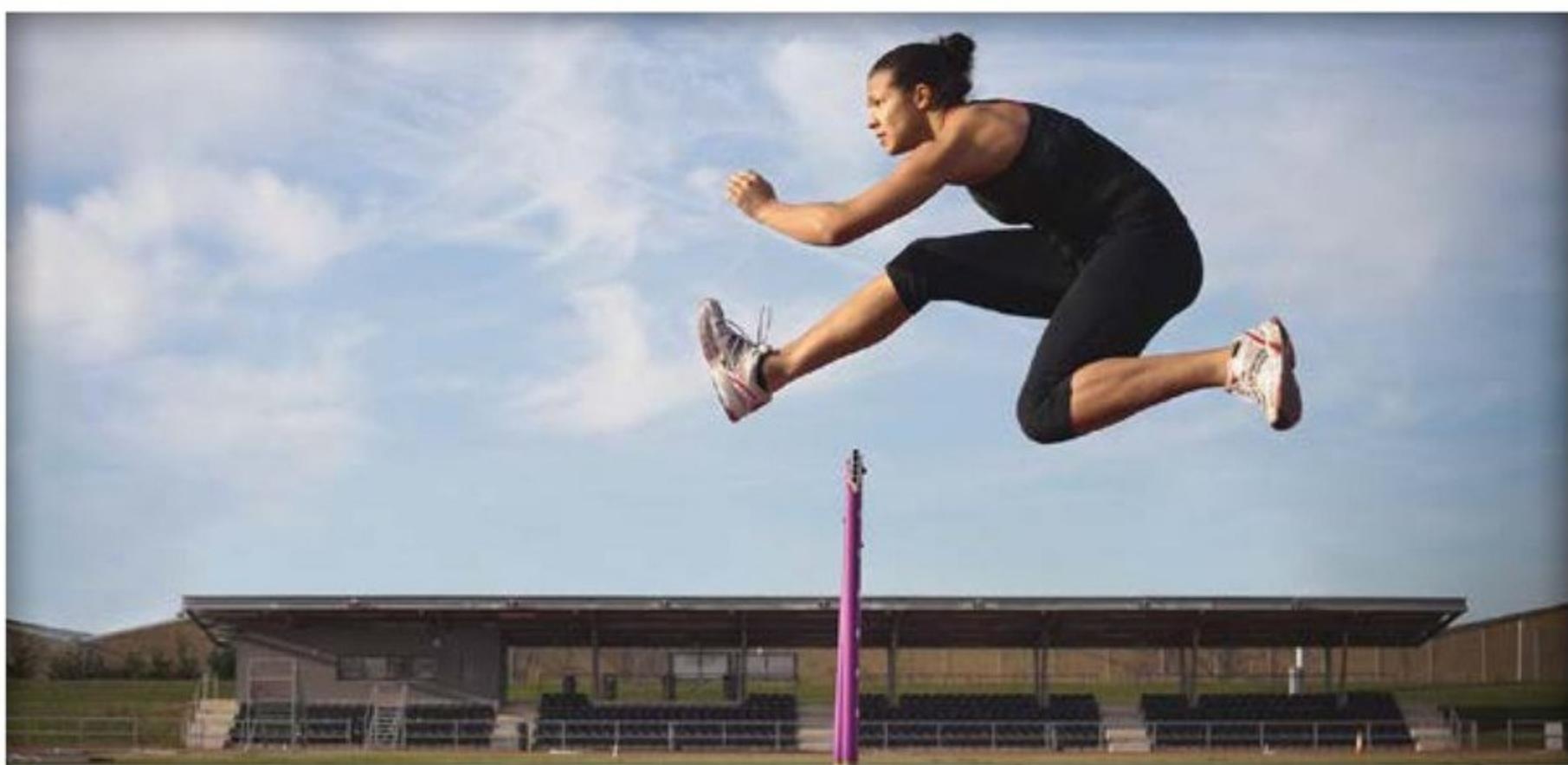
The Need for ZZZs

If our brain doesn't shut down while we snooze, what does it do? The answer: it helps us learn by **shuffling** memories.

The brain first stores much of what we learn in what is called *short-term memory*. Short-term memory is a good place to put information for a little while. It isn't big enough or strong enough to hold everything we learn forever. The brain must move information from short-term memory to *long-term memory*. This shuffle happens while we sleep. Doing this makes it easier to remember and use what we've learned.



Scientists examine a man's brain and body during a sleep study.



Professional athletes need sleep to strengthen body tissues and restore energy levels.

Falling asleep does not just involve a change in brain activity. The body's processes change as well. When we are awake, we use energy. Body cells are broken down. When we are asleep, the body shifts to a different kind of activity. During sleep, new cells are built up. This process **restores** body tissues and helps them grow.

For this reason, sleep is important to athletes. During training, they constantly break down cells and tissues. They need enough rest to restore those tissues and make them stronger. This is also the reason that new babies sleep so much. Most infants double their birth weight in five months. That rate of growth can only happen if there is more building-up activity than breaking-down activity.

We also need sleep to help our bodies fight illness and heal wounds. It strengthens the body's **immune system**—the cells and tissues that work to fight infection. During sleep, the body focuses on healing instead of using energy on other activities. Studies show that during sleep, the body produces more of the special blood cells that fight illness. That's why doctors recommend bed rest for their sick patients.

Sleep Problems

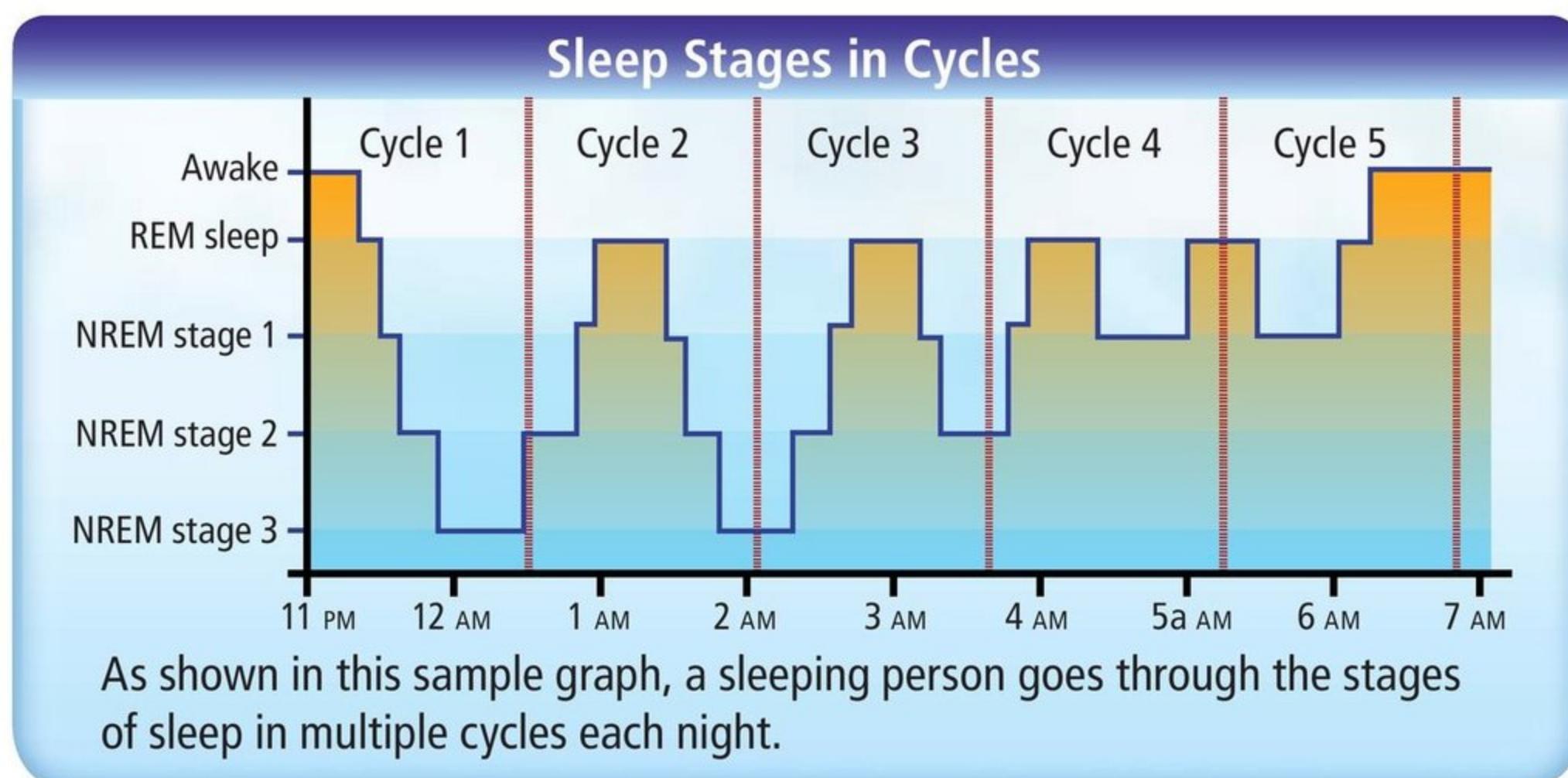
There are a number of different sleep problems. Here are three of the best-known ones.

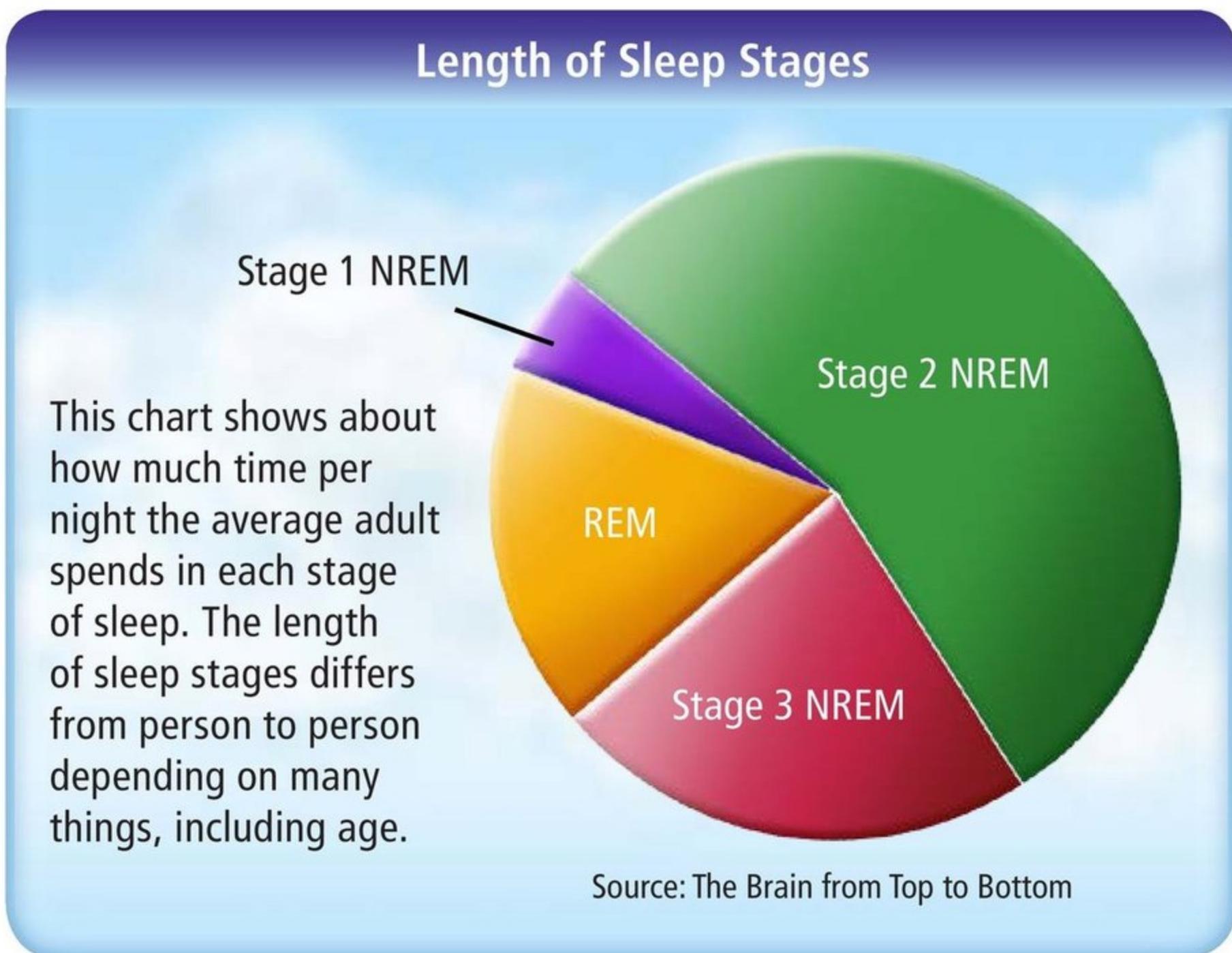
- *Insomnia* is difficulty falling asleep. People may suffer from insomnia for any number of reasons. Stress and worry may cause insomnia. Bad pain or disease may make it impossible to sleep.
- *Narcolepsy* is almost the opposite of insomnia. People with narcolepsy may suddenly fall asleep at any time. These sleep attacks can be startling to others. Patients may have sudden muscle weakness that makes them fall to the ground, unable to move.
- *Sleepwalking* is fairly common among teens. It is rare in adults. Sleepwalkers move about with their eyes open—walking, talking, or even doing chores. A sleepwalking episode usually lasts less than ten minutes. It is not dangerous or harmful to wake a sleepwalker, but it's best to simply lead him or her back to bed.

Sleep Patterns

Not all kinds of sleep are the same. Sleep goes through cycles. To understand how sleep works, researchers **monitor** brain activity, eye movement, breathing rates, and heart rates in sleeping people. They put all these measurements into a single graph. The graph shows a pattern of different stages of sleep.

There are two types of sleep—rapid eye movement (REM) sleep and non-rapid eye movement (NREM) sleep. NREM sleep has three different stages. During the first stage, people feel drowsy and start to doze. They may twitch and suddenly jerk awake, imagining they are falling. This stage doesn't last more than ten minutes.





During stage 2 NREM, muscles don't move much. The sleeper becomes less aware of the outside world. This is when memories start to shift. Half or more than half of all sleep time is spent in stage 2 NREM sleep.

During stage 3 NREM, sleepers begin to dream. In the brain, newly learned information is **reorganized**. Lasting memories are formed. Breathing rate, heart rate, blood pressure, and brain temperature are lowest during this stage. It is usually very hard to wake someone from this deep sleep. This stage lasts for nearly a quarter of sleep time.

REM sleep is quite different from the other stages of sleep. During REM sleep, closed eyes move rapidly from side to side. It's as if the sleeper is watching a ping-pong match. Brain activity, breathing, and heart rate are almost at waking levels. Instead of resting, the brain is speeding along, yet the sleeper's body is completely still. Muscles are frozen in place during this stage. Perhaps that is because of the wild dreams that take place during REM sleep.

Sweet (and Not So Sweet) Dreams

We dream when we are in REM and deep sleep. We dream every night, although we don't always remember our dreams. All dreams are like stories that play out in our mind.

Not all of these stories are pleasant. Nightmares are scary dreams that can make sleepers wake up upset. Young children sometimes have serious nightmares called *night terrors*. Night terrors can cause them to scream and move about without being fully awake.

For centuries, people have wondered if dreams had secret meanings. Ancient people believed they were messages from the gods. Today, some people think that dreams come from our imagination. Others think dreams have hidden messages.



Getting a Good Night's Rest

Many things should happen when our tired head hits the pillow. When they don't, things can go wrong for us during the day.

A lack of sleep can make us cranky and cause us to make more mistakes when working. We also have a hard time solving problems. Our brain doesn't struggle alone. Studies show that the body has a harder time keeping a steady temperature without enough sleep. Wounds take longer to heal.



Naps don't always make up for a lack of good nighttime sleep, but a quick nap can help improve mood, alertness, and performance.



Sticking to a sleep schedule, even on weekends, can help you fall asleep and stay asleep all night.

Good sleep habits are very important. Try to go to bed and wake up at the same time each day. This helps keep your body on **schedule**. It also helps if you limit your screen time. Try not to watch television or use a computer, tablet, or smartphone just before bedtime. Don't exercise right before going to bed. Going for a walk is fine, but anything more could make it hard to fall asleep.

If you do have trouble falling asleep, try taking a warm bath or shower. Either one will relax your muscles.

Good sleep habits keep the body healthy and the mind sharp. Remember, if you don't snooze, you just might lose!

Glossary

brain waves (<i>n.</i>)	patterns of brain activity that can be measured in electric currents (p. 7)
function (<i>v.</i>)	to act or work as expected (p. 4)
immune system (<i>n.</i>)	a system that moves antibodies through the body to fight infection (p. 10)
monitor (<i>v.</i>)	to observe or check the progress of something over time (p. 11)
reorganized (<i>v.</i>)	changed the way something is ordered or arranged (p. 12)
restores (<i>v.</i>)	returns something to its original condition (p. 9)
schedule (<i>n.</i>)	a plan for when and where one or more events will take place (p. 15)
shuffling (<i>v.</i>)	moving around or rearranging (p. 8)
triggers (<i>v.</i>)	causes something to take place (p. 7)

Why We Sleep

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Connections

Writing

Think about your bedtime routine and sleep habits. Using information from the book, write about whether you would change your habits.

Math

If people spend about one-third of their lives asleep, how many years have you spent asleep so far?

The logo for Reading A-Z features the word "Reading" in a red, sans-serif font. The letter "R" has a small sun-like icon above it with rays extending to the right. To the right of "Reading" is a large, stylized red letter "A-Z".

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