Sleep Better, Learn Smarter

The teen guide to brain boosting sleep

SLEEP BETTER, LEARN SMARTER

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GRADE 10

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Dedication

OFFERING WITH LOVE:

TO MY LOVING MOM AND DAD

FOR EVERYTHING THAT ARE DONE FOR ME,

AND TO EVERYONE

WHO HELPED ME

TO TAKE ANOTHER ONE STEP

TOWARDS WORDSMITHING

Forward

In an increasingly complex global future, the "Hemamala Upahara" book project, led by Mahamaya Girls' College, stands as a turning point in girls' education. Over a decade, it has successfully nurtured thousands of children to become young authors.

This year, by collaborating with other schools, we aimed to provide students with a wealth of new experiences. The goal was to develop multi-faceted skills, including communication, values, and creative growth. As a result, children have written books that pay tribute to Princess Hemamala, who brought the Sacred Tooth Relic—the supreme symbol of the Buddhist world—to the Hill Country (Kandy).

I extend my gratitude to everyone involved, including the students who contributed their creativity and the teachers who guided them.

Shashikala Senadhira

Principal

Mahamaya Girls' College

Congratulatory Message

It is a great honor for me, as the Governor of the Central Province, to send a congratulatory message for the launch of the books created through the Hemamala Tribute Book Creation Project initiated by Mahamaya Girls' College, Kandy.

Education is the fundamental foundation for the progress of society, and it is further strengthened through books and literary creations. It is clearly commendable that students' talents, creativity, and intellectual abilities are emerging through projects such as this.

I believe that this book creation project will provide valuable knowledge and a precious literary contribution not only to the students but to the entire society. Furthermore, I hope that through such efforts, future writers who will bring pride to Sri Lanka will emerge.

I extend my heartfelt appreciation and blessings to the Principal, the academic staff, the students, and everyone involved who dedicated themselves to this successful endeavor. I wish this project and the book launch ceremony great success.

Sarath B.S. Abeykoon

Governor, Central Province

Emeritus Professor, University of Peradeniya

2026-05-10

Congratulatory Message

I highly appreciate the noble and outstanding effort of the Principal and the academic staff of Mahamaya Girls' College, Kandy, the student daughters, the students of other participating schools, and everyone who dedicated themselves to plan and implement this book publication project. The project was organized under the leadership of Mahamaya Girls' College, Kandy, with the participation of other schools in the Kandy Zone, with the aim of encouraging children toward book creation within the current school system, as a tribute to Hemamala Kumariya who brought the Sacred Tooth Relic to Sri Lanka.

For several decades, Sri Lanka has been committed to providing free, compulsory, quality, and equitable education to all children, thereby producing a future generation of intelligent and skilled citizens. In such a context, this book creation program for school children helps develop creative ability, critical thinking, and other positive qualities for a balanced and well-rounded personality, and contributes to building a future knowledge-based society.

May all activities of the Hemamala Tribute Book Creation Project be successful through the blessings of the Sacred Tooth Relic.

Pradeep NilangaDela

DiyawadanaNilame,

Sri DaladaMaligawa.

2026.05.10.

Content

Nervous System

What is nerve system?

The first thing you have to understand that our body is like a machine full of signals and connections between organs. And a large communication system is spread throughout our body. This vast communication and control network system inside our body is known as the nervous system. Nervous system send messages with a high speed between brain and organs. This nerve system is one of the main system in our body that acts as a electric grid.

Major parts of nervous system

Our nervous system has two main parts.

- CENTRAL NERVOUS SYSTEM (CNS)

  Central nervous system acts a major job when converting our feelings and thoughts into action. This part of the system contains brain and the spinal cord. This can be named as the command centre because its job is processing information and making decisions.

❖ PERIPHERAL NERVOUS SYSTEM (PNS)

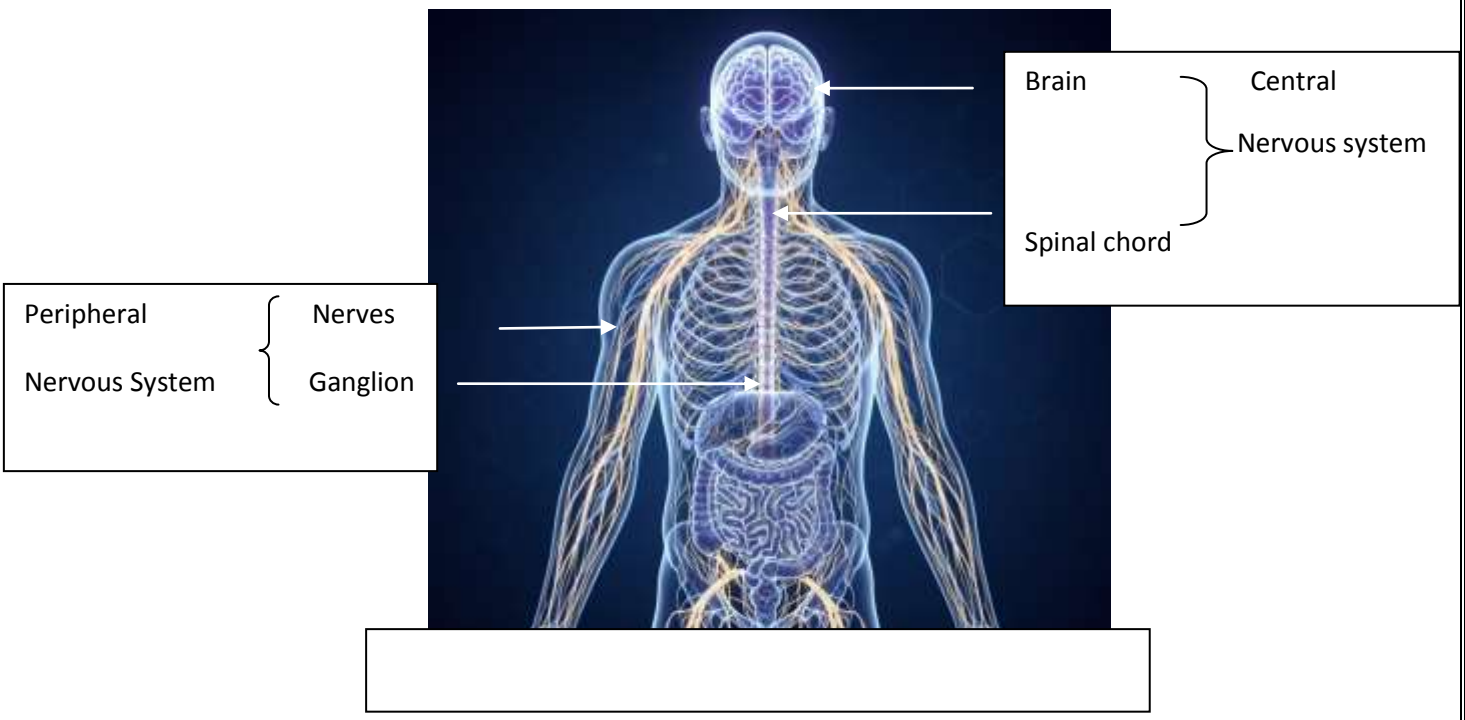
Peripheral nervous system contains all nerves branched out from the CNS to our organs. This part of the nervous system act as wires that carries messages back and forth. Peripheral nervous system is divided further according to the function done by them.

SOMAIC NERVOUS SYSTEM:

This controls voluntary movements like waving hand and carries sensory information like feeling a cold breeze to the brain.

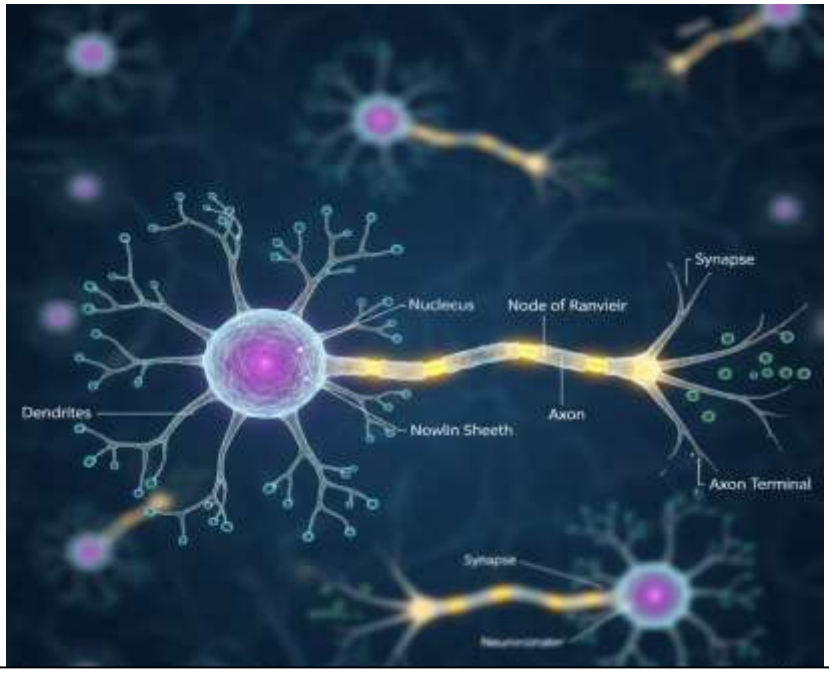
AUTONOMIC NERVOUS SYSTEM:

This controls involuntary functions we don't think about, such as our heart beat, digestion and breathing.



Neurons

The fundamental structural unit of the nervous system is neuron. There won't be any use of the nervous system without neurons. Neurons communicate with the help of electrical impulses and chemical signals called neurotransmitters. They receive and transmit signals to different parts of the body.



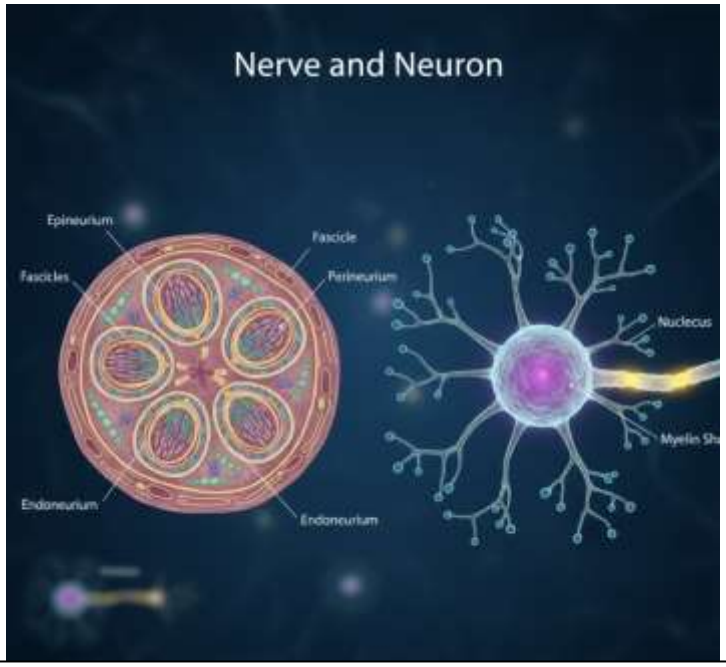
Below is a brief introduction about each part of the neuron.

- Dendrite **r**eceives incoming signals from other neurons.
- Axon is a long fiber that carries the signal away from the cell body.
- Synapse is the tiny gap between neurons where chemicals jump across to pass the message.

Neuron Type	Role in the System	Path
Sensory Neurons	Gather data from the environment.	From Body to CNS
Inter neurons	Process information (Found only in the CNS).	Within the Brain/Spinal Cord
Motor Neurons	Carry out commands to muscles.	From CNS to Body

Difference between nerves and neurons

Neuron is a single microscopic cell. But a nerve is a macroscopic cable like bundle of many axons from different neurons.

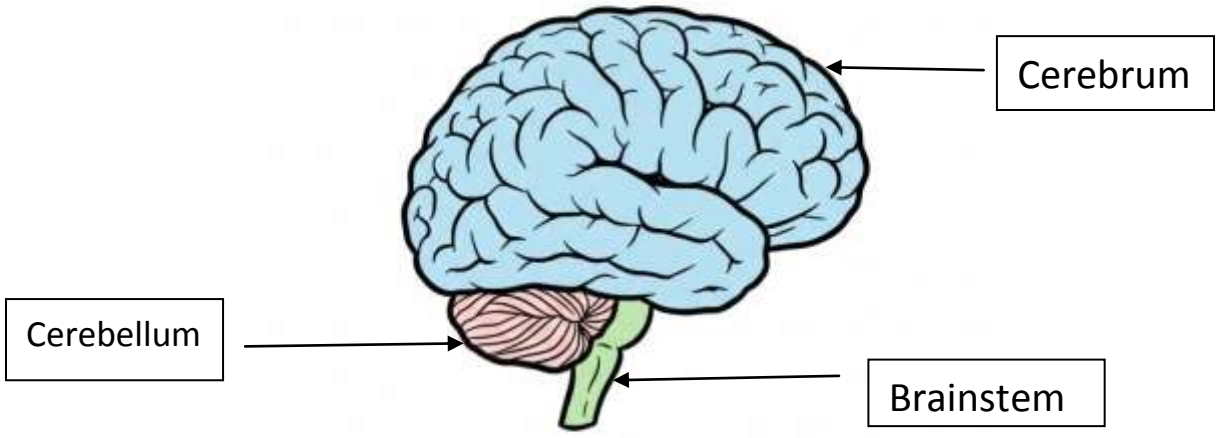


Brain

Now let us dive further into brain.

Simply we can name brain as the CPU of a machine. Because brain is the organ that control every thought, emotion, touch, motor skills, vision, breathing, temperature, hunger, heartbeat and every process that regulate our body. Brain is a part of central nervous system.

There are three main parts to brain.



- **Cerebrum**

This is the largest part of the brain. And the thinking part of the brain. We can introduce this part as the command centre. This handles our five emotions, memories and our personality.

Cerebrum can be divided into two parts as left half and right half. Left half helps us with the logical side such as for math, language and facts. Right half helps us with the creative side such as for arts and crafts, music and imagination.

- **Cerebellum**

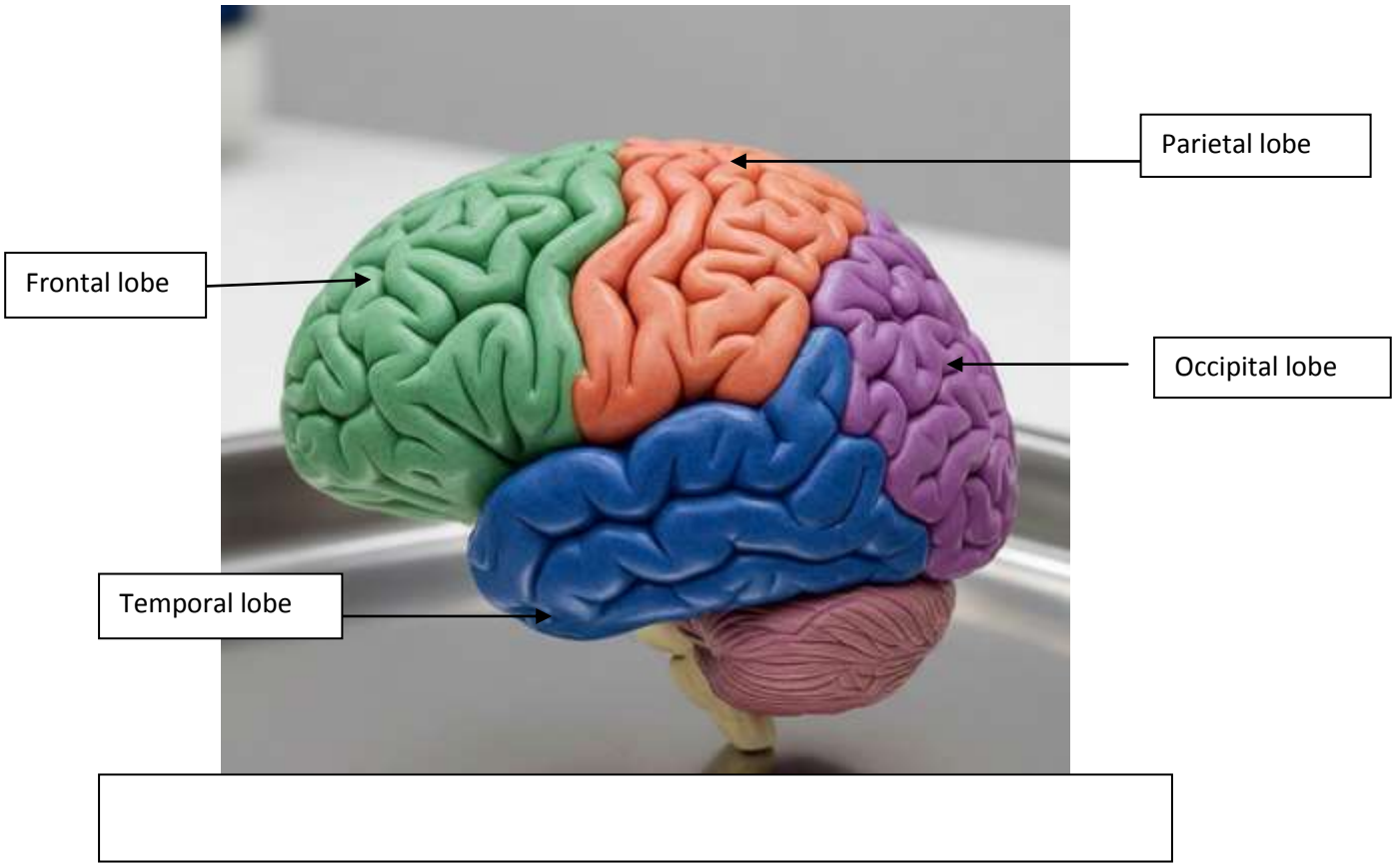
This is the part of the brain that help in controlling the movements of the body. This is located at the back of the brain, below the temporal and occipital lobes and above the brainstem. Some of functions done by cerebellum are Motor learning, Sense of body position, Balance and equilibrium and fine movement coordination.

- **Brainstem**

This part connects our brain to the spinal cord. And this is the survival part of the brain. We can name this part as an Autopilot. Because it helps us by controlling involuntary functions such as breathing, heartbeat and digestion.

Four Magical Rooms

Our brain contains four sections. Those are frontal lobe, parietal lobe, temporal lobe and occipital lobe.



There are specific functions that each lobe controls.

1. The room of choices – Frontal lobe

This is the largest lobe in our brain and this is the place where your thought magically turns into action and decide who you want to be. Frontal lobe helps us with decision making, personality, language production, judgments, emotional traits, motor planning etc. And also this is the most important lobe for education.

2. The room of feelings – Parietal lobe

Parietal lobe is located at the top-back of our head. This is the lobe where sense touch, smell and taste. And it is the lobe that helps us with spacial perception, visual perception, academic skills, math calculations, reading and writing.

3. The library - Temporal lobe

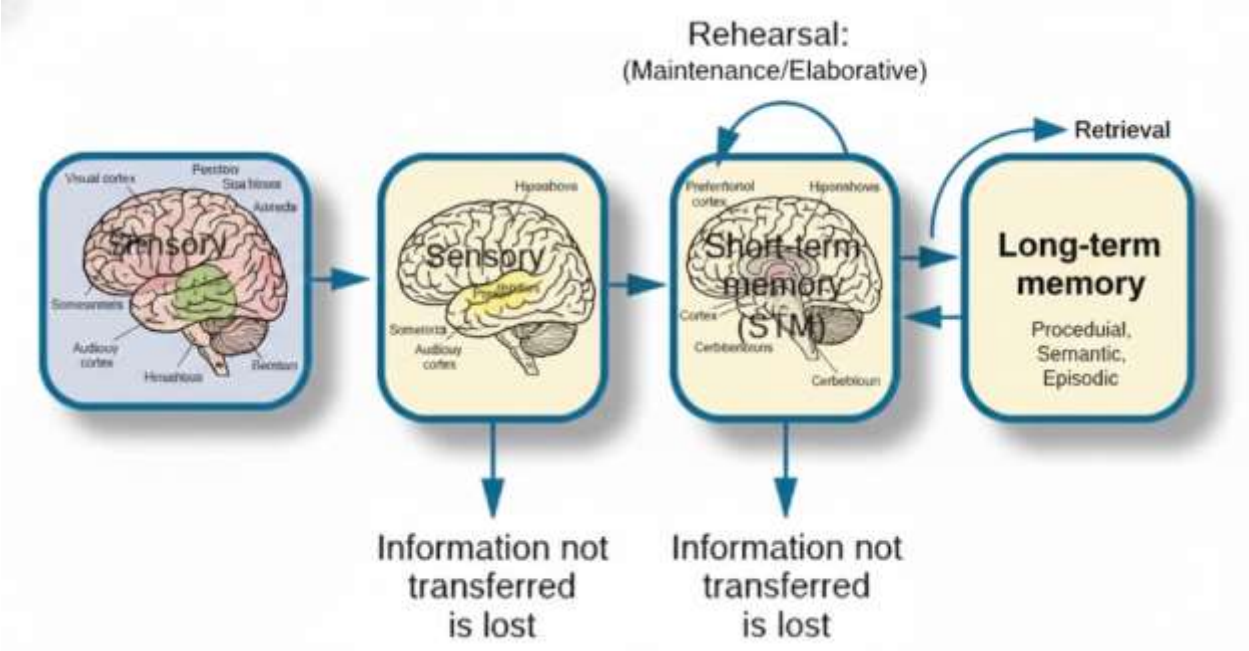
This lobe is very important to us as students. The reason for naming this room as library is this is the store room for all our memories and language. The temporal lobe primarily handles auditory processing emotional responses also.

4. The Cinema - Occipital lobe

Even though occipital lobe is located at the very back of our head this is the place where we actually see. Jobs done by occipital lobe are visual mapping, colour processing, motion perception and recognition.

Memory circle

Here we come to the most important part of our discussion. Here we are going to get to know how our short-memory converts to long-term memory through interactions between Magical Rooms simply known as **Consolidation**.



Delivery service

This is where this process starts. Now think you studying something new in class or sense something new so all these data is given to the brain. These sensory and motor information (except the sense of smell) are taken by thalamus as nerve signals. This part of brain acts as a post office.

i. Meaning makers

Once sending information by the thalamus to cortex, our cinema and the library get into work. The cinema or the occipital lobes convert light into visual data. The library or the temporal lobe converts sound into meaningful words.

ii. Sticky note

The information sent to the hippocampus which is located inside the temporal lobe store the information as the short term memory. This memory is like a sticky note because we can read it easily but also it's easy to lose or thrown away.

iii. Magical sleep

This is where system consolidation occurs. This happen as a fascinating conversation between hippocampus and neocortex. Neocortex is the wrinkled outer layer of your brain where long-term memories are kept (permanent library). When we fall into deep sleep (slow wave sleep) recorded information is replayed again at a high speed and the neocortex starts to strengthen the connections between its own neurons.

iv. Wisdom test

Now the short term memory has converted into long term memory. During **REM sleep** (when you dream), the brain shifts focus. While deep sleep moves the "files," REM sleep seems to "test" them. This helps us with converting raw data to wisdom by mixing your new experiences with your old ones.

v. Clean up

After Sharp-Wave Ripples (voice of hippocampus talking to neocortex) have successfully replayed the day's events to the neocortex, the hippocampus gradually fades "temporary files" because it knows the neocortex has a strengthened trace in the library. Now hippocampus is ready for next day work. Sometimes this clean up might not finish happening after one night of sleep.

Magical sleep

Some people think we should sleep only for rest. But there are so many purposes of sleeping.

Why we should sleep?

Sleep helps us to;

Repair our body: During deep sleep, the body enters an **anabolic state**, increasing protein synthesis and cellular restoration to mend muscle tissue and damaged cells.

Improve learning and memory: Sleep facilitates **neural consolidation**, where the hippocampus "replays" the day's events to encode them into the long-term storage of the neocortex.

Lower stress level: Sleep regulates body's primary stress hormone **cortisol**. When you are sleep-deprived, cortisol levels stay high, keeping you in a "fight or flight" state even when you're safe.

Improve creativity: During **REM sleep**, the brain makes unusual connections between unrelated ideas. This "associative play" is why we often wake up with the solution to a problem we couldn't solve the day before.

Grow and develop: For children and teens, sleep is literally when they get taller. The Human Growth Hormone is primarily released during the deepest stages of sleep

Maintain our immune system: Sleep increases the production of T-cells and cytokines. These are the cells that recognize and kill foreign pathogens like viruses.

There is the specific time limit to sleep according to the age category

Infant	4 – 12 months	12 – 16 hours
Toddler	1 – 2 years	11 – 14 hours
Preschool	3 – 5 years	10 – 13 hours
School age	6 -12 years	9 – 12 hours
Teen	13 – 18 years	8 – 10 hours
Adult	18 years or above 18	7 hours or more

Stages of sleep

There are four stages and two types of sleeps in a sleep cycle as NREM and REM sleep.

Stage 1 (N1)

This stage occur when someone first fall into sleep (1min-7min)

Stage 2 (N2)

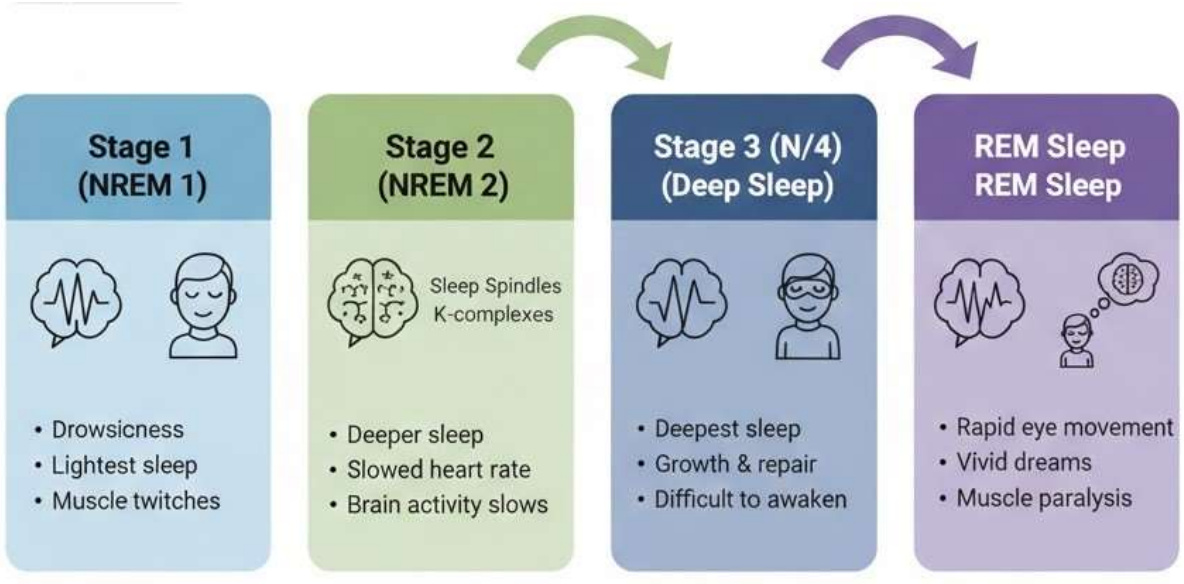
At this stage the body temperature drops, muscles relax, heart rate and breathing slows, eye movement stops and brain activity slows (10 min-25 min)

Stage 3 (N3/Deep sleep)

Here the Human Growth Hormone is released. The body prioritizes physical repair, immune system strengthening, and "cleaning" the brain via the glymphatic system. If you wake up at this stage you will be feeling heavy, groggy feeling where you don't know where you are for a few seconds. (20min-40min)

Stage 4 (REM sleep)

This stage starts after 90 minutes after falling asleep. This stage is characterized by active brainwaves similar to waking, rapid eye movements, vivid dreaming, and temporary muscle paralysis. This stage is essential for memory consolidation, learning and emotional regulation. (10min-60min)



If not

As students we have to sleep properly. If not you'll be falling so many troubles.

When you break your sleep cycle, a condition known as sleep fragmentation, you are interrupting a high-precision biological sequence before it finishes its work. Because sleep stages follow a strict order, moving from light sleep to deep sleep and finally to dreaming. Any disruption forces the brain to "reset" and start over from the beginning.

This means that if you are woken up frequently, your brain may spend all its time in the light stages and never stay under long enough to reach the deeper, restorative phases where physical repair and memory filing happen.

The result is a "biological debt" where your body remains physically exhausted and your brain stays cluttered with metabolic waste, leaving you feeling groggy and unfocused the next day regardless of how many total hours you spent in bed.

If we break the sleeping cycle you will face troubles such as;

Feeling fatigue

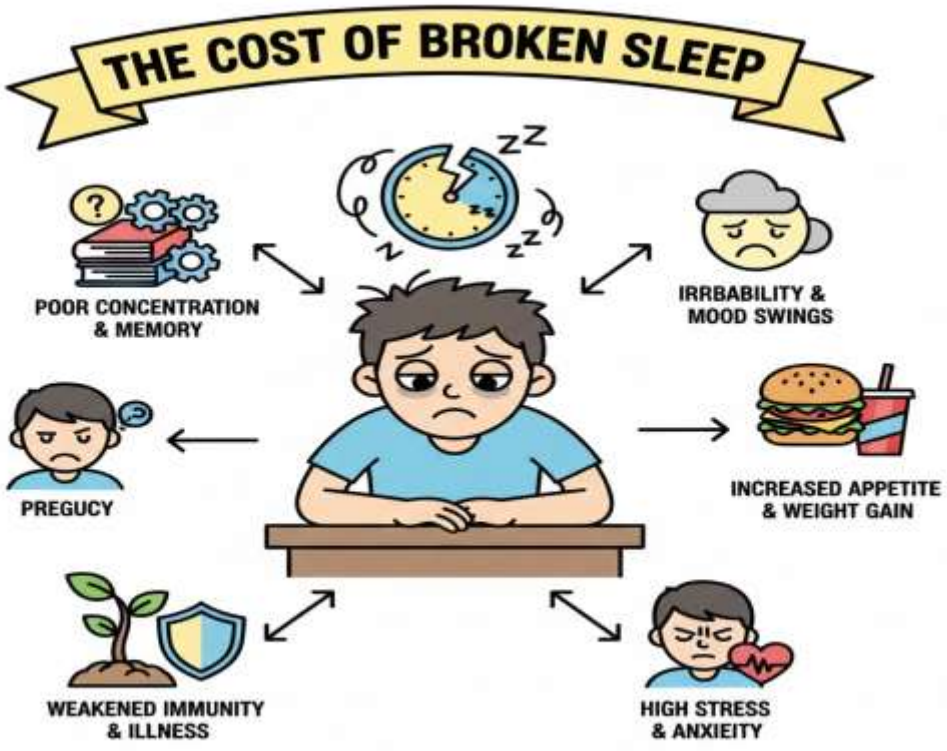
Disabilities in thinking, focusing and remembering

Hand tremors

Daytime sleepiness

Slowed reaction time

These troubles are big barriers towards our education. So if we want to overcome these we have to have a healthy good sleep.



Midnight Guardian's curse

Curse 01

Most of the time as students we have practiced to drink coffee to wake up late at night. But this bad manner can disrupt your body's natural rhythms and long-term health.

How coffee keeps you awake

Coffee doesn't provide any sort of energy to our body. Instead it masks tiredness by interfering with brain.

Throughout the day your body produces adenosine which is a chemical that helps to make you feel sleepy and tired. Caffeine blocks adenosine receptors in the brain. So that no more sleeps signals receiving from brain. When adenosine receptors are blocked your neurons stay active. So you are well focused. By this alertness is increased and fatigue is reduced too.

There are so many adverse of staying wake up late at night drinking coffee.

1 . Disruption of Circadian Rhythm

Caffeine blocks the sleepy hormone called melatonin. This cause the delay of natural release of melatonin by roughly 40 minutes, making it much harder to fall asleep.

2-Impaired Sleep Architecture

Caffeine reduces deep sleep (NREM STAGE 3) which helps us with the physical recovery and feeling refreshed the next day. In case you will feel fatigue.

It increases the light sleep (NREM STAGE 1) and leads to more frequent awaking during the night.

Did you know?

Even 400mg of caffeine taken six hours before bed can reduce the sleep time by over one hour.

3-Immediate physiological and mental effects

It makes your heart race, causing "racing thoughts" or anxiety.

This stimulates stomach acid production which can lead to acid reflux or heartburn when lying down shortly after the meal.

4- Long-term health risks

Use of coffee late at night leads to persistent sleep deprivation. This problem leads to number of diseases such as hypertension, diabetes, obesity and cardiovascular diseases.

Also chronic use of late night coffee creates a caffeine cycle so that poor sleep at night leads to higher caffeine consumption the next day.

To minimize these problems, health organizations recommend to stop consuming coffee at least 8.8 - 9 hours before your bedtime.

Curse 02

Now a day's children use various electronic devices to make the day - to - day work easier. But using screens late at night will be a big barrier to a healthy sleeping cycle.

Using screens such as phones, tablets, computers and laptops before bedtime expose you to blue light.

This blue light is very dangerous because this blue light signals your brain to stop producing the hormone called melatonin. By that your sleeping cycle is disrupted. Exposing to bright screen light for even two hours leads delaying of our internal clock by three hours. Cognitive overstimulation

Engaging in social media, video games or emails keep the brain active and hyper focused. Interactive apps, notifications, endless scrolling and gaming leads to dopamine hits which is a quick happiness that doesn't exist for a long time. It reduces focus, make studying boring and increase addiction-like habits. Impact on sleep quality

This reduce the time spent in NREM stage 3 (deep sleep) the stage vital for physical recovery. It reduce the REM sleep also which helps us with memory processing and emotional regulation

Extra hour of screen use in bed increase the risk of insomnia by 59% We can minimize these problems by Power downing electronic devices at least 60 minutes before the bedtime.

Keeping the phone, tablets, laptops and computers away from the bedroom.

If you want light to sleep use red or amber tones which have the least impact on melatonin production.

Curse 03

Bed rotting and daytime bed use is the next cure that disrupts our sleeping cycle. When you use the bed for non-sleep activities like studying, eating, scrolling phone, brain begins to view the bed as a space for activity and stress. This can leads is to awake, alert or stress when we are in bed.

To prevent these we can use bed only for sleeping and to take rest.

If you are not sleepy even after 20 minutes going to bed get out of bed, go to another room and do a boring activity so that you're physically getting sleepy. Now come to bed again so this prevents thinking bed is a place to be wake and frustrated. Curse

Curse 04

Vigorous late night exercises or high intensity workout within three hours of bed raises our internal temperature and increase the production of cortisol and adrenaline which are hormones that keep us on alert and awake.

Other than doing vigorous late-night exercises doing low-intensity movements like stretching or light yoga is recommended if you must exercise in the evening.

Curse 05

Long or late daytime naps-If you are nagging for more than 20-30 minutes or napping after 3.00 p.m. it reduce the sleep time and make harder to go to sleep at proper time. From now on if you limit naps to 20 minutes and do not take naps in the evening it will be helpful to maintain a good and healthy sleeping cycle.

Curse 06

Late night meals - Eating or drinking before the bed impact on the ability of falling asleep. Because when you take food late night, muscles that digest and metabolize food have to keep working instead of resting. This disrupts your circadian rhythm.

A study has found that women's sleeping patterns were impacted by this problem more than men's sleep patterns.

By preventing taking food three hours before going to bed will be helpful to have a good sleep.

Following the below given sleep rule is beneficial for us to be healthy (sleep rule – 10-3-2-1-0-)

10 hours before sleep	**No more caffeine**
03 hours before sleep	**No more food or alcohol**
02 hours before sleep	**No more work**
01 hours before sleep	**No more screen time**
0	**The number of times you hit snooze in the morning**

Victory

Here we come to the last chapter of this long journey.

Now let us see how we can destroy all the guardian's curses and get the victory by studying well with small tips.

Tip 01 - Optimizing your study timing

We all have subjects we like and dislike. So when you start studying and where energy level is high start studying with a boring, difficult subject. This tip will be helpful to balance our studies.

Late night studying sessions do badly more than good we think. By studying wake update night will disrupt your sleeping cycle and circadian rhythm leading to different diseases and disorders which can minimize the quality of our memory.

If you want to change your sleep-wake up cycle or circadian rhythm you should gradually shift bedtime only 30-60 minutes every two days until you reach the goal.

Tip 02 - Manage stimulants and nutrition

As I mentioned before coffee is a curse that disrupt the sleep cycle which is a big barrier to our daily work. We have to avoid consuming coffee at least after 5.00 p.m. if we have to maintain a healthy sleep.

Heavy or sugar crashes that leads to drowsiness which means the feeling of being sleepy, tired or having low alertness. Consumption of snacks like nuts, fruits and Greek yoghurt is good for sustain energy.

To stay hydrated when you study keeps a water bottle nearby and take regular. So that make sure you are always hydrated.

Tip 03 - Maintain active learning habits

We can use Pomodoro technique to study. Here we should study 25 minutes we can get a 5 minute break. This technique prevents fatigue and helps us to stay focused.

Reading aloud, teaching to somebody, creating mind maps, charts, using flashcards are some of the other techniques that are friendly to our memory. These prevent boredom included sleepiness.

You can use your break to boost blood circulation by engaging in a short walk, stretches and jumping jacks.

Tip 04- Create a focused environment

Studying in your bedroom or on your bed is something you should not do. I have mention about this before.

Studying in a brightly lit room preferably with natural light during day and keeping the room cool helps us with our studies a lot.

When you study stay in a upright position is another important habit to keep your mind on alert.

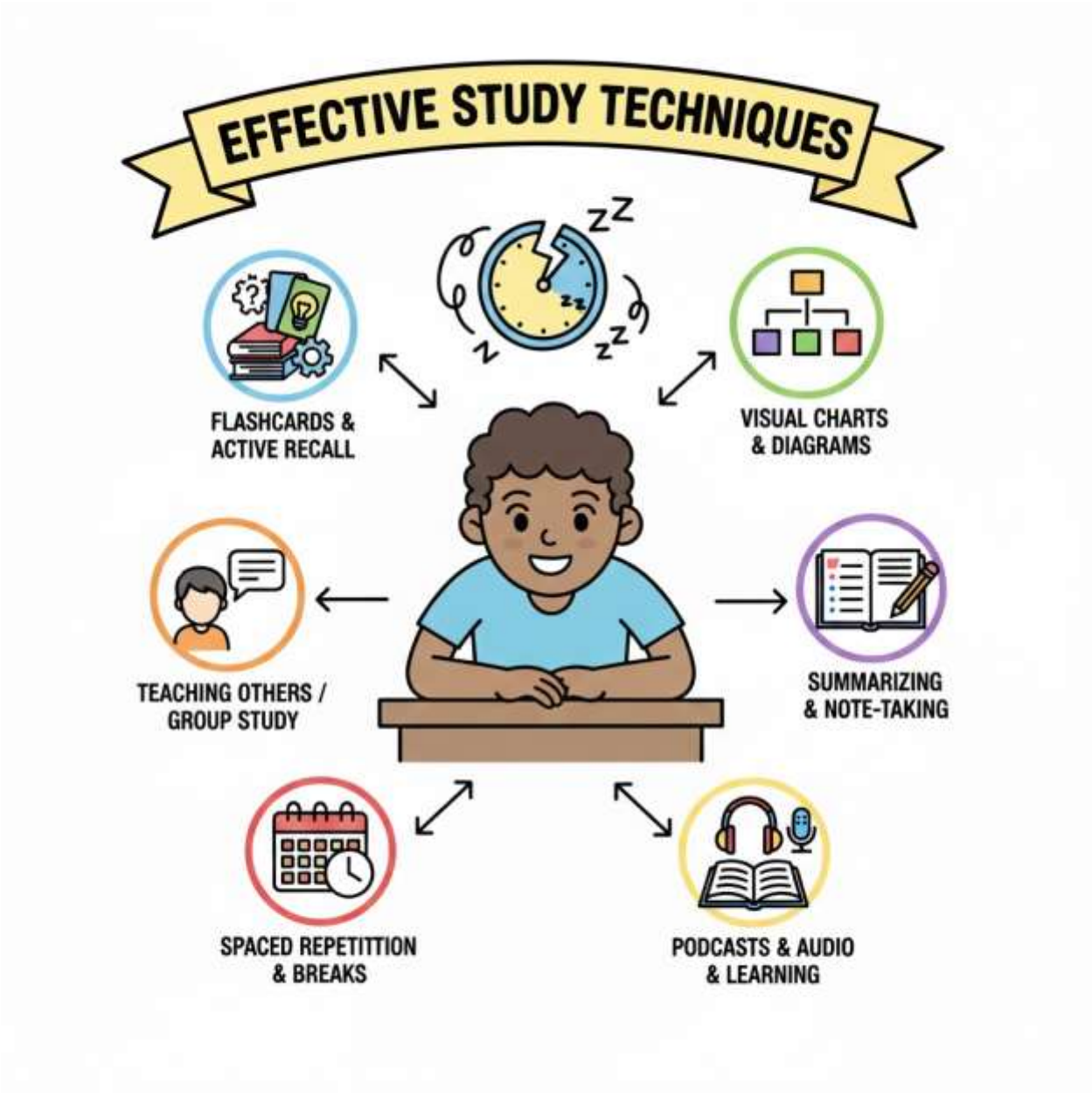
Tip 05 - Prioritize sleep quality

Going to bed and waking up at the same time is more important to stabilize your circadian rhythm.

If you are exhausted you can have a short 10 - 20 minute power nap to start work again refresh.

But you should be on alert not to have long naps during day time otherwise you will be facing number of problems that I have mentioned before.

Avoid screens one hour before you go to bed, so that make sure not to expose to blue light.


EFFECTIVE STUDY TECHNIQUES
FLASHCARDS & ACTIVE RECALL
VISUAL CHARTS & DIAGRAMS
TEACHING OTHERS / GROUP STUDY
SUMMARIZING & NOTE-TAKING
SPACED REPETITTION & BREAKS
PODCASTS & AUDIO & LEARNING

Afterword

With the approval of the Ministry of Education, this research-based project has empowered thousands of student authors for over ten years. Educationists recognize it as a program that significantly enhances the quality of school education. In alignment with modern educational reforms, encouraging students to author a research work is a milestone in this journey. In this digital age of "Smart" technology, the modern school must demonstrate through research that books and technology should be used together. This is because the unique joy a child receives from a book cannot be replaced by anything else. To prevent children from drifting away from books—which remain our primary educational tool and storehouse of human knowledge—Mahamaya Girls' College has spearheaded the "Hemamala Upahara" project for many years. Its primary objectives are to foster academic discipline, promote values, and pay tribute to Princess Hemamala, who fulfilled a historic mission to empower women. We express our gratitude to the Principal, teachers, parents, alumni of Mahamaya Girls' College, representatives of other schools, the Diyawadana Nilame, and the staff of the Sri Dalada Maligawa (Temple of the Sacred Tooth Relic) for their support.

Seneviratne Mahalekam

(Project Creator)