



Sleep and the developing brain



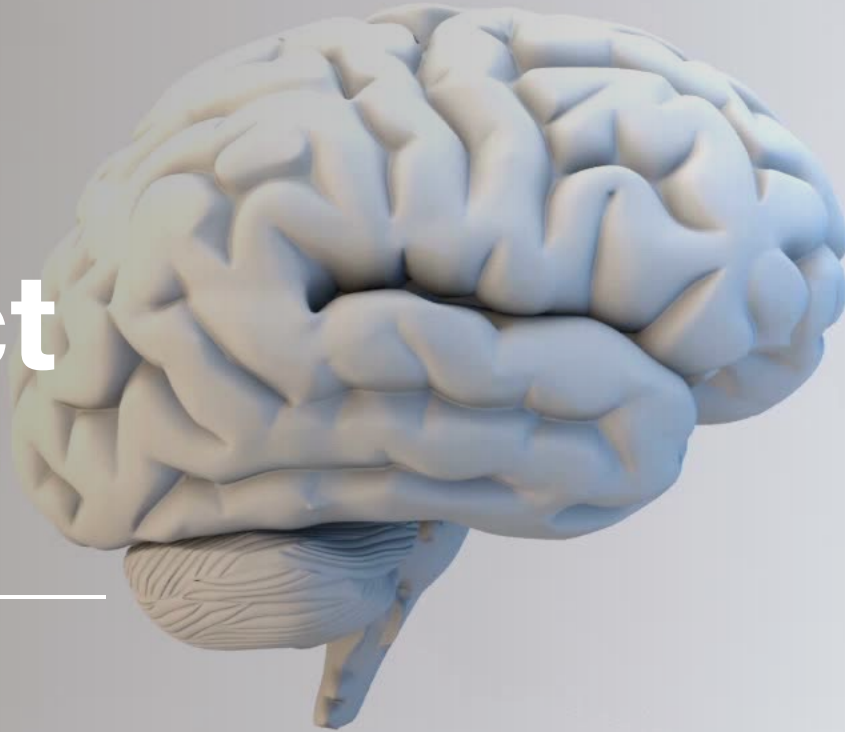
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Northshore School District

Agenda

- Sleep and the Brain.
- Sleep Recommendations.
- How Much Sleep are Our Children Getting?
- What is Causing Lack of Sleep?
- Tips for Parenting Healthy Sleep Habits.
- Q & A.



How Does Sleep Effect the Brain?

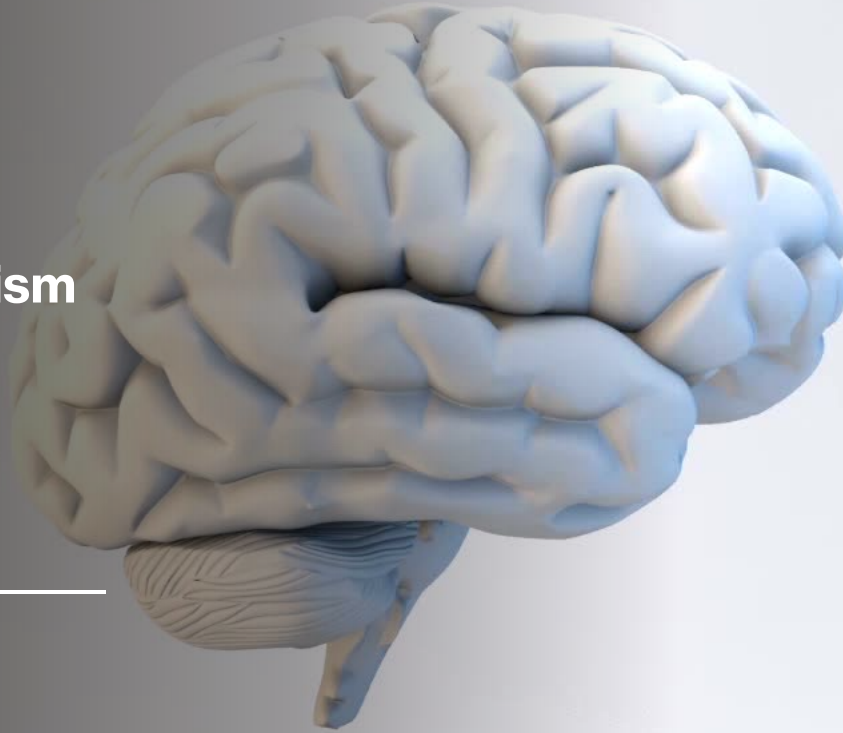




Improve memory recall

Regulate the body's metabolism

Reduce mental fatigue

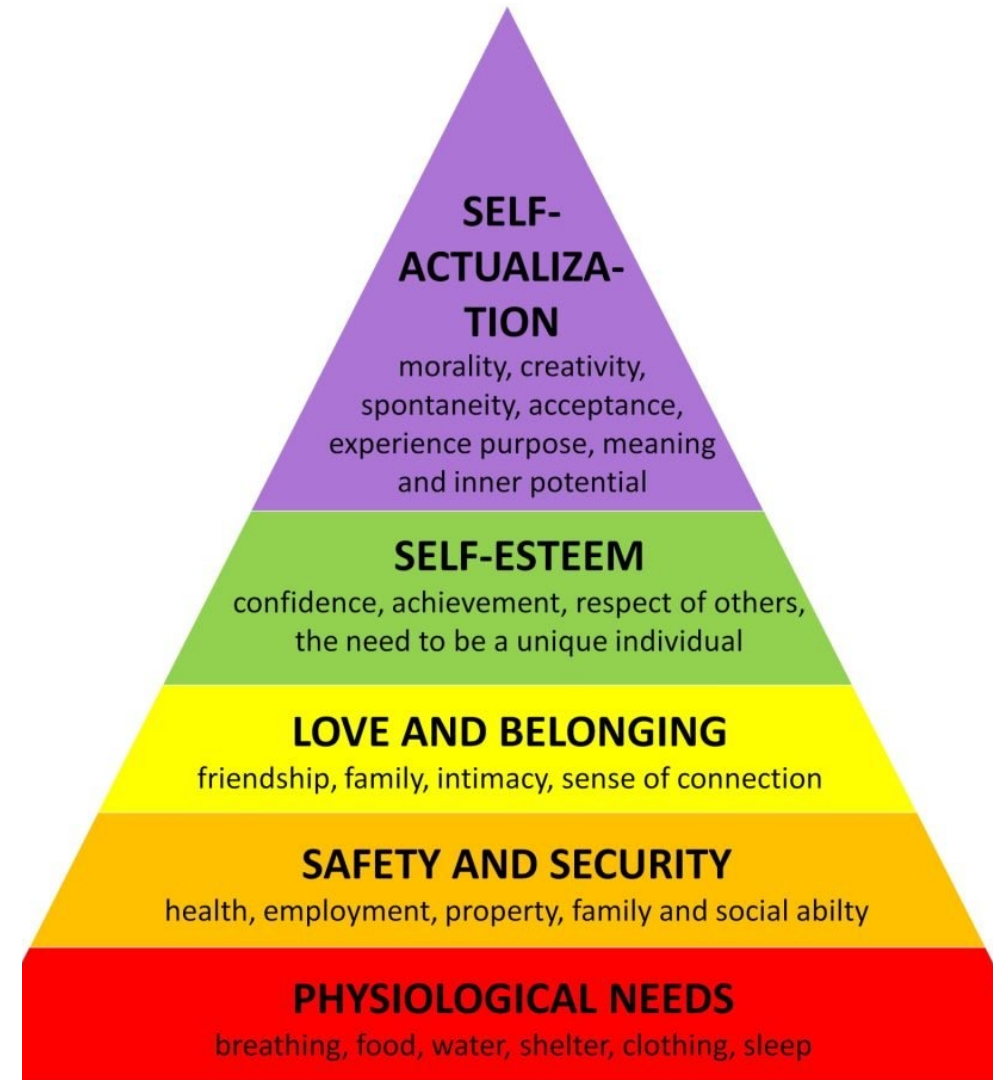


Sleep has been proven to



Maslow's Hierarchy of Needs

- Sleeping is a basic physiological need



Chronic Sleep Loss

Emotional deterioration

- Unable to regulate emotions. Crying uncontrollably, quick to anger.

Mental deterioration

- Reduces academic performance. Unable to think clearly. Slow to learn new concepts, unable to recall facts.
- Increases risk of lifelong mental health struggles.

Physical deterioration

- Decreases coordination, slows down reactions.



What is Happening Inside the Sleeping Brain?

Sleeping is an unconscious state that is divided into two major phases with each phase containing cycles.

- NREM (Non-Rapid Eye Movement) has 3 cycles as the brain moves into deep sleep; N1, N2, N3.
- REM (Rapid Eye Movement) has tonic and phasic components.



What is each phase doing?

NREM (Non-Rapid Eye Movement)

- N1, transition between the state of being awake to sleep.
- N2, light sleep. Muscles are relaxing, breathing is slowing, body temperature is dropping.
- N3, deep sleep.



What is each phase doing?

REM (Rapid Eye Movement) – Deep Sleep

- Phasic REM, refers to motor activity such as eye movement, muscle twitches, changes in breathing.
- Tonic REM, refers to no eye movement, reduced brain waves, and still muscles.



What is each phase doing?

During NREM and REM cycles the brain is

- flushing out toxins
- repairing and regrowing tissues
- building bone and muscle
- strengthening the immune system
- improving memory processing



Working Together

NREM - REM Cycles

- Each cycle varies in length from 70-100 minutes in the beginning of sleep to 90-120 minutes later in the night.
- Complete cycles can occur 4-5x during 8 hours of sleep.



Restriction in Sleep

- Can impair the ability to drive similar to drinking too much alcohol.
- Cognitive deficits are similar to those seen in some stroke patients.
- Contributes to obesity and poor control of Type II Diabetes.
 - Higher levels of the hormone ghrelin (increases appetite)
 - Decreases levels of leptin (feel less full)
 - Junk foods higher in carbs and sugar
- Disrupts the development of the prefrontal cortex.



Restriction in Sleep

- **Prefrontal Cortex**
 - One of the last regions of the adolescent brain to develop.
 - Part of the circuit that involves decision-making, reward processing, social interaction, emotion.



Restriction in Sleep

Based on recent studies sleep-deprived teens are more likely to report:

- Anxiety, depression, and suicidal thoughts and behaviors.
- High-risk behaviors such as drunk driving, texting while driving, drug and alcohol use, smoking, risky sexual behavior, fighting, and carrying a weapon.
- Drowsy driving.



Restriction in Sleep

Studies have linked persistent early life sleep deprivation with lower executive functioning, slower to learn, social emotional challenges.

- Hard to self regulate behaviors and emotions.
- Trouble adapting to new and unexpected situations.



How Sleep Affects the Brain

Review

The brain is a beautiful central processing system that during adequate sleep is able to:

- Clean out the toxins in the brain.
- Repair and allow growth in areas of the body.
- Support memory consolidation, strengthen attention and processing speeds, and bolster mental health.



Sleep Statistics and Recommendations for Healthy Sleep Habits





6 OUT OF 10

**MIDDLE SCHOOLERS
DON'T GET ENOUGH SLEEP**



7 OUT OF 10

**HIGH SCHOOLERS
DON'T GET ENOUGH SLEEP**

**KIDS 6–12 YEARS
NEED**


**9 TO 12
HOURS**



Z z z

**TEENS 13–18 YEARS
NEED**

**8 TO 10
HOURS**



Healthy Youth Survey – Fall 2023

Northshore School District

8th graders

- 55% don't get enough sleep

10th graders

- 70% don't get enough sleep

12th graders

- 79% don't get enough sleep



Sleep Hygiene



Sleep Hygiene

A series of healthy sleep habits that can improve your child's ability to fall asleep and stay asleep.



Sleep Hygiene for Younger Students

Choosing a bedtime

How much sleep does your student need to be at their best?

Helpful Resources

- Bedtime Calculator by AASM
- Pediatrician Recommendation
- Sleep Guideline by CDC



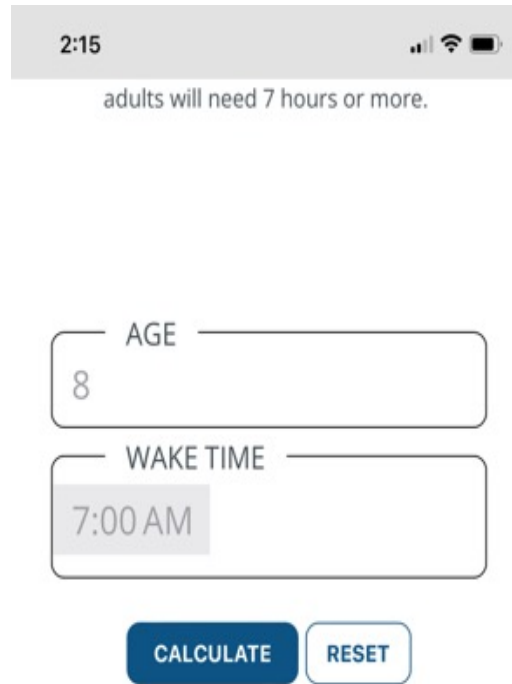
Sleep Hygiene for Younger Students

Choosing a bedtime

Bedtime Calculator by the American Academy of Sleep Medicine

<https://sleepeducation.org/healthy-sleep/bedtime-calculator/>

Make keeping to a scheduled bedtime a family priority.

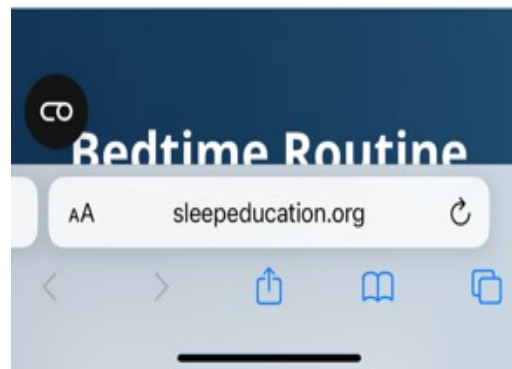


2:15 adults will need 7 hours or more.

AGE 8

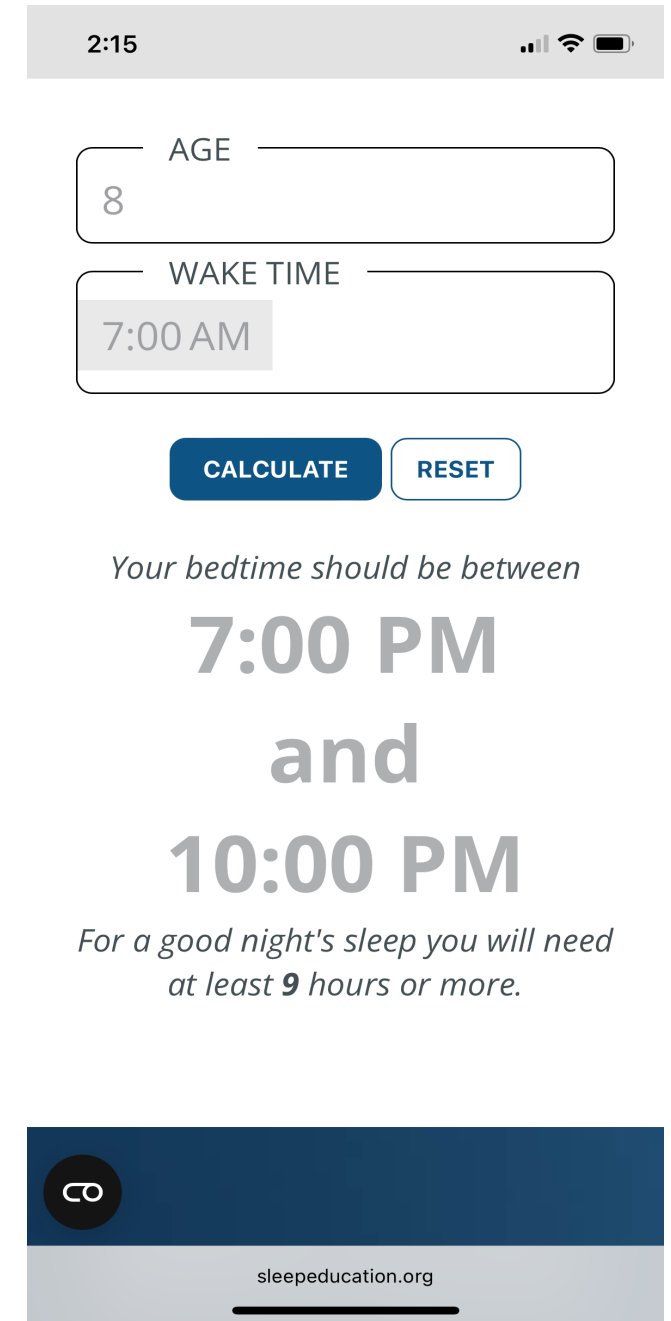
WAKE TIME 7:00 AM

CALCULATE RESET



Bedtime Routine

sleepeducation.org



2:15

AGE 8

WAKE TIME 7:00 AM

CALCULATE RESET

Your bedtime should be between

7:00 PM

and

10:00 PM

For a good night's sleep you will need at least 9 hours or more.

sleepeducation.org

Sleep Hygiene for Younger Students

Bedtime Routine

An hour before bedtime have them begin their relaxing, self-care routine.

- Brushing teeth
- Shower/bath
- Reading (to them, with them, independently)
- Soothing touch: brush hair, scratch back



Sleep Hygiene for Younger Students

Bedtime Routine

Research shows that physical contact is associated with

- lower blood pressure
- slower heart rate
- decreased cortisol levels
- decreased anxiety
- faster recovery time from the cold virus



Sleep Hygiene for Younger Students

Create Opportunity for Choice

- Which pajamas would they like to wear?
- Which stuffed friend gets the special invite to sleep with them?
- Would they like to be read to? They read to you? Both of you read quietly?



Sleep Hygiene for Younger Students

Room Ambiance

- Is the room appropriately lit for sleep? Well placed nightlight.
- Cooler room temp with appropriate blankets, comforter at hand.
- Position of alarm clock.
- Bed supplied with comfortable pillows, blankets.



Awake Hygiene for Younger Students

Choosing a time to wake up

- Pick a time that allows your sleeper to adjust to their day.
- Do they naturally jump right out of bed? Do they need time to adjust?



Awake Hygiene for Younger Students

Choosing how to wake up

Provide options to your child.

- Analog alarm clock
- Digital alarm clock

Family member wake up. Choosing options.

- Turn on light
- Open door
- Gentle touch
- Singing



Sleep Hygiene for Older Students

Choosing a bedtime

Bedtime Calculator by the American Academy of Sleep Medicine

<https://sleepeducation.org/healthy-sleep/bedtime-calculator/>

Make keeping to a scheduled bedtime an expectation.

9:00

AGE

13

WAKE TIME

7:00 AM

CALCULATE

RESET


Your bedtime should be between

9:00 PM

and

11:00 PM

For a good night's sleep you will need at least **8** hours or more.



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Sleep Hygiene for Older Students

Bedtime Routine

Teen should aim for beginning their relaxing, self-care routine an hour before bedtime.

- Electronics turned off and put away in designated location.
- Brushing teeth
- Shower/bath
- Calming activity; reading, journaling
- Set alarm



Sleep Hygiene for Older Students

Bedtime Routine

Communicating love through affectionate touch. Healthy, pleasant touch results in

- Brain releasing hormone, oxytocin
- Oxytocin improves social bonding
- Improves trust
- Lowers anxiety and fear

While this is the time teens are pushing us away they are experiencing “touch hunger”.



Sleep Hygiene for Older Students

Use of Bed and Room Ambiance

- Eating and studying should be done outside of the bed.
- Bed should be clean and void of miscellaneous items.
- Bed should be inviting with pillows, blankets.
- Blinds or curtains that block outside light. Dark room.
- Cooler temp with blankets and comforters available.



Awake Hygiene for Older Students

Choosing how to wake up

- What type of alarm clock do they want?
- Do they need a family member as back up?
- Are they waking up at an appropriate time?



Sleep Statistics and Healthy Sleep Habits

- **Review**

- 55% to 80% of our students in the Northshore School District are not getting the recommended amount of sleep.
- Kids from age 6 - 12 need 9 to 12 hours.
- Teens need 8 to 10 hours.
- Sleep hygiene is an effective and proven way to help students achieve the sleep that is required for a healthy, developing brain.





Sleep Challenges





Sleep Challenges

Sleep challenges are as unique and varied as each student.

These challenges could include:

- Biology
- Over Scheduling
- Diet and Caffeine
- Screen Time
- Poor Sleep Hygiene
- Neurodevelopmental conditions such as autism spectrum disorder or attention deficit hyperactivity disorder (ADHD)

Sleep Challenges

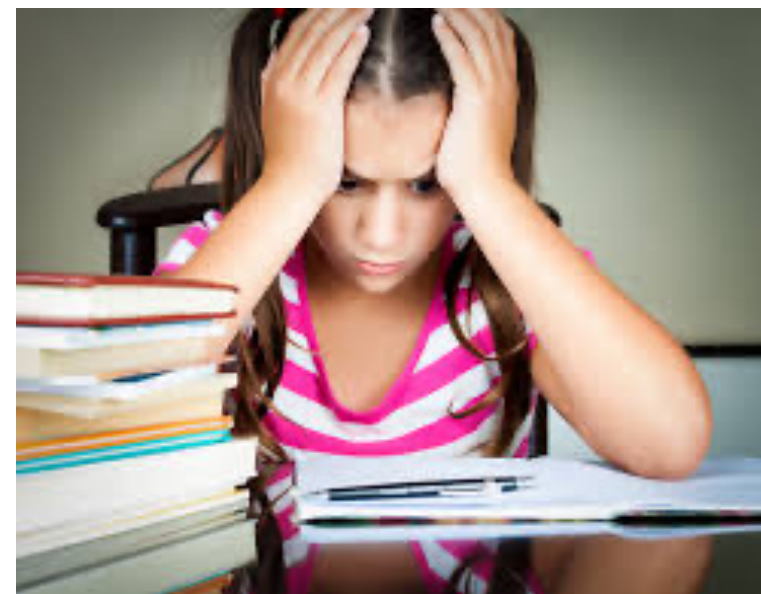
Biology

The Circadian Rhythm and Hormonal Changes.

- Circadian Rhythm is the 24 hour internal clock in our brain. It regulates the cycles of feeling awake and feeling ready for bed.
- The hormone melatonin is regulated by the Circadian Rhythm but also signals to the brain and body when its time for sleep. It is called the “darkness cue”.
- Hormonal changes are occurring rapidly during puberty. There is a natural shift of the production of the melatonin hormone in teenagers.
- A teens circadian rhythm can make it harder for them to fall asleep before 11:00 pm.

Students can feel they are starting their day this way....





Sleep Challenges

Overscheduling

- A February 2024 analysis in the *Economics of Education Review* found that students are assigned too much homework and participate in too many extracurricular activities for their health.
- This analysis found that overscheduling can cause depression and anxiety.



- Sometimes students can feel they are starting their day this way...

Sleep Challenges

Diet and Caffeine

- Caffeine and sugar in foods and drinks effect a student's growing mind and body.

Noticeable effects

- Difficulty falling asleep, staying asleep, waking up
- As we've learned poor sleep then interferes with regular development such as social emotional development, learning, and growth.
- Anxiety, depression, cavities, obesity, diabetes.



Sleep Challenges

Screen Time

A March 2023 study by the *Yale Department of Psychiatry and Columbia School of Nursing* found that students with high levels on digital technology were statistically more likely to exhibit:

- Depression
- Anxiety
- Social anxiety
- Somatic complaints



Sleep Challenges

Screen Time

Current Recommendation for 10-to-17 year olds:

- The *American Academy of Pediatrics* recommends 2 hours or less of screen time per day, not including homework or virtual learning.



Sleep Challenges

Screen Time

Research

- A Dec. 2023 study published in *The Journal of Adolescent Health* found that 15 year olds who used screens in the hour before bed took an extra 30 minutes longer to fall asleep.
- A July 2023 study published in the *Journal of Family Medicine* found that 52% of the adolescents who's screen time was 6 hours or more a day reported being poor sleepers.



Sleep Hygiene

Using what we've learned about healthy sleeping habits, what is wrong with this picture?





Sleep Hygiene

What is wrong with this picture?

- Eating in bed
- Studying in bed
- Coke bottle – caffeine consumption
- Gaming device laying next to him
- Body is actually under the covers, not just laying on top of bed



Sleep Challenges

Neurodevelopmental conditions

Autism spectrum disorder

In addition to the other tips already discussed:

- White noise
- Create visual support, such as a chart or poster, that follows bedtime activity routines.
- Reduce bedtime routine to 20-30 minutes instead of the hour discussed.
- Continue to put all electronic devices away at least an hour before bedtime.

Sleep Challenges

Neurodevelopmental conditions

Attention deficit hyperactivity disorder (ADHD)

In addition to the other tips already discussed:

- Napping may or may not be helpful. Worth experimenting.
- Change sleep time in 20-minute intervals to avoid jarring the brain.
- Continue to put all electronic devices away at least an hour before bedtime.
- Avoid hitting the snooze button upon waking up.

Sleep Challenges Review

- **Review**
- Sleep challenges are unique to each student but with thoughtfulness, preparation, and intent it can be negated.
- Over scheduling, diet, screen time, sleep hygiene, and biology all play a part in creating sleep challenges.





Tips for Parenting Healthy Sleep Habits



Tips for Parenting Healthy Sleep Habits

Words of Encouragement to Caregivers

You know your child best.

You know your family dynamics best.

Pick habits that you feel fit your family's lifestyle and your child's needs.

Start slow, take small steps.

Give yourself grace. Be kind to yourself and your family. Changes can be hard to adjust to and to do well with at first. Practice makes easier.

Notice and congratulate the positive, for yourself and your child.

Tips for Parenting Healthy Sleep Habits

Unable to fall asleep

What happens when you're following all these suggestions, and your child is still struggling to fall asleep?

Help them focus on cognitive behavior techniques that can calm the brain.

- **Breathing**
- **Visualizing**
- **Journaling**
- **Brain cycle education**



Tips for Parenting Healthy Sleep Habits

Unable to fall asleep

Breathing

Keeping it very simple, yet affective, have your child practice slow, deep, breaths.

- Breath in as slowly and deeply as possible and exhale as slowly as possible emptying all breath.
- While they are deep breathing, they should be focused on the feeling of the air in their body.



Tips for Parenting Healthy Sleep Habits

Unable to fall asleep

Visualizations

What is your child interested in that does not involve gaming?

Athletes can pick a skill that they are working on. Eyes closed, after deep breathing for several cycles, imagine performing to the best of their ability. Have them picture themselves in their uniform, smells, sounds, then performing flawlessly.



Tips for Parenting Healthy Sleep Habits

Unable to fall asleep

Visualizations

Academic Performance – students can pick a subject that has a test or specific subject matter. Eyes closed, after deep breathing for several cycles, imagine performing to the best of their ability on that test. Have them picture themselves in class. Where are they sitting? Who is around them? They should imagine feeling confident and relaxed the entire time. The teacher hands out the test and they write their name at the top and begin to easily answer the questions.



Tips for Parenting Healthy Sleep Habits

Unable to fall asleep

Visualizations

The Perfect Day at School

The student imagines in detail from the minute they wake up to the end of the day what a perfect day would look and feel like.



Tips for Parenting Healthy Sleep Habits

Unable to fall asleep

Journaling – Data Dumping

Homework assignments and various worries can feel large and intense once a child has laid down.

Taking the time to journal/list/quick note everything on their mind before they go to bed can clear the brain.



Tips for Parenting Healthy Sleep Habits

Unable to fall asleep

Gratitude Journaling

Research in the *Journal of Psychosomatic Research* has found that feeling grateful helps people sleep better and longer.

Journaling about things you are grateful for is a reminder of how even the smallest of things in life can have positive impacts.

Positive thoughts help soothe the nervous system.



Tips for Parenting Healthy Sleep Habits

Unable to fall asleep

Sleep Phase Education

Explaining the phases of the sleeping brain can help a child picture the process as they are deep breathing. This is another way of focusing the brain to allow for sleep transition.

Utilizing breathing, visualizations, and journaling helps calm and focus the brain to help it move into the NREM, N1 cycle.



Tips for Parenting Healthy Sleep Habits

Multiple Household Parenting

- It would be most effective if both houses practiced similar healthy sleep habits.
- Realistically that can be hard and impractical.
- If possible, the most important, beneficial shared goal between houses would be a shared bedtime, with electronic devices put away outside the bedroom.



Tips for Parenting Healthy Sleep Habits

Communication

- It helps if everyone living in the household is aware of the changes being implemented.
- Grandma, visiting friends, older siblings can all help to positively support the sleep goals of the house.

Tips for Parenting Healthy Sleep Habits

Parenting with Boundaries

If you think boundaries may be an issue in your household ...

(Dr. Chapman and Dr. Campbell insights)

Reflect

- Take the time to reflect on your own childhood and teen years. What was your relationship like with your parents? What did you wish they understood? Do you feel they connected with you? Understood you? How did that make you feel?

Tips for Parenting Healthy Sleep Habits

Parenting with Boundaries

Understanding what works best with your child.

- Help them feel seen and heard at home.
- Who are they now.
- Listen more and try not to immediately offer solutions or advice.
- Ask questions.
- Provide a no pressure environment for interacting.
- Give grace, love, and understanding.

Tips for Parenting Healthy Sleep Habits

Parenting with Boundaries

Specific boundary setting areas

- Screen Time
- Snacking Habits
- Bed Time
- Bed Time Rituals

Tips for Parenting Healthy Sleep Habits

Parenting with Boundaries

Set Screen Time Boundaries.

- Evaluate your child's screen time.
- Set expectations.
- Be realistic. Set smaller goals to help your child and the household adjust.
- Be present.
- Be engaged. Find time to interact. Give your child your full attention.

Tips for Parenting Healthy Sleep Habits

Parenting with Boundaries

Set Screen Time Boundaries

- Establish an electronics docking station for the household.
- Set a specific time at night that all electronics should be put away.
- Create phone-free zones such as the bathroom and family meal time.
- Discuss with your child so they understand why boundaries are being set.
Ask for their suggestions.
- Model boundaries.

Tips for Parenting Healthy Sleep Habits

Parenting with Boundaries

Provide healthy snacking opportunities.

- Keep house stocked with healthy snacks.
- Limit caffeine drinks available to them.
- Request input from your child.
- With younger children help watch the time. “If you feel like a snack tonight, now is the time to get it. Otherwise, the kitchen is closing.”

Tips for Parenting Healthy Sleep Habits

Parenting with Boundaries

Set a bedtime and bedtime ritual

- Following sleep guidelines and discussing with your child, what bedtime works best?
- Following sleep hygiene, what time should your child start getting ready for bed and what activities should they be following? What do they find most relaxing?

Tips for Parenting Healthy Sleep Habits

Parenting with Boundaries

Communicate

- I Am On Your Side. “I want to help you get better sleep so you can feel better at school.”
- Ask for your child’s feedback.
- Listen
- Adjust if appropriate to accommodate your child’s input.
- Explain decisions if unable to accommodate input.
- Explain what will happen if your child does not follow these rules.

Review

How sleep effects the brain

What happens inside the sleeping brain.

- NREM and REM

What each cycle does.

- N1, N2, N3

What happens to the brain when sleep is restricted

- Emotional, mental, and physical deterioration



Review

Sleep Recommendations

- How much sleep our children are getting.
- Recommended sleep hours.
- Sleep hygiene.



Review

Sleep challenges

We reviewed 6 main areas which included:

- Child's biological development
- Over scheduling
- Diet and caffeine
- Screen time
- Poor sleep hygiene
- Neurodevelopmental conditions



Review

Tips for Parenting Healthy Sleep Habits

Small steps

Cognitive behavioral techniques

- Breathing
- Visualizing
- Journaling
- Educating



Review

Tips for Parenting Healthy Sleep Habits

Multiple households

Communication

Establishing boundaries

- Screen time
- Snacking habits
- Bedtime
- Bedtime rituals





Sleep and the developing brain



Q & A



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