



The Science Behind Starting School Later

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Agenda

- Why is sleep important?
- How does sleep and circadian biology change in adolescence?
- What are the consequences of sleep loss?
- What are the benefits of later school start times?



Why is Sleep Important?

- **Food for the brain** – produces alertness, enhances memory and our ability to learn
- **A biological requirement** – helps us perform effectively and safely
- **Essential for development** – particularly during growth and maturation
- **A key to our health** – as important as good nutrition and regular exercise

Getting sleep helps prevent illness and is critical for healthy bodies and healthy minds.

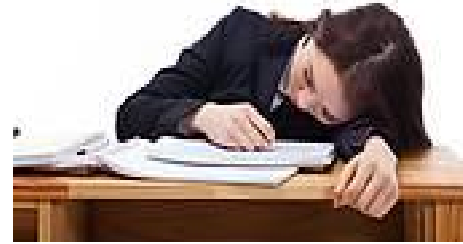


Teens Experience a Shift to a Later Sleep-Wake Cycle



- Teens need 8-10 hours of sleep per night.
- Biological clocks shift during adolescence towards later bedtimes and later wake-up times.
- Delayed melatonin release also leads to increased alertness in the evening and decreased alertness prior to 9 a.m.
- This delayed phase occurs with a concurrent shift towards earlier school start times

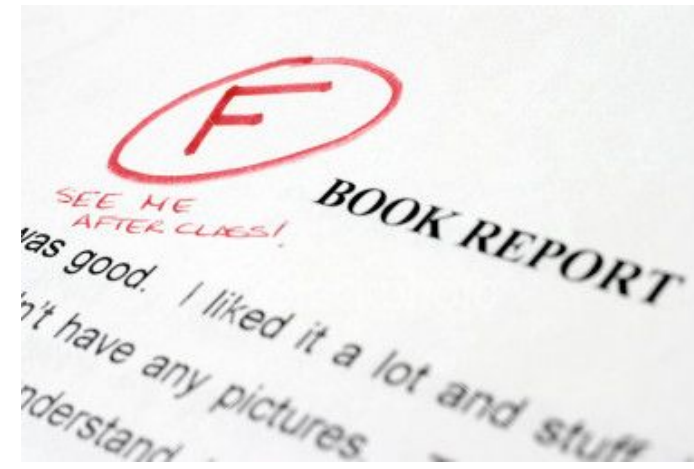
Teens Are Chronically Sleep-Deprived



- Less than 15% of teens achieve the minimum recommended hours of sleep per night (8 hours)
- Early school start times also have a selective impact on rapid eye movement sleep
 - Compromises memory consolidation and learning of new tasks
- In laboratory studies, teens show levels of sleepiness that are comparable to that of narcoleptics (sleep-disordered population)

Consequences of Sleep Loss: Academic Functioning and Mental Health

- Sleep loss in adolescents is associated with increased risk of:
 - Poorer grades/ scores on standardized tests
 - Truancy and dropouts
 - Reduced problem-solving/ attention
 - Irritability, difficulty getting along with others
 - Depression
 - Anxiety
 - Substance Use
 - Suicide



Consequences of Sleep Loss: Physical Health and Performance



- Shorter sleep duration predicts increased risk of obesity, cardiovascular risk, and type 2 diabetes
- Sleep loss is associated with increased sports-related injuries in high school students
- Sleep loss impairs healing and recovery
- According to Harvard Study: “Applying principles of sleep physiology to competitive sports has the clear potential to yield a significant and natural athletic performance advantage”.



Consequences of Sleep Deprivation: Safety

- Drowsy driving:
 - Over 100,000 motor vehicle crashes per year are caused by drowsy driving
 - Over 50% of drowsy-driving crashes are caused by drivers aged 16-25 years
 - National poll: 68% of high school seniors have driven while drowsy; 15% at least 1x/wk
 - Sleep loss impairments are equal or greater than those due to alcohol intoxication (i.e., 3-4 beers)



American Academy of Pediatrics Recommendation (2014)

- Middle and High School starts “no earlier than 8:30”.
- The American Academy of Pediatrics “**strongly supports** the efforts of school districts to optimize sleep in students and urges high schools and middle schools to **aim for start times that allow students the opportunity to achieve optimal levels of sleep (8.5–9.5 hours) and to improve physical and mental health, safety, academic performance, and quality of life.**”



With later start times, will teens actually *sleep more* or just stay up later?

- Evidence from districts around the country shows that when schools delay start times:
 - Teens get an additional hour of sleep per night on average
 - Bed times remain the same
 - More morning sleep (when REM is most likely to occur)
 - The later the start time, the more sleep they get
 - But even a 30 minute delay results in improvements





BENEFITS OF DELAYED SCHOOL START TIMES: EVIDENCE FROM DISTRICTS AROUND THE COUNTRY



Benefits of Later School Start Times: School Performance

- Attendance improves
- Tardiness rates drop
- Drop-out rates decline
- Standardized test scores improve
 - In one study SAT scores for the top 10% of students increased by more than 200 points
- Grades improve
- Disadvantaged students and highest achieving both benefit
 - “Early school start times reduce performance among disadvantaged students by an amount equivalent to having a highly ineffective teacher.”
 - This reduced performance, translates into roughly \$17,500 in reduced lifetime earnings per student. (Brookings Institute)



Benefits of Later School Start Times: : Health & Safety

- Delayed start times are associated with improvements in:
 - Mood (fewer report feeling unhappy, depressed)
 - Health (decreased health center visits)
 - Safety
 - **Teton County School District:** the number of car crashes for teen drivers was significantly reduced by 70% when a school shifted start times from 7:35 AM to 8:55 AM.



Summary

- Sleep is vital for healthy minds and bodies.
- The conflict between teens' biological clocks and early school start times sets the stage for chronic sleep loss for most adolescents.
- Delaying school start times is a modifiable target to reduce the epidemic of teen sleep deprivation.
- Evidence shows benefits of later school start times for academic performance, health, and safety.

Obstacles & Solutions

- Three start times vs. two start times
- Traffic (Highway 248)
- Athletics

Bell Times

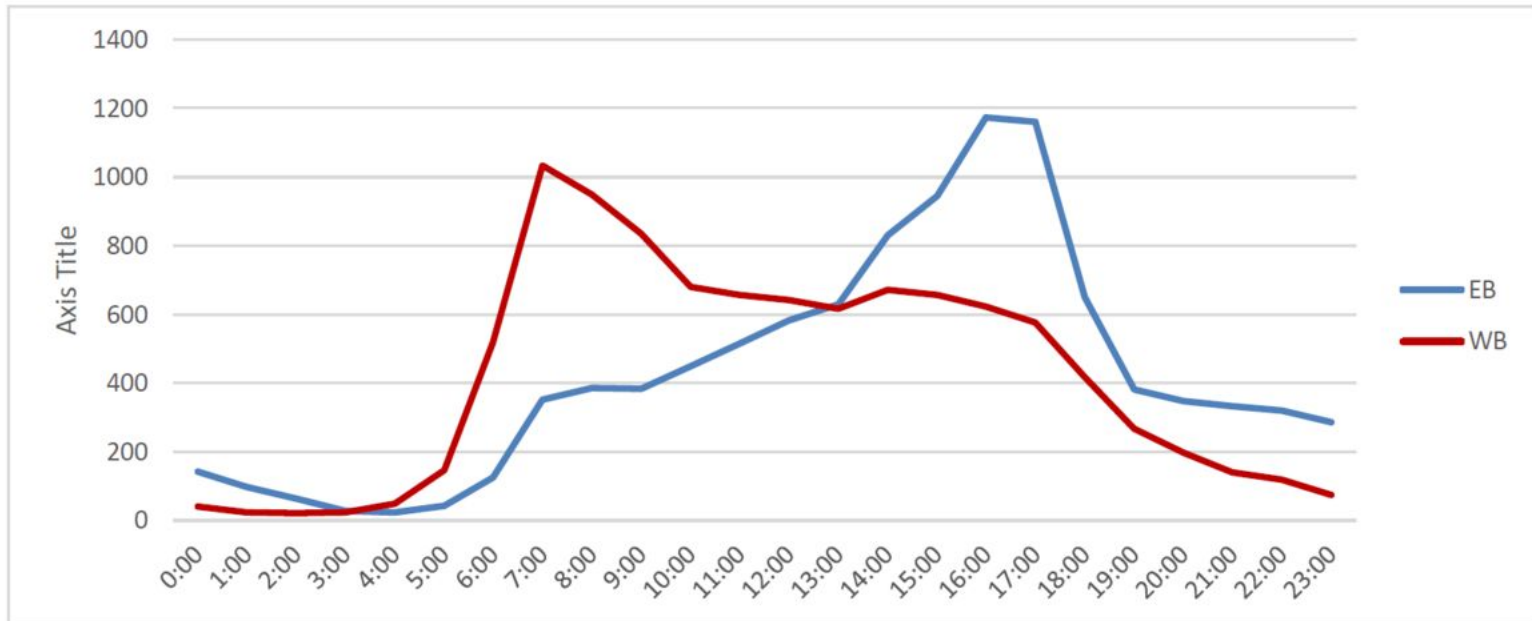
Current Bell Times						
Schools	Start Bell Time	End Bell Time	First Stop AM	Last Stop PM	Longest Ride Time	
PCHS/TMJH	7:30	2:25	6:47	3:00	39	
Elementary	8:15	3:05	7:45	3:29	29	
EHMS	8:50	3:40	8:07	4:22	34	

Two Bell Times						
Schools	Start Bell Time	End Bell Time	First Stop AM	Last Stop PM	Longest Ride Time	
PCHS/TMJH	8:50	3:40	7:48	4:36	59	
Elementary	7:45	2:25	6:47	3:13	55	
EHMS	8:50	3:40	7:48	4:36	59	

Three Bell Times						
Schools	Start Bell Time	End Bell Time	First Stop AM	Last Stop PM	Longest Ride Time	
PCHS/TMJH	9:00	3:50	8:05	4:31	41	
Elementary	8:15	3:05	7:27	3:39	33	
EHMS	7:30	2:20	6:40	3:05	40	

Traffic Study

Figure 7: SR-248 Hourly Weekday Volume (Winter)



- Similar pattern to Summer weekday analysis

Q & A

- 2 minutes for anyone who wants to speak
- Further questions/commentary?
Email Molly Miller: MMiller@pcschools.us
(Community Relations Specialist)

What's Next?

Surveys & stay involved:

Facebook: www.facebook.com/parkcityschools/

Instagram: [ParkCitySchoolDistrict](https://www.instagram.com/ParkCitySchoolDistrict)

Twitter: [@ParkCitySchools](https://twitter.com/ParkCitySchools)

Pinterest: pinterest.com/ParkCitySchools/

Website: www.pcschools.us

