More Sleep for a Healthier Student

A REPORT AND INITIAL RECOMMENDATION FROM THE RADNOR TOWNSHIP SCHOOL DISTRICT ADOLESCENT SLEEP & SCHOOL START TIME COMMITTEE

Fall-Winter 2018-19

This report is subject to change at any time based on ongoing discussions and investigation. It is current as of Nov. 15, 2018.

Chapter 1

Introduction

The Radnor Township School District Adolescent Sleep and School Start Time Committee had four main purposes: understand the identified national public health issue of chronic sleep deprivation in adolescents and the contributing factors and consequences; educate the community on the topic; evaluate the impact on Radnor; and present a report and initial recommendation to district administration and, ultimately, the School Board.

Section 1

OVERVIEW

IN THIS SECTION

1. Background
2. Committee Overview
3. Recommendation at a Glance

This report is subject to change at any time based on ongoing discussions and investigation. It is current as of Nov. 15, 2018.

In recent years, compelling scientific research[1] regarding the importance of sleep on adolescent health has earned deserved national attention.

The American Academy of Pediatrics, the Centers for Disease Control and Prevention, and the American Medical Association, among others, have issued policy statements recommending that adolescents get 8-10 hours of sleep each night and the secondary school day begin at 8:30 a.m. or later.

Since 2015, Radnor Township School District parents, staff and community members have been formally and informally reviewing the scientific research on adolescent sleep deprivation and its potential impact on Radnor students[2]. Central to the discussions and studies has been exploring potential strategies to help adolescents get more sleep, one strategy being to delay the start of the school day.

Several school districts across Pennsylvania and more than 100 across the country have implemented a later high school start time as a result of the findings uncovered through their respective studies. As of November 2018, at least 20 school districts in suburban Philadelphia counties are actively engaged in similar discussions.

1. See Chapter 2, Section 1: The Science of Adolescent Sleep, pages 13-16
2. See Chapter 1, Section 3: Educating the Community, pages 8-11

Recognizing the need for Radnor Township School District to also formally investigate the issues of adolescent sleep and school start time, Superintendent Kenneth E. Batchelor officially named further study of these subjects a district "Priority Project" for the 2017-18 school year. To begin the study, a committee of various stakeholders in the district and Radnor Township was formed.

RTSD ADOLESCENT SLEEP & SCHOOL START TIME STUDY COMMITTEE

The Radnor Township School District Adolescent Sleep and School Start Time Committee was formed using the results of a survey[3] open October 26 to November 8, 2017 and completed by approximately 500 community members. The survey sought feedback about adolescent sleep and school start time and provided respondents a chance to request to be considered for the committee. About 100 respondents expressed interest in serving on the committee.

Purpose of Committee

The RTSD Adolescent Sleep and School Start Time Committee was tasked with the following:

1. **Understand** the public health issue of chronic sleep deprivation in adolescents and the contributing factors and consequences
2. **Educate** the community on the topics of adolescent sleep and school start times
3. **Evaluate** the impact of adolescent sleep and a possible change in school start times on Radnor Township School District
4. **Report** on the initial recommendation to RTSD Administration, Superintendent, and School Board

Committee Members

The 38 committee members were chosen from 100+ applicants.[4] Committee members met 13 times between November 2017 and May 2018. Detailed information regarding the work and progress of the committee can be found in Chapter 1, Section 2: "Timeline."

Committee Recommendation

After more than a year of study, the RTSD Adolescent Sleep and School Start Time Committee offers an initial recommendation of a 55-minute delay in the start time at Radnor High School from 7:35 a.m. to 8:30 a.m. and a 37-minute extension to high school day from 2:27 p.m. to 3:04 p.m. The remaining 18 minutes of the school day would remain intact as a result of efficiencies to be implemented in the RHS schedule.

To achieve the morning delay at RHS, the start and end times at Ithan, Radnor and Wayne elementary schools would need to be delayed by 15 minutes -- from 9 a.m. to 9:15 a.m. and from 3:30 p.m. to 3:45 p.m. A new afternoon bus transportation model for Radnor Middle School and Radnor High School students would need to be implemented.

3. See www.RTSD.org/sleep

4. Adolescent Sleep and School Start Time Committee members were selected based on their responses indicating 1) they did not initially believe the science behind sleep; 2) they believed the science, but felt district operations need not change; or 3) they believed in the science and were interested in researching the logistics of a later school start time, its associated obstacles, and these obstacles' solutions to these obstacles.

Initial Recommendation at a Glance

More About the Initial Recommendation and How it was Reached Beginning on Page 25.

8:30 a.m.-3:04 p.m.

Proposed New Start and End Times at Radnor High School

(Current Radnor High School Start and End Times: 7:35 a.m.-2:27 p.m.)

9:15 a.m.-3:45 p.m.

Proposed New Start and End Times at Ithan, Radnor & Wayne Elementary Schools

(Current Elementary School Start and End Times: 9 a.m.-3:30 p.m.)

PROPOSED NEW AFTERNOON BUS TRANSPORTATION MODEL*

For Radnor Middle School and Radnor High School

(Current Radnor Middle Start and End Times Remain As Is: 8 a.m.-3 p.m,)

RECOMMENDATION OPPORTUNITIES

- No loss in instructional time at RHS
- May be able to use existing bus resources
- Minimal impact on community's usage of fields with continued support from RHS administration
- Minimal impact on RTSD-sponsored sports
- Fully addresses adolescent sleep needs

RECOMMENDATION CHALLENGES

- 15-minute later start & end times at ES level
- Earlier morning pick-up time for RMS students
- Private/special education school transportation logistics unknown at this time
- Traffic patterns around RHS at a later start time
- Change in RHS & RMS afternoon busing model
- Possible longer bus rides for RMS, RHS students

Why Start School an Hour Later at RHS?

Starting school at 8:30 a.m. adheres to the guidelines set by major medical organizations.

Why Start and End School 15 Minutes Later at All Elementary Schools?

The start and end times at each RTSD elementary school require a 15-minute shift to ensure bus transportation for all RHS and elementary students should RHS start at 8:30 a.m..

***How Could the New Afternoon Bus Transportation Model for RHS and RMS Work?**

This new proposed afternoon bus transportation is admittedly a work in progress and requires close additional study and evaluation. As it stands, the new afternoon model proposes half of the district's bus fleet pick-up students at RHS while the other half of the bus fleet picks up students at RMS. The buses that started at RMS would then travel to RHS to pick-up the remaining RHS students before taking students home. Likewise, the buses that started at RHS would travel to RMS to pick up the remaining students before taking students home. This transportation model may involve additional costs pending further study.

Studying Sleep in RTSD

RTSD Adolescent Sleep & School Start Time Committee

Students
Tobey Le (RHS)
Scott Massey (RHS)
Ryan Oliver (RHS)
John Sutherby (RHS)
Lauren Yang (RHS)
Annabel Zhao (RHS)
Ryan Movsowitz (RMS)

Parents/Guardians
Eileen Bookbinder
Erin Croke
Sarah Fox
Pamela Kenney
Jacqueline Kloss, Ph.D.
Alicia Kolber
Thomas Le

Parents/Guardians
Michelle Leonard
Katherine Moore
John Reilly
Kristen Ressler
Rachel Ebby-Rosin
Shobha Sharma

Community Members
Laura Foran
Roberta Winters

District Staff Members
Kenneth Batchelor (Superintendent)
Dan Bechtold (Committee Co-Chair, RHS Principal)

District Staff Members
Michael Friel (RHS Athletic Director)
John Hearn (Director of Transportation)
Doug Kent, Ed.D. (RMS Assistant Principal)
Carl Rosin (RHS Teacher)
Anthony Rybarczyk, Ed.D. (Committee Co-Chair, Director of Elementary Teaching & Learning
David Stango (Former RHS Assistant Principal)
Jessica Verguldi-Scott (RHS Teacher)

21 Meetings Since May 2016, discussion regarding the the district's investigation into the subjects of adolescent sleep and school start time has taken place at eight public School Board and Committee meetings. Since November 2017, the RTSD Adolescent Sleep and School Start Time Committee has met 13 times.

2 Surveys A survey for community members to share their thoughts on adolescent sleep and school start time was open from October 26-November 8, 2017 and received 502 responses. A survey for Radnor High School students on their sleep habits was open in March 2018 and received 848 responses.

6 Formal Presentations Radnor Township School District welcomed two nationally known pediatric sleep experts for six total presentations for community members, staff and students on adolescent sleep and strategies to improve student sleep health, including by implementing later school start times. Dr. Judith Owen visited RTSD in February 2016 and Dr. Wendy Troxel in March 2018.

Next Steps The School Board received the recommendation from the Adolescent Sleep and School Start Time Committee on November 13, 2018. The Board is set to review the recommendation through February/March 2019 before voting on whether or not to adopt the recommendation. **No aspects of the recommendation will be implemented without Board approval.**

Share Feedback
sleep@rtsd.org
Dec. 3, 2018 Evening Meeting for Community
Jan. 7, 2019 "Science of Sleep" with Dr. Judith Owens

Radnor Township School District
135 S. Wayne Ave.
Wayne, PA 19087
www.RTSD.org

Section 2

TIMELINE

IN THIS SECTION

1. Study Timeline: 2015-2019

This report is subject to change at any time based on ongoing discussions and investigation. It is current as of Nov. 15, 2018.

Representatives from Radnor Township School District have been informally and formally involved in discussions and meetings focused on the subjects of adolescent sleep and school start time since at least 2015. Activities conducted by the district include:

- Discussion at eight School Board and Committee meetings since May 2016
- 13 meetings of the RTSD Adolescent Sleep and School Start Time Committee since November 2017
- Two separate surveys for community members and Radnor High School students
- Two separate community presentations featuring national sleep expert Dr. Judith Owens in February 2016 and national sleep expert Dr. Wendy Troxel in March 2018
- Student and staff presentations featuring national sleep expert Dr. Judith Owens in February 2016 and national sleep expert Dr. Wendy Troxel in March 2016
- The creation of a dedicated webpage in September 2015 (www.RTSD.org/sleep)
- The creation of an email address for ongoing community feedback (sleep@rtsd.org)

A complete timeline of activities related to the study of adolescent sleep and school start time in RTSD can be found on the following pages.

2014-2016

August 2014
The American Academy of Pediatrics publishes research finding sufficient sleep integral to adolescent health

August 2015
Former RTSD Superintendent Dr. Michael Kelly announces at the School Board Business Meeting that the district will be taking a look at the issue of adolescent sleep needs and school start time

Oct. 2015-Present
Representatives from the Leagues of Women Voters, RTSD, and parent groups from Lower Merion, Tredyffrin-Easttown, Radnor, and West Chester form the **Regional Adolescent Sleep Needs Committee (RASNC)**. RASNC has met every month during the school year since formed. Current members represent 14 school districts

Dec. 2015
With support from local school districts such as RTSD and T/E, RASNC finalizes planning for a public event featuring **Dr. Judith Owens**, a nationally renowned pediatric sleep expert

Feb. 21 & 22, 2016
Nationally renowned pediatric sleep expert **Dr. Judith Owens** visits RTSD to speak to staff, students, parents and community members

May 24, 2016
At School Board meeting, RTSD affirms commitment to support efforts to ensure students get sufficient sleep

June 2016
The initial district-supported Adolescent Sleep Needs Task Force holds its first meeting

2017

June 27, 2017
Superintendent Kenneth E. Batchelor, who joined RTSD in February 2017, names exploration of student sleep needs and school start time an RTSD 2017-18 Priority Project

Aug. 15, 2017
RTSD Curriculum Committee names "Adolescent Sleep" a planned agenda item for certain 2017-18 Curriculum Committee Meetings

Sept. 19, 2017
School Board Curriculum Committee meeting: Announcement made that RTSD Adolescent Sleep and School Start Time Committee will be created

Sept. 26, 2017
At a planning meeting, district staff reiterate the district's ongoing commitment to the topic of student sleep and school start time and share a timeline and action plan for the study. Previous members involved in the initial Adolescent Sleep Needs Task Force are encouraged to apply to become a member of the new committee

Oct. 26-Nov. 8, 2017
Survey open for Radnor community on adolescent sleep and school start time; survey includes application to apply to be member of the to-be-formed Adolescent Sleep and School Start Time Committee

Nov. 29, 2017
First meeting of the Adolescent Sleep and School Start Time Committee: Introduction of members; review of the RTSD mission statement; discussion about committee's purpose; and initial work to establish study areas

Dec. 14, 2017
Meeting of the Adolescent Sleep and School Start Time Committee: Members separate into subcommittees focused on areas of study such as Academics and Transportation

2018

Jan. 11, 2018
Meeting of Adolescent Sleep and School Start Time Committee: Review of RTSD mission statement and purpose of committee; discussion about research and possible impacts on community; identification of questions for FAQ and pros and cons of a later school start time; discussion of other strategies that address student sleep

Jan. 25, 2018
Meeting of the Adolescent Sleep and School Start Time Committee: Members of RASNC discuss the organization's background and guiding principles and conduct Q&A. Committee members review questions for a Teen Sleep Habits survey for RHS students, develop FAQs, and receive an update on the creation of dedicated website and email address

Feb. 22, 2018
Meeting of Adolescent Sleep and School Start Time Committee: Final review of Teen Sleep Habits Survey; review of FAQs; break-out groups discuss scenarios: no later start time/plan to address student sleep needs and later school start time/associated logistics

March 12 & 14, 2018
Pediatric sleep expert **Dr. Wendy Troxel** visits RTSD to present to area parents and community members (March 12) and RHS students in grades 9-12 (March 14)

March 14-28, 2018
Teen Sleep Habits Survey given to RHS students in English classes

2018

April 26, 2018
Meeting of Adolescent Sleep and School Start Time Committee: Overview of progress to date; review of Teen Health Habits Survey data; determination to evaluate at least four options ranging from no change in school start time to a 90-minute adjustment

April 12, 2018
Meeting of the Adolescent Sleep and School Start Time Committee: Update from RASNC regarding a webinar with Dr. Ali Haghani, an expert in the field of transportation, in which committee members participated; overview of Teen Sleep Habits Survey, which was completed by 848 RHS students; further discussion on start time scenarios

May 7, 2018
Meeting of Adolescent Sleep and School Start Time Committee: Evaluation of different start time scenarios; discussion of items impacted by a change in start time, including transportation, schedules, sports, community youth sports, and clubs/ activities

May 8, 2018
Curriculum Committee Meeting of the Whole School Board: Presentation on the progress of the Adolescent Sleep and School Start Time Committee, including purpose of committee; committee members; objectives of the study; summary of meetings and events; summary of results of the Teen Sleep Habits Survey; and next steps

May 21, 2018
Meeting of Adolescent Sleep and School Start Time Committee: Decision made to ask RHS and RTSD administrators to follow up to evaluate the scenarios to determine impact on RTSD as well as community as a whole

Week of August 27, 2018
Meetings held with RTSD Transportation Department to evaluate all start time scenarios

August 28, 2018
School Board Business Meeting: Presentation on progress and next steps for the Adolescent Sleep and School Start Time Committee as part of larger presentation on the 2017-18 RTSD Goals and Priority Projects

Sept. 7, 2018
Timeline developed for release of final Adolescent Sleep and School Start Time Committee proposal on whether a later school start time in RTSD is feasible and recommended. **Initial Recommendation is subject to a vote by the School Board prior to any action (scheduled for March 2019)**

Week of Sept. 10, 2018
Discussions with RTSD school administrators regarding impact of possible time change on all District schools

Sept. 11, 2018
Curriculum Committee Meeting of the Whole School Board: Adolescent Sleep and Start Time listed as a "Priority Project" on proposed district Goals and Priority Projects for 2018-19

Oct. 8, 2018
Draft of Adolescent Sleep and School Start Time Committee Report and Initial Recommendation made available to members of Adolescent Sleep and School Start Time Committee for review prior to Oct. 10 meeting.

Oct. 10, 2018
Meeting of Adolescent Sleep and School Start Time Committee: Review of draft Adolescent Sleep and School Start Time Committee Report and Initial Recommendation

Nov. 1, 2018
Meetings with RTSD staff members to review and discuss Adolescent Sleep and School Start Time Committee Report and Initial Recommendation

Nov. 8, 2018
Meetings with RHS students to discuss Adolescent Sleep and School Start Time Committee Report and Initial Recommendation

Nov. 9, 2018
Adolescent Sleep and School Start Time Report and Initial Recommendation made available to School Board and public

Nov. 13, 2018
Curriculum Committee Meeting of the Whole School Board: Adolescent Sleep and School Start Time Committee Report and Initial Recommendation presented

Dec. 3, 2018
Planned evening meeting open to public to discuss Adolescent Sleep and School Start Time Report and Initial Recommendation and receive feedback

2019

February 2019
Planned event open to the public focusing on "The Science Behind Sleep" featuring nationally renowned sleep expert **Dr. Judith Owens**

February 2019
Planned School Board discussion during respective Committee Meetings and monthly Board Meeting

Spring 2019
School Board scheduled to vote on Adolescent Sleep and School Start Time Committee Initial Recommendation at monthly Board meeting

Section 3

EDUCATING THE COMMUNITY

IN THIS SECTION

1. Public Forums
2. Website
3. Feedback Opportunities
   a. Surveys
   b. Email Address
   c. Upcoming Events

This report is subject to change at any time based on ongoing discussions and investigation. It is current as of Nov. 15, 2018.

Since 2015, Radnor Township School District has actively sought to educate the RTSD community about the issues of adolescent sleep and strategies to improve adolescent sleep health, including discussions regarding the possibility of a later school start time.

PUBLIC FORUMS

Radnor Township School District has welcomed two nationally renowned sleep experts to speak to parents, community members, students, and staff members: Dr. Judith Owens in February 2016 and Dr. Wendy Troxel in March 2018.

Dr. Judith A. Owens

Dr. Judith Owens is Director of Sleep Medicine at Boston Children's Hospital in Boston Massachusetts and a Professor in Neurology at Harvard Medical School. She is an internationally-recognized authority on pediatric sleep and the author of over 150 original research and review articles in peer-review journals, chapters, and books on the topic. Her particular research interests are in the neurobehavioral and health consequences of sleep problems in children, sleep

health education, and cultural and psychosocial issues impacting on sleep.

Previously, Dr. Owens was the Director of Sleep Medicine at Children's National Medical Center in Washington DC (2010-15) and Director of the Pediatric Sleep Disorders Clinic and the Learning, Attention, and Behavior Program at Hasbro Children's Hospital in Providence, Rhode Island. She received her undergraduate and medical degrees from Brown and a Master's in Maternal and Child Health from the University of Minnesota. She completed pediatric residency training at Children's Hospital of Philadelphia, and fellowships in Behavioral Pediatrics at Minneapolis Children's Medical Center and in Child Psychiatry at Brown University. She is board certified in Pediatrics and Sleep Medicine.

In February 2016, Dr. Owens visited RTSD as a panelist for an evening program, "Sleep and the Adolescent Brain,[1]" which also featured Dr. Katharine Dahlsgaard, the Lead Psychologist at the Anxiety Behaviors Clinic at the Children's Hospital of Philadelphia, and Dr. Joseph O'Brien, the Executive Director of the Chester County Intermediate Unit. Hundreds of parents and community members from Radnor and surrounding school districts attended the presentation, which centered on the causes and implications of sleep deprivation in adolescents and strategies to help. Dr. Owens also presented separately to staff members (*pictured*).

Dr. Wendy Troxel

Dr. Wendy Troxel is a Senior Behavioral Scientist at the RAND Corporation and Adjunct Faculty in the Departments of Psychiatry and Psychology at the University of Pittsburgh. A licensed clinical psychologist and certified behavioral sleep medicine specialist, her work has been funded by the National Institutes of Health and the Department of Defense, as well as private foundations and corporations. Dr. Troxel's work has been widely cited by the media, including *The Wall Street Journal, The New York Times, The Financial Times*, ABC World News Tonight, CBS Sunday Morning, NPR and BBC. Dr. Troxel was also one of the featured sleep experts in the National Geographic documentary "Sleepless in America"and her TED talk on the impact of school start times on adolescent sleep has received more than 1.5 million views.

During her visit to RTSD in March 2018, Dr. Troxel spoke to staff members and officials from other school districts during a day-time presentation and to more than 400 attendees throughout the region at

1. http://bit.ly/sleepandadolescentbrain

a public evening presentation. A third presentation was given to Radnor High School students the following day.

During Dr. Troxel's presentations, she reviewed the science behind the sleep patterns of adolescent students, the implications for students who do not get enough sleep, and immediate strategies to help adolescents improve their sleep hygiene beyond a change to the school start time.

WWW.RTSD.ORG/SLEEP

Since September 2015, a webpage on the district's website, www.RTSD.org, has been dedicated to providing the public information on the latest developments in the science behind adolescent sleep. Beginning in December 2017, www.RTSD.org/sleep also regularly chronicled the work and progress of the RTSD Adolescent Sleep and Start Time Committee. The webpage also houses related resources, community and student feedback, and a study timeline.

FEEDBACK OPPORTUNITIES

Two Surveys

- From October 26 to November 8, 2017, a survey on student sleep and school start time was open and advertised to the Radnor community. The survey included the opportunity to apply to be member of the to-be-formed RTSD Adolescent Sleep and School Start Time Committee. The survey was completed by more than 500 community members, with nearly 100 requesting consideration to be on the committee. **The complete results of the survey can be found on www.RTSD.org/sleep.**

- From March 14-28, 2018, a "Teen Sleep Habits Survey" was administered to Radnor High School students in their English classes. Nearly 850 students in grades 9-12 (approximately 72%) completed the survey. **An overview of the survey results can be found on www.RTSD.org/sleep.**

Email

A dedicated email address, sleep@rtsd.org, was established when the RTSD Adolescent Sleep and School Start Time Committee began its work to allow members of the public to provide ongoing feedback.

Recent and Upcoming Events

November/December 2018

Meetings with faculty, staff members and students regarding Adolescent Sleep and School Start Time Report and Initial Recommendation

November 13, 2018

Presentation of Adolescent Sleep and School Start Time Report and Initial Recommendation at Curriculum Committee Meeting of the Whole School Board

December 3, 2018

Planned evening meeting open to public to discuss Adolescent Sleep and School Start Time Report and Recommendation and receive feedback.

February 2019

Planned event open to the public focusing on "The Science Behind Sleep" featuring nationally renowned sleep expert Dr. Judith Owens.

February 2019

Planned School Board discussion during respective Committee Meetings and monthly Board Business meeting.

Spring 2019

Planned School Board vote on whether to accept and implement Adolescent Sleep and School Start Time Recommendation at monthly Board Business meeting

Chapter 2

Research and Data

Section 1

THE SCIENCE OF ADOLESCENT SLEEP

IN THIS SECTION

1. The Circadian Rhythm
2. Getting a Good Night's Sleep
3. Consequences of Sleep Deprivation
4. School Start Times
5. Economic Benefits

This report is subject to change at any time based on ongoing discussions and investigation. It is current as of Nov. 15, 2018.

According to many national health organizations, such as the American Academy of Pediatrics (AAP), the Centers for Disease Control and Prevention (CDC), the American Academy of Sleep Medicine, the Society of Behavioral Medicine, and the National Sleep Foundation (NSF), adolescents have different sleeping rhythms than than they do during life's other developmental stages. It is more difficult for adolescents to fall asleep earlier and wake up earlier, which leads to sleep deprivation that can be physically, socially, emotionally and academically detrimental.

According to the National Sleep Foundation's "Adolescent Sleep Needs and Patterns Research Report and Resource Guide," sleep is a basic drive of nature that helps people think clearly, complete tasks, and fully enjoy life.

THE CIRCADIAN RHYTHM

According to the NSF, a person's circadian rhythm is essentially a 24-hour clock running in the background of the brain that cycles between sleepiness and alertness.

According to a 2017 article published in SAGE research journal *Phi Delta Kappan*[1], "it's a matter of biology, not choice" when it comes to adolescents' inability to fall asleep before approximately 10:45 p.m. Their brains also remain in "sleep mode" until about 8

1. Wahlstrom, K., 2016, Later start time for teens improves grades, mood, and safety, SAGE research journal, Phi Delta Kappan.

a.m. This delay in adolescents' circadian rhythms is directly related to hormonal changes during puberty. Most people experience this so-called "sleep phase shift" during adolescence; the shift disappears as people enter their 20s. Adolescents also experience "delayed sleep phase," or a shift in the production of melatonin, the sleep hormone, by two hours.[2]

GETTING A GOOD NIGHT'S SLEEP

The CDC and NSF recommend adolescents get eight to 10 hours of sleep per night. The AAP recommends 8.5 to 9.5 hours.

As of 2015, the average school start time for the majority of American public middle, high, and combined schools (constituting almost 26.3 million students) was 8:03 a.m[3]. If the typical high schooler naturally falls asleep at 11 p.m. or later according to the NSF, a school day beginning at 8 a.m. or earlier makes it difficult, if not impossible, for adolescents to get the amount of sleep as recommended by medical organizations.

2. Crowley, S., Acebo, C., Carskadon, M., 2007, Sleep, circadian rhythms, and delayed phase in adolescence, Sleep Medicine
3. Wheaton, A., Ferro, G., Croft, J., 2015, School Start Times for Middle School and High School Students — United States, 2011–12 School Year, Morbidity and Mortality Weekly Report, Centers for Disease Control and Prevention.

According to a 2010 large-scale study published in* The Journal of Adolescent Health, *just 8% of American high school students get the right amount of sleep.

CONSEQUENCES OF SLEEP DEPRIVATION

According to the AAP[4], chronic sleep loss in children and adolescents is one of the most common – and easily fixable – public health issues in the United States. The AAP states:

The research is clear that adolescents who get enough sleep have a reduced risk of being overweight or suffering depression, are less likely to be involved in automobile accidents, and have better grades, higher standardized test scores and a...better quality of life.

Sleep deprivation in adolescents can result in poor health and academic performance, limiting the ability to learn, listen, concentrate, and solve problems.[5] Lack of sleep can also contribute to acne and other skin problems; aggressive or

4 and 5. Owens, J., 2014, School Start Times for Adolescents, American Academy of Pediatrics

On Need for Action, Medical Organizations Agree

Since 2014, prominent national medical organizations have confirmed chronic sleep deprivation is a health epidemic and issued recommendations stating ***adolescents need 8 to 10 hours of sleep each night and secondary schools should start no earlier than 8:30 a.m.***

American Academy of Pediatrics

American Medical Association

American Psychological Association

American Academy of Child and Adolescent Psychiatry

Centers for Disease Control & Prevention

National Parent Teacher Association

American Academy of Sleep Medicine

Society of Behavioral Medicine

National Association of School Nurses/ Society of Pediatric Nurses

List not all inclusive

inappropriate behavior; over- or unhealthy eating and weight gain; an increase in the use of caffeine and nicotine; and unsafe driving.

SCHOOL START TIMES

According to the National Education Association, increasing evidence supports the notion that later school start times make a difference in students' lives, including through improved educational outcomes and mental health. The NEA states that physicians have been advocating for later start times for more than 20 years, and the body of literature linking adolescent sleep with increased student success has grown in depth and rigor over that time.

According to the National Sleep Foundation, "classes should not start in most cases until 8:30 a.m. or later."[6] In its School Start Times for Adolescents Policy Statement, the AAP stated[7]:

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...."

ECONOMIC BENEFIT

According to a 2017 Rand Corporation Study, later school start times could have a substantial impact on public health and the United States economy. The predicted benefit per student suggests that under reasonable cost assumptions, even after a relative short period of time, the benefits will outweigh the costs, according to the study.[8]

At a national level, up to 3% of GDP is lost due to lack of sleep, and an increase in sleep could add $226.4 billion to the U.S. economy.[9]

Furthermore, economic modeling of data from five OECD countries found that individuals who sleep fewer than six hours a night on average have a 13% higher mortality risk than people who sleep at least seven hours.[10]

How Sleep Deprivation Impacts Students

Mental Health

Teenagers sleeping less than eight hours at night were about three times more likely to make a suicide attempt compared to those sleeping nine hours or more.
(Liu, X.,2004, Sleep and Adolescent Suicide Behavior, Sleep)

Problematic Behavior

A study involving 12,154 high school students found teenagers who get less than eight hours of sleep versus more than eight hours of sleep were more likely to engage in risky behaviors such as fighting, smoking, alcohol/marijuana use, and sexual activity.
(McKnight-Eily, 2011, Relationships between hours of sleep and health-risk behaviors in US adolescent students, Preventive Medicine)

Distracted Driving

Car crash rates decreased by 16.5% when school start time was moved one hour later.
(Danner, F and Phillips, B, 2008, Adolescent Sleep, School Start Times, and Teen Motor Vehicle Crashes, Journal of Clinical Sleep Medicine)

Physical Health and Obesity

Teenagers not obtaining adequate sleep at age 16 were 20% more likely to be obese by age 21.
(Suglia SF, Kara S, Robinson WR, 2014, Sleep duration and obesity among adolescents transitioning to adulthood: do results differ by sex? Journal of Pediatrics)

6. *National Sleep Foundation. 2014 Sleep in America Poll: Sleep in the Modern Family. Washington (DC): The Foundation; 2014 Mar.*
7. *Owens, J., 2014, School Start Times for Adolescents, American Academy of Pediatrics*
8-10. *Marco Hafner, Martin Stepanek, Jirka Taylor, Wendy M. Troxel, Christian Van Stolk 2016, Why sleep matters — the economic costs of insufficient sleep: A cross-country comparative analysis, Rand Corporation*

Section 2

RADNOR HIGH SCHOOL STUDENT SURVEY

IN THIS SECTION

1. Results of Teen Sleep Survey

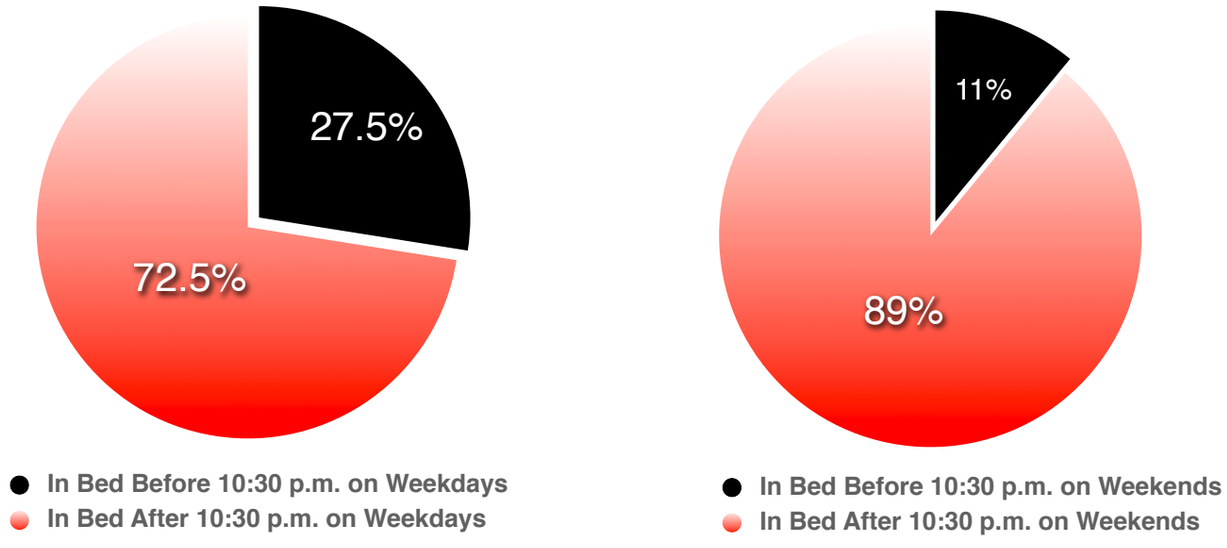
This report is subject to change at any time based on ongoing discussions and investigation. It is current as of Nov. 15, 2018.

As part of the Adolescent Sleep and School Start Time Committee's work, all Radnor High School students were invited to take a "Teen Sleep Survey" online. The survey was given during the school day a week after the students attended a presentation at RHS by sleep expert Dr. Wendy Troxel on March 14, 2018.[1] 848 of 1,183 of students (about 72%) took the survey.

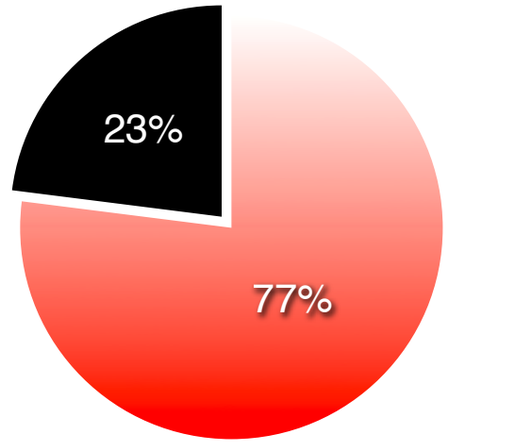
Survey Highlights

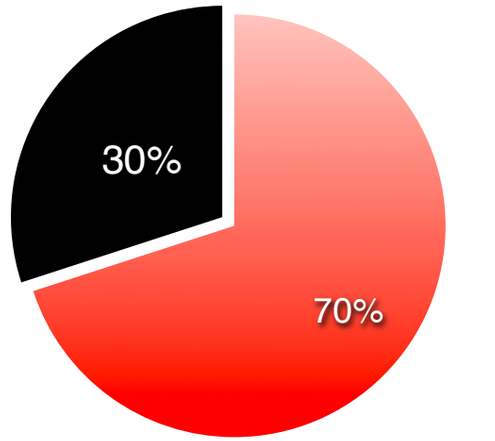
1. Students get insufficient sleep on school nights.

Students were asked to rate what time they usually go to bed and wake up on school nights versus weekend nights.

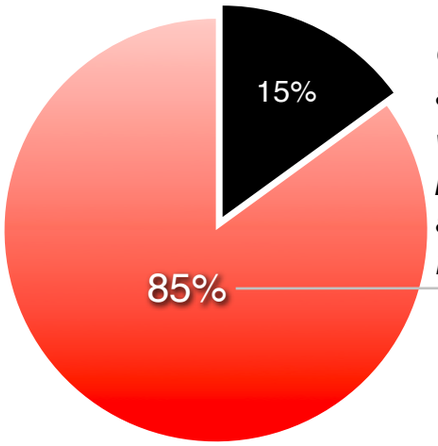


1. See Chapter 1, Section 3: Educating the Community, pages 8-11

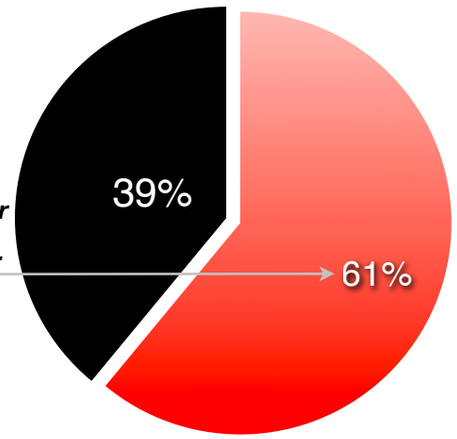




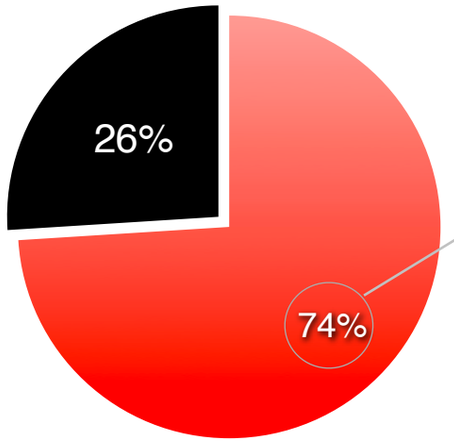
2. *Most students prefer a later school start time.*

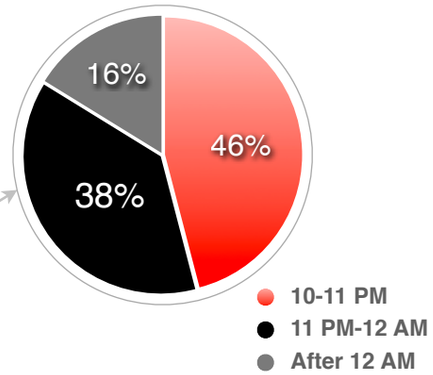


Of the 85%, 61% would prefer a 8:30 AM or later start.

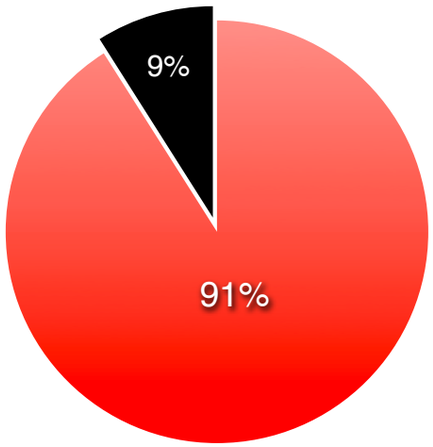


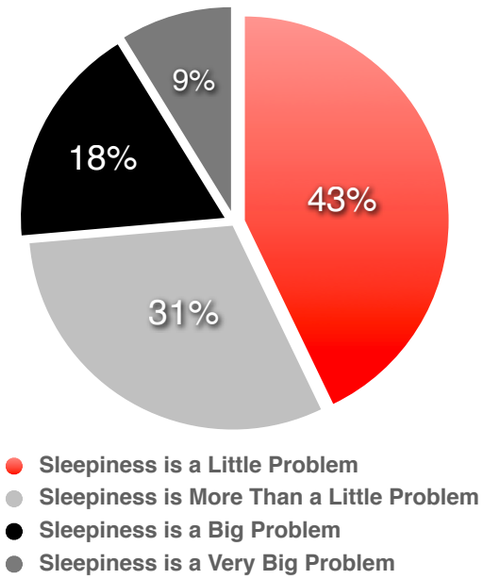
3. *Students Have Difficulty Falling Asleep Before 10 PM*



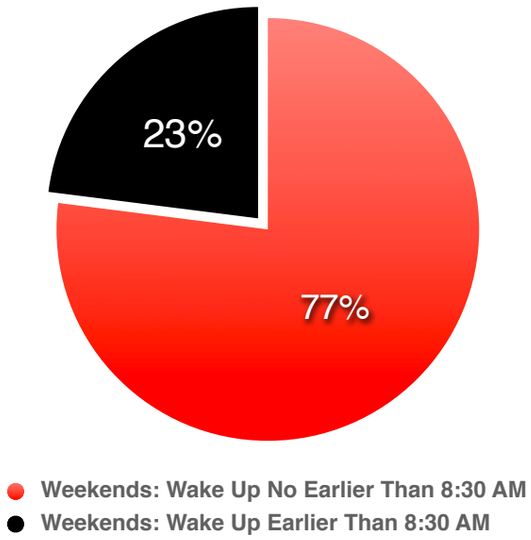


4. *Most students feel sleepiness is a problem.*

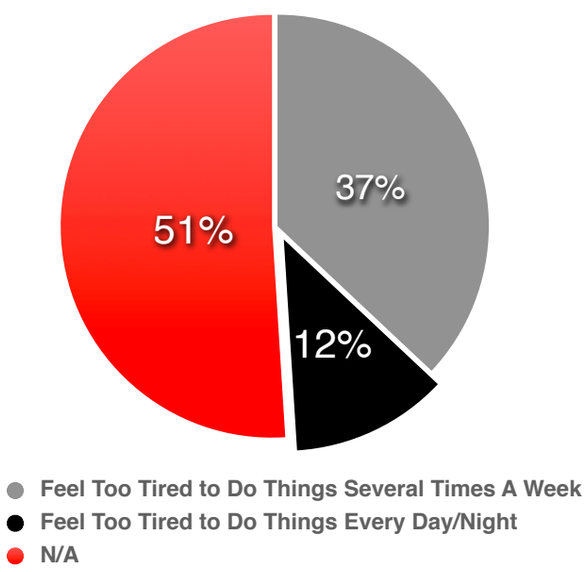


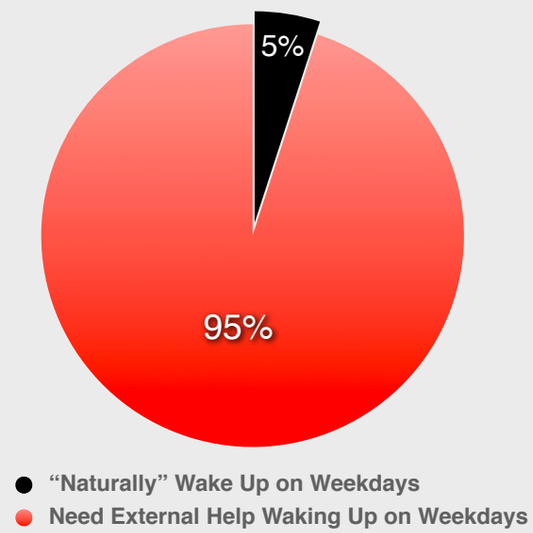


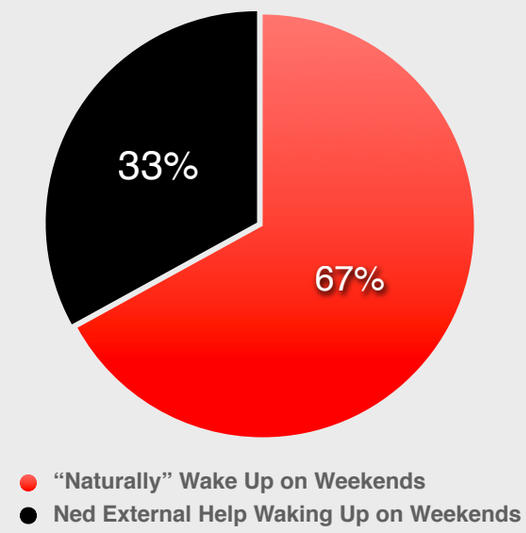
5. Students Naturally Wake Up After 8:30 AM



6. Nearly 50% Feel Too Tired To Do Things

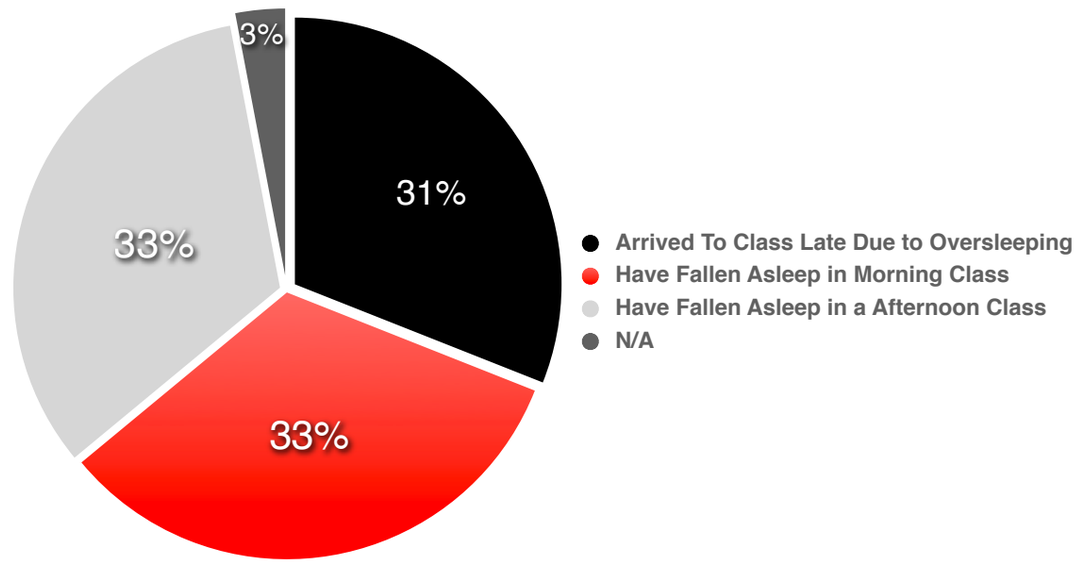




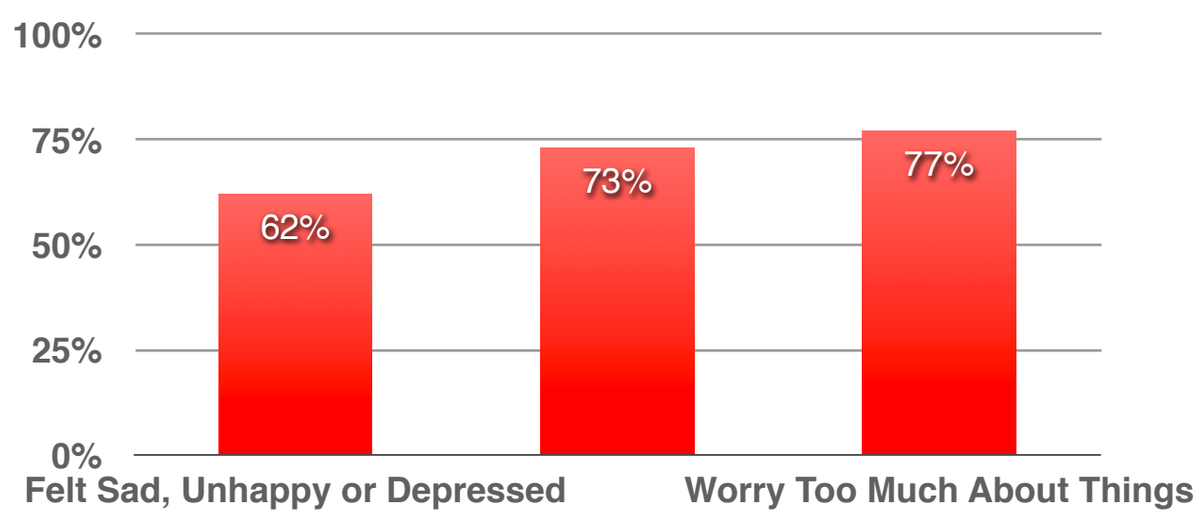


The discrepancy between "naturally" waking on weekends versus weekdays is meaningful as it may indicate that students have not met their sleep needs on weekdays, whereas they are likely to be able to meet their sleep needs on the weekends.

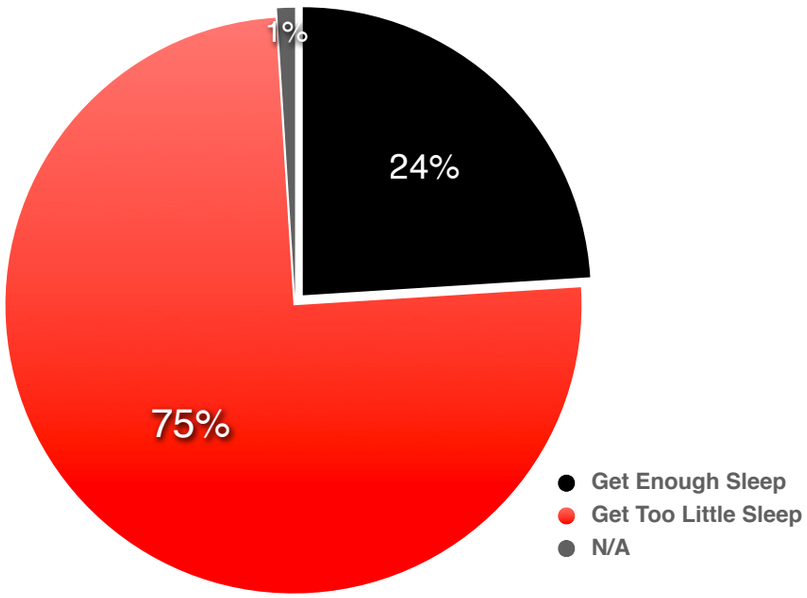
7. About 1/3 of students reported daytime consequences of sleep deprivation during class at least once in the previous two weeks.

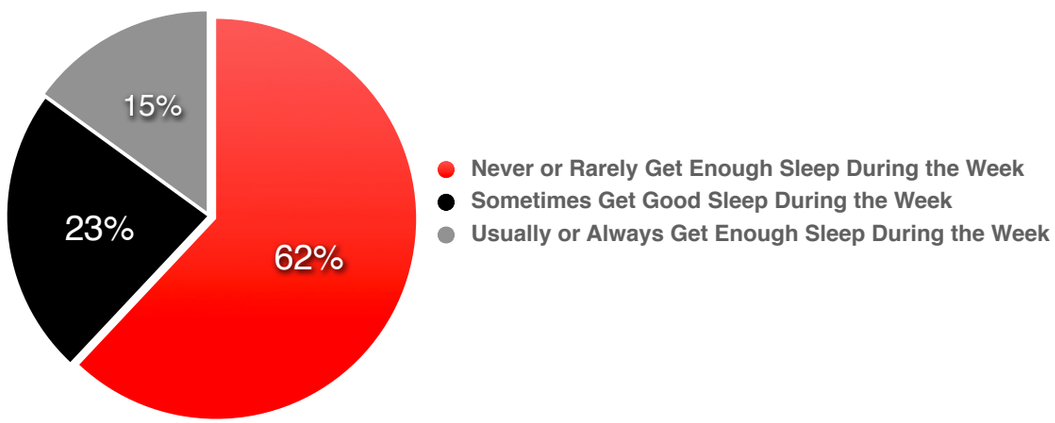


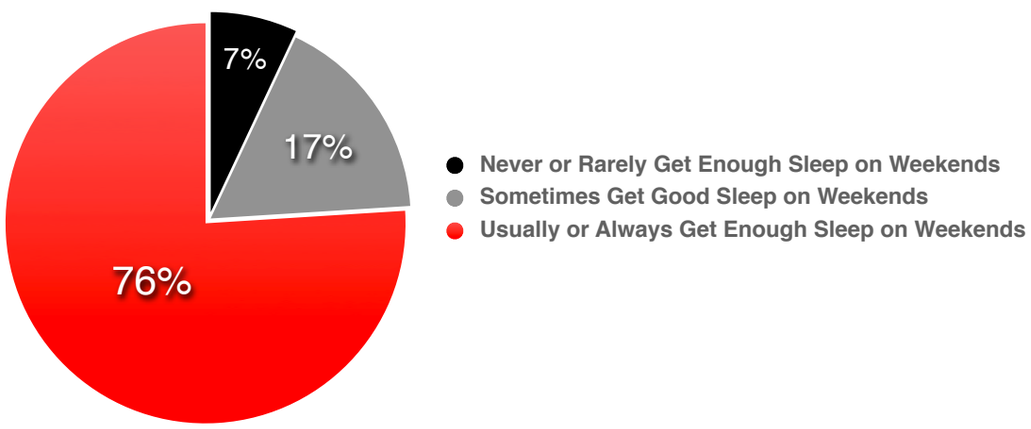
8. A majority of students reported negative mood symptoms at least once during the previous two weeks.



9. Most students feel they do no get enough sleep.







WHAT ELSE MIGHT IMPACT STUDENT SLEEP?

In terms of sleep quality, 35% of RHS students who completed the Teen Sleep Survey in March 2018 consider themselves "poor sleepers." Nearly half of the respondents (46%) reported staying up until 3 a.m. or later at least once over the prior two weeks.

Just 6% of participating students reported having a good night's sleep every night over the past two weeks, whereas 61% reported either never, once, or twice having a good night sleep over the previous two weeks.

Homework

According to the Teen Sleep Survey results, homework primarily dictates what time students go to bed on school nights. Forty-three percent of respondents cited "I have finished my homework," as to why they go to bed, followed by 29% for "I felt sleepy." Sixty-four percent (64%) of respondents reported they would go to bed earlier if not for studying. In comparison, students' primary reason for going to bed on weekends was "I felt sleepy" (42%), followed by "finished socializing" (30%)

The State of Homework

- 91% of student respondents reported doing homework/studying during prior week
- 63% of student respondents reported doing 2-4 hours of homework per night
- 18% of student respondents reported doing 4-6 hours of homework per night
- 53% of student respondents they either struggle to stay awake or fall asleep while studying

Extracurricular Activities

Seventy-one percent (71%) of RHS student-respondents report being involved in organized sports and/or regularly scheduled physical activity, while 37% reported participating in clubs and other activities. Responses from the survey suggest these commitments may be obstacles to adequate sleep for some students. Fifty-percent (50%) of student-respondents who participate in organized sports or activities and 37% of students involved in clubs/activities report they'd go to bed earlier if not for their involvement.

After-School Employment

Working for pay is also an obstacle to sleep for 9% of RHS student-respondents. Twenty-seven percent (27%) reported working for pay.

- 47% report working less than 5 hours per school week
- 27% report working 5-10 hours per school week
- 26% report working 10+ hours per school week

Of the working students, 6% reported struggling to stay awake while at work and 31% reported they would go to bed earlier if not for their job.

Technology

Access to technology is also an obstacle to sleep. Fifty-percent (50%) of respondents report they turn off every nearby device before sleep.

- 88% of students report having their cell phone in their bedroom
- 58% of students report having a computer in their bedroom
- 16% report having a television in their bedroom

Chapter 3

GENERAL SLEEP HEALTH STRATEGIES

There are certain steps that be taken right now to help adolescents get more sleep.

Section 1

GENERAL SLEEP HEALTH STRATEGIES

IN THIS SECTION

1. Strategies to Improve Sleep Health Now

This report is subject to change at any time based on ongoing discussions and investigation. It is current as of Nov. 15, 2018.

There are many steps that can immediately be taken to improve sleep health. Regardless of the final schedule at Radnor High School, RTSD is committed to educating parents, students, staff and community members about ways to promote healthier sleep patterns in students.

- **Turn Off Electronic Devices** a minimum of an hour before trying to go to sleep.
- **Control Diet After Dinner**: Avoid snacking and caffeine
- **Avoid Over-scheduling**: Set realistic expectations that family and friends support and accept
- **Set good examples**: Parents can lead the way by making sleep a priority for themselves, eating right and exercising regularly
- **Streamline mornings**: Organize for the next day the night before by picking out clothes, gathering books, and packing lunch
- **Bed is for Sleep**: Associate bed for sleeping only. Do homework in another room.
- **Complete Tasks with Screen Time First**
- **Shift Family Routines**: Expose adolescents to outside light in the morning by walking the dog, taking out the trash, or walking to school
- **Keys to a Good Night's Sleep**
  - Implement a Family Media Plan
  - Non-Phone Alarm Clock
  - Blue-Light Filters
  - Weighted blankets
  - Cool Room
  - Smart Lights (dimming)

School- and District-Based

- Core classes later in day
- Shift exams to later in day
- Include sleep hygiene education in curriculum
- "Student Wellness" a 2018-19 School Board-approved RTSD goal

FROM THE NATIONAL SLEEP FOUNDATION

- Sleep is vital to a people's well-being, as important as the air they breathe, the water they drink and the food they eat. It can help adolescents eat better and manage stress.
- Biological sleep patterns shift toward later times for both sleeping and waking during adolescence — meaning it is natural to not be able to fall asleep before 11 p.m.
- Most teens do not get enough sleep — one study found that only 15% reported sleeping 8.5 hours on school nights.
- Teens tend to have irregular sleep patterns, typically staying up late and sleeping in on weekends, which can affect their biological clocks and harm sleep quality.
- Many teens suffer from treatable sleep disorders, like1 asnarcolepsy, insomnia, restless legs syndrome, or sleep apnea.
- When sleep deprived, a person is as impaired as driving with a blood alcohol level of .08%. Drowsy driving causes over 100,000 crashes each year.
- If planned correctly, naps make people work more efficiently. But naps that are too long or too close to bedtime can interfere with sleep.
- Where one sleeps should be a haven: cool, quiet, and dark. Bright light is helpful in the morning to signal to the body it is time to wake up.
- No pills or vitamins can replace good sleep. Caffeine close to bedtime can harm sleep. Coffee, tea, soda, and chocolate late in the day should be avoided. Nicotine and alcohol also interfere with sleep.
- A bed time and wake time should be established and met, even on the weekends. A consistent sleep schedule helps people feel less tired by allowing the body to sync with its natural patterns.
- It is best not to eat, drink, or exercise within a few hours of bedtime. Electronic devices should also be avoided the hour before bed.
- A bedtime routine is beneficial: if the same procedures are followed every night before bed, the body is signaled that it is time for bed.
- Jotting down notes before bed of things to be remembered or addressed the following day may make staying awake worrying or stressing less likely.

Chapter 4

Recommendation

The RTSD Adolescent Sleep and School Start Time Committee recommends a later school start time at Radnor High School (from 7:35 a.m. to 8:30 a.m.) and a corresponding later school end time (from 2:27 p.m. to 3:04 p.m.)

To accommodate the bus transportation needs at Radnor High School due to this schedule change, the committee recommends a later school start time at Ithan, Radnor and Wayne elementary schools (from 9 a.m. to 9:15 a.m.) and a later school end time (from 3:30 p.m. to 3:45 p.m.).

Section 1

SCHOOL START OPTIONS

IN THIS SECTION

1. Four Options for School Schedule

This report is subject to change at any time based on ongoing discussions and investigation. It is current as of Nov. 15, 2018.

Four high school start time options, and their impact on other RTSD schools, were discussed and considered by the Adolescent Sleep and School Start Time Committee.

See page 28 for a chart providing an overview of the school schedule options.

Option #1: No Change, Increase in Sleep Health Education

No Change to Radnor High School Schedule (7:30 a.m.-2:27 p.m.)
No change to Radnor Middle School schedule (8 a.m.-3 p.m.)
No change to Ithan, Radnor & Wayne elementary schools schedule (9 a.m.-3:30 p.m.)

Option #1 makes no change to the school schedule while taking steps to address student well-being associated with adolescent sleep needs. No changes to school schedules or transportation routes would occur, however all practices for district sports, clubs and activities would be required to take place after school. The district would also reexamine the amount of homework and provide parents information regarding the effects of late-night screen time as well as how to promote healthy sleep habits.

It is important to note that all action items related to increasing wellness education about sleep as listed in Option #1 are also proposed for implementation as part of the other three options.

Pros of Option #1

- No financial impact
- Minimal impact to RTSD sports due to elimination of morning practices to better support sleep health
- No impact on community group usage of athletic fields
- Increased understanding of sleep hygiene and time management

Cons of Option #1

- Does not address adolescent sleep need recommendations as outlined by the Centers for Disease Control and Prevention, the American Medical Association, the American Academy of Sleep Medicine, and the American Academy of Pediatrics

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Option #2: Delay RHS Start Time By 25 Minutes

Resulting Radnor High School Hours: 8 a.m.-2:34 p.m.
No change to Radnor Middle School schedule
No change to Ithan, Radnor & Wayne elementary schools schedule

Option #2, which models a plan implemented by nearby Unionville-Chadds Ford School District beginning the 2017-18 school year, would push the start time for Radnor High School from 7:35 a.m. to 8 a.m., or a delay of 25 minutes.

Due to modifications to Radnor High School's schedule, efficiencies have been identified that would only require the school day to be extended by seven minutes (from 2:27 to 2:34 p.m.) to accomplish a 25-minute later start time. The schedules of the other RTSD schools would not be impacted. Increased costs to the district would be associated with additional buses. A two-tier transportation model may be an option to increase efficiency of secondary bus runs, but the morning private school runs would necessitate additional bus drivers and vehicles.

Pros of Option #2

- Adheres more closely to the recommendations of the CDC, AMA, AASM and AAP
- Minimal impact to RTSD-sponsored sports
- No impact on community group usage of athletic fields

Cons of Option #2

- Negative financial impact of additional school buses and bus drivers.
- Only partially addresses adolescent sleep needs as outlined by the CDC, AMA, AASM and AAP

Option #3: Delay RHS Start Time By 55 Minutes

Resulting Radnor High School Hours: 8:30 a.m.-3:04 p.m.
No change to Radnor Middle School schedule
Resulting Ithan, Radnor & Wayne elementary schools schedule: 9:15 to 3:45 p.m.

Option #3 achieves the 8:30 a.m. high school start time as recommended by major medical organizations by delaying the start time for Radnor High School by 55 minutes.

What About a "Flip?"

When the committee considered Option #3, the idea of "flipping" the current elementary school start time of 8:45 a.m. with the current Radnor High School start time of 7:30 a.m. was discussed. A decision was made that achieving an 8:30 a.m. start time at Radnor High School should not result in the elementary school starting at 7:30 a.m. Rather, the committee agreed, achieving the 8:30 a.m. start at Radnor High School should involve an investigation into a new afternoon bus transportation model for Radnor Middle School and Radnor High School.

While the Radnor High School start time would be delayed to 8:30 a.m., the current Radnor Middle School start time of 8 a.m. would not change. Elementary schools would see a change in their current start times, however, with all schools starting 15 minutes later at 9:15 a.m. and ending 15 minutes later at 3:45 p.m.

Pros of Option #3

- Minimal impact on community group usage of athletic fields with continued support from RHS administration
- Minimal impact on RTSD-sponsored sports practices; RHS administration plans to address impact on athletic competitions
- Fully addresses adolescent sleep needs as outlined by the CDC, AMA, AASM and AAP

Cons of Option #3

- Earlier bus pick-up time for RMS students in the morning
- Private/special education school transportation logistics unknown at this time
- Change in afternoon bus transportation model for RHS and RMS
- Elementary families impacted by later start and end times

Option #4: Delay RHS Start Time By 85 Minutes

Resulting Radnor High School schedule: 9 a.m.-3:34 p.m.
No change to Radnor Middle School schedule
Resulting Ithan, Radnor and Wayne elementary schools schedule:
*A half-hour **earlier** start (from 9 a.m. to 8:30 a.m.) and end (from 3:30 p.m. to 3 p.m.) or a half-hour **later** start (from 9 a.m. to 9:30 a.m.) and end (from 3:30 p.m. to 4 p.m.) to the school day*

Option #4 exceeds the 8:30 a.m. high school start time recommended by major medical organizations. This model would require additional buses and drivers and would cause conflicts for scheduling bus runs with Radnor High School and RTSD elementary schools. Since the Radnor High School day would end at 3:34 p.m. under this option, the impact on high school athletics and community sports groups would be considerable. Academically speaking, student-athletes would likely miss class time regularly to get to competitions on time.

Pros of Option #4

- Exceeds adolescent sleep recommendations

Cons of Option #4

- Loss of instructional time for student-athletes
- Significant impact on RTSD-sponsored sports/athlete academics
- Significant impact on community group usage of athletic fields

Overview of Proposed School Schedule Options

School Schedule Options	Sleep Wellness Education?	Radnor High School Start Time	Radnor High School End Time	Elementary School Start Time	Elementary School End Time	Radnor Middle School Schedule Change?	Additional Buses Needed?	Impact to Radnor High School Sports?	Meets Medical Organizations' Recomms.?
No Change (Option 1)	Yes	7:35 AM	2:27 PM	9 AM	3:30 PM	No	No	No	No
25-Min Delay at RHS (Option 2)	Yes	8 AM	2:34 PM	9 AM *(If two-tier busing model implemented)*	3:30 PM *(If two-tier busing model implemented)*	No	TBD	No	No
55-Min Delay at RHS* (Option 3)	Yes	8:30 AM	3:04 PM	9:15 AM	3:45 PM	No	TBD	Yes, Minimal	Yes
85-Min Delay at RHS (Option 4)	Yes	9 AM	3:34 PM	8:30 AM or 9:30 AM	3 PM or 4 PM	No	TBD	Yes, High	Yes

**Initial recommended schedule from RTSD Adolescent Sleep and School Start Time Committee*

Section 2

STARTING RHS AT 8:30 A.M.

IN THIS SECTION

1. Current Elementary School Schedules
2. Current Radnor High School Schedule
3. Proposed RHS Schedules (8: 30 a.m. Start)
4. Instructional Time Overview

This report is subject to change at any time based on ongoing discussions and investigation. It is current as of Nov. 15, 2018.

As part of the analysis of an 8:30 a.m. start time at Radnor High School, many areas were and will continue to be examined, including Student Learning Time (Instructional Time); Transportation; Clubs, Athletics and Activities; Schedules; Staffing; and Equitable Opportunities.

Under the initial recommendation from the Adolescent Sleep and School Start Time Committee of an 8:30 a.m. RHS start time, RTSD schools would start and end at the following times:

Radnor High School: 8:30 a.m.-3:04 p.m.

Radnor Middle School: 8 a.m.-3 p.m.

Ithan, Radnor & Wayne elementary schools: 9:15 a.m.-3:45 p.m.

2018-19 Elementary School Schedules *(See Page 30)*

Ithan, Radnor and Wayne elementary schools serve approximately 1,650 students in grades K-5. Each building's schedule is organized by grade level. Students in each grade level rotate through "Specials" (Art, Music, Physical Education/Health, Library) and

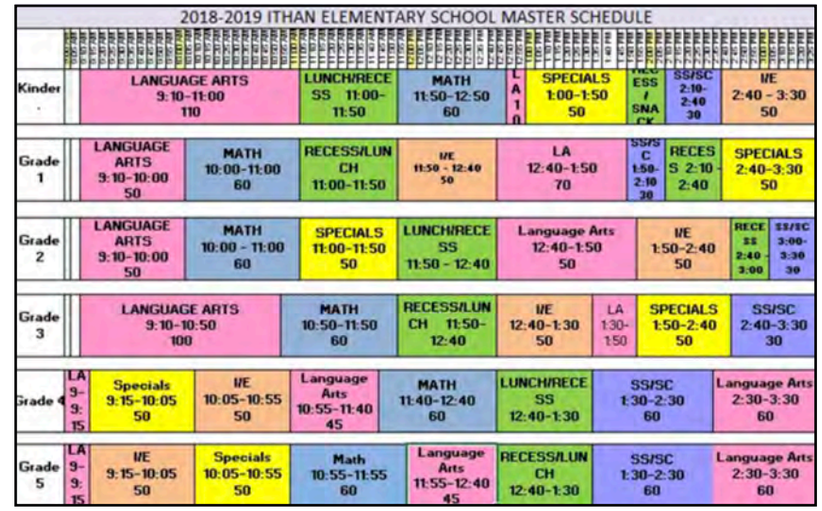
lunch/recess time every week. Students in each grade level also have instructional time in English Language Arts (ELA), Mathematics, Social Studies or Science, and Intervention/Enrichment (I/E) time each day.

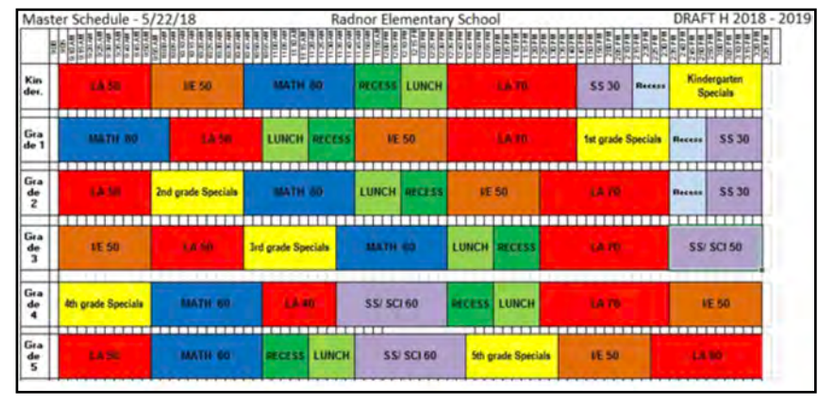
While all three elementary schools would start and end the school day 15 minutes later should the Radnor High School start time be delayed to 8:30 a.m., it is important to note that the structure of the elementary school day would not change.

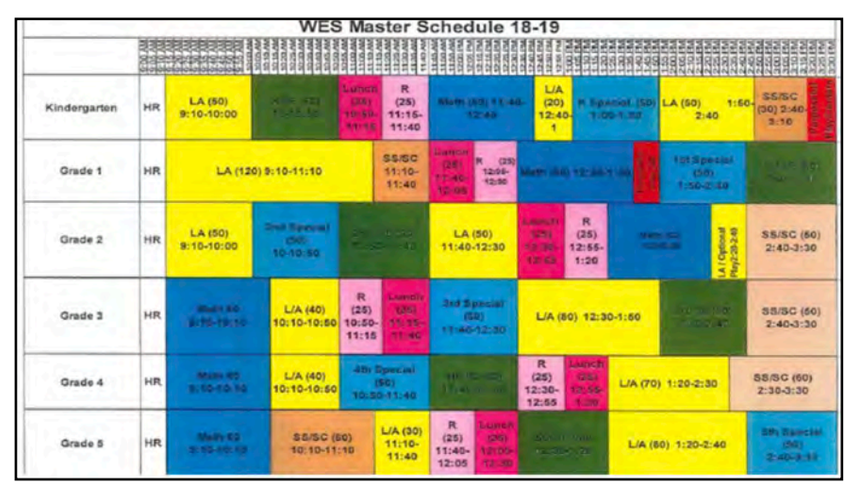
Potential concerns regarding the timing of the last lunch are resolved due to all elementary schools incorporating a snack time for students scheduled for the last lunch of the school day. This is a common practice that is already in place.

As part of the initial recommendation to delay the elementary school start and end times by 15 minutes, it was also recommended for the RTSD Director of Elementary Teaching and Learning to work with the elementary principals, or designee(s), to streamline elementary bell schedules to provide the most efficient use of staff resources for Specials and Intervention/Enrichment (I/E) time. These resources are shared among the three elementary school buildings.

2018-19 Elementary School Schedules







2018-19 Radnor High School Schedule

Radnor High School students may have eight classes on their schedule for the school year, although the required number of classes students must take in any given school year is 6.5. Some classes meet every other day for the school year, or every day for one semester, and are thus deemed half-credit classes.

Students at Radnor High School eat lunch when unassigned 5th or 6th period. For example, a student who has an A5 class would attend class from 10:52-11:33 a.m. If that student was assigned a B6 class, he/she would report to that class from 11:38 a.m.-12:19 p.m. The student would then be unassigned for C and would eat lunch from 12:24-12:54 p.m.

A different student unassigned for A would eat lunch from 10:52-11:22 a.m., then would be assigned classes B5 and 6C. Radnor High School values having lunches begin prior to 1 p.m. to provide the optimum learning experience for the student body.

Radnor High School's current bell schedule runs on a modified block format. On Mondays, Tuesdays, and Fridays, students at RHS have a traditional schedule with 8 class periods that have 41 minutes of instructional time each.

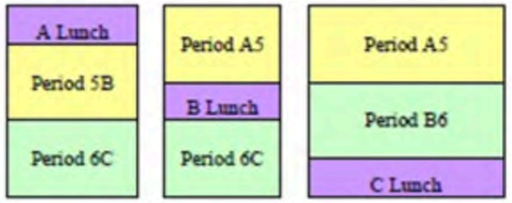
2018-19 School Year Schedule at Radnor High School

RADNOR HIGH SCHOOL
BELL SCHEDULE
8 BLOCK DAYS (M, T, F)

8 Period Days (Mondays, Tuesdays, Fridays)

	Begin	End
HR	7:35 AM	7:44 AM
Period 1	7:48 AM	8:29 AM
Period 2	8:34 AM	9:15 AM
Period 3	9:20 AM	10:01 AM
Period 4	10:06 AM	10:47 AM
A	**10:52 AM**	11:22 AM
Period 5	11:27 AM	11:33 AM
B	11:38 AM	12:08 PM
Period 6	12:13 PM	12:19 PM
C	12:24 PM	**12:54 PM**
Period 7	**12:59 PM**	**1:40 PM**
Period 8	**1:45 PM**	**2:27 PM**

On 8 period days, lunch is assigned and appears on student schedules.

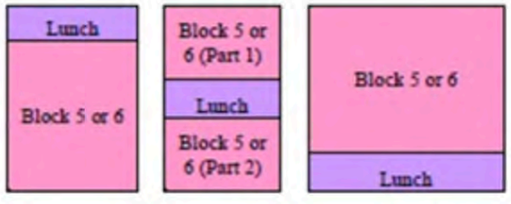


BOLD times indicate when bells will ring

4 Period Days (Wednesdays, Thursdays)

	Begin	End
HR	7:35 AM	7:44 AM
Block 1 or 2	7:48 AM	9:08 AM
Community Pd.	9:13 AM	9:38 AM
Block 3 or 4	9:43 AM	11:03 AM
A	**11:08 AM**	11:38 AM
Block 5 or 6	11:42 AM	11:46 AM
B	11:50 AM	12:20 PM
Block 5 or 6	12:24 PM	**12:28 PM**
C	12:32 PM	**1:02 PM**
Block 7 or 8	**1:07 PM**	**2:27 PM**

On block days, 5th or 6th period classes will be designated for specific lunches.



BOLD times indicate when bells will ring

On Wednesdays and Thursdays, RHS students have a block schedule with 4 classes that have 80 minutes of instructional time each. On Wednesdays, students go to their odd class periods (1, 3, 5, 7) and on Thursdays students attend their even class periods (2, 4, 6, 8).

These block days afford teachers the opportunity to provide unique learning experiences for students, such as having in-class debates, bringing in guest speakers, facilitating science labs, and more.

Also, unique to Block Days is Community Period. Community Periods provide two, 25-minute periods per week for various meetings to occur, tutoring to take place, and for club meetings, activities and grade-level assemblies to be held.

Several changes are proposed for the high school's schedule.

8 Period RHS Schedule If 8:30 AM Start Time

To achieve an 8:30 a.m. high school start time while lessening the impact on after-school sports and the community's use of Radnor High School facilities, the RHS schedule was closely analyzed for efficiencies. As a result, passing time between classes is proposed to be shortened by one minute, from five minutes to four. Homeroom time is also proposed to be eliminated. Considered non-instructional time, homeroom time is not able to be counted toward the required school hours in the PA School Code under §51.61, Instructional School Day and School Year. Eliminating homeroom would also eliminate one passing transition from homeroom to first period. Additional time would be added to eighth period to account for early dismissals for athletic events.

With the elimination of homeroom, a link to the video of morning announcements would be provided via the RHS Learning Management System, Schoology, which would allow students to watch during the school day when their time allows. Morning announcements would also loop on the television in the cafeteria throughout the school day. Distribution of any forms, passes or other materials to students would be done in a student's first period classes. For 15-20 minutes prior to the start of first period, the Emotional Support room would be staffed by a Special Education teacher to provide both drop-in and regularly scheduled check-ins for students who may benefit from a more structured start to their school day.

8 Period RHS Schedule If 8:30 a.m. Start Time and Earlier Lunches

RADNOR HIGH SCHOOL
ALTERNATE BELL SCHEDULE (earlier lunches)
8 Period Days (Mondays, Tuesdays, Fridays)

	Begin	End
Period 1	8:30 AM	9:11 AM
Period 2	9:15 AM	9:56 AM
Period 3	10:00 AM	10:41 AM
A	**10:45 AM**	11:15 AM
Period 4	11:19 AM	11:26 AM
B	**11:30 AM**	12:00 PM
Period 5	12:04 PM	12:11 PM
C	**12:15 PM**	**12:45 PM**
Period 6	12:49 PM	1:30 PM
Period 7	1:34 PM	2:15 PM
Period 8	2:19 PM	3:04 PM

On 8 period days, lunch is assigned and appears on student schedules

A Lunch	Period A5	Period A5
Period 5B	B Lunch	Period B6
Period 6C	Period 6C	C Lunch

BOLD times indicate when bells will ring

The only difference between the above and previous schedules for Mondays, Tuesdays, and Fridays is that the above schedule moves lunches forward. This "earlier

lunches" schedule modifies the current A5, 5B, B6, 6C schedule to an A4, 4B, B5, 5C plan. RHS administration recommends this alternate bell schedule in place of the previous A5, 5B, B6, 6C model.

4 Block RHS Schedule If 8:30 a.m. Start Time

RADNOR HIGH SCHOOL
BELL SCHEDULE
4 Block Days (Wednesdays, Thursdays)

	Begin	End
Block 1 or 2	8:30 AM	9:50 AM
Block 3 or 4	9:54 AM	11:14 AM
A	**11:18 AM**	11:48 AM
Block 5 or 6	11:52 AM	11:57 AM
B	12:00 PM	12:30 PM
Block 5 or 6	12:33 PM	**12:38 PM**
C	12:42 PM	**1:12 PM**
Block 7 or 8	1:16 PM	2:41 PM
Community Pd.	2:45 PM	3:04 PM

On block days, 5th or 6th period classes will be designated for specific lunches.

BOLD times indicate when bells will ring

Like the previously proposed 8 Period schedules, the above 4 Block schedule on Wednesdays and Thursdays also eliminates homeroom. However, distinct to this schedule is the placement of Community Period. For the 2018-19 school year, Community Period falls between Blocks 1 and 3 on Wednesdays and between Blocks 2 and 4 on Thursdays. This proposed schedule shortens Community Period by six minutes and moves it to the end of the school day to mitigate lost class time due to early dismissals for athletic events.

Instructional Time

The 1949 Pennsylvania School Code sets forth the required instructional time for public schools in the state under §51.61. Instructional School Day and School Year.

Per PA School Code, the minimum length of an instructional school day by grade level is:

1. **Nursery school: 2 hours**
2. **Kindergarten: 2.5 hours**
3. **Grades 1-8: 5 hours**
4. **Grades 9-12: 5.5 hours**

Further, "in grades K-12, schools shall be in session a minimum of 180 days of instruction or the equivalent clock hour requirement, with prior approval of the Board. Upon request, the Board may, when a meritorious educational program warrants, approve a school year containing a minimum of 990 secondary or 900 elementary hours of instruction as the equivalent of 180 school days."

RHS Instructional Time Calculations

Mondays, Tuesdays and Fridays

- 332 instructional minutes per day x 3 days per week=
  996 instructional minutes on M, T, F

Wednesdays and Thursdays

- 344 instructional minutes per day x 2 days per week=
  688 instructional minutes on W, Th

Totals

996 instructional minutes (M, T, F) + 688 instructional minutes (W, Th)=

1,654 instructional minutes per week

1,654 instructional minutes per week/5 days per week=

330.8 average instructional minutes per day

330.8 average instructional minutes a day x 180 school days a year=

62,852 instructional minutes per school year

62,852 instructional minutes/60 minutes per hour=

1,047.5 instructional hours per school year

Instructional Time Conclusion

Modifications to the Radnor High School schedule to achieve an 8:30 a.m. start time fall in line with state requirements for instructional time. Radnor High School's new schedule would afford students 6.5 hours per day for instructional time per school day, exceeding the 5.5-hour state requirement. In an academic year, students will exceed the 990 hours of state-required instructional time.

Section 3

TRANSPORTATION

IN THIS SECTION

1. **Morning Bus Transportation (8:30 a.m. RHS Start)**
2. **Afternoon Bus Transportation (8:30 a.m. RHS Start)**
3. **Morning and Afternoon Student Supervision**
4. **Bus Safety in the Afternoon**

This report is subject to change at any time based on ongoing discussions and investigation. It is current as of Nov. 15, 2018.

Transportation logistics remain a major topic of discussion and investigation. In addition to transporting RTSD students, the district's bus fleet transports hundreds of private school students each day.

Proposed MORNING Transportation Model: 8:30 a.m. RHS Start

The current morning bus transportation model at Radnor Township School District involves the pick up of Radnor High School and private school students first followed by a drop-off at RHS. Students are then picked up and dropped off at Radnor Middle School and St. Katharine's. Finally, elementary school students are picked up and transported to their respective schools. A new transportation model would need to be put in place to accomplish an 8:30 a.m. start time at RHS.

RTSD Elementary, Middle and High Schools

7 – 7: 45 a.m.
Begin picking up RMS and St. Katharine's students (17 buses needed)
Proposed RMS start time of 8 a.m.

7:50 – 8:15 a.m.

Begin picking up RHS students (21 buses needed)

Proposed RHS start time of 8:30 a.m.

8:25 – 9 a.m.

Begin picking up students for RTSD elementary schools (27 buses needed)

Proposed elementary start time of 9:15 a.m.

Private Schools and Special Needs Schools

6:45 – 7:15 a.m.

Pick up private school students throughout RTSD

Meet at Radnor High School for necessary transfers

7:15 – 8 a.m.

Transport students to private schools (10-12 buses needed)

7:15 – 9 a.m.

Transport students to special needs schools (14 buses needed)

AFTERNOON Transportation Model: 8:30 a.m. RHS Start

The current afternoon bus transportation model at RTSD involves the pick up of RHS students first, followed by the drop-off at their bus stops. Students are then picked up from Radnor Middle School and taken to their bus stops. Finally, elementary school students are picked up at each school and transported to their respective bus stops.

Length of Time of Bus Rides for Students Each Afternoon

	SHORTEST RIDE	LONGEST RIDE	**AVERAGE**
55-Minute Later RHS Start*	31 minutes	44 minutes	**37.6 minutes**

Should an 8:30 a.m. start time be implemented at Radnor High School, RHS and Radnor Middle School would both dismiss at or near 3 p.m. (3 p.m. at RMS and 3:04 p.m at RHS). Due to this close proximity in dismissal times, a new afternoon bus transportation model would need to be implemented.

This new proposed afternoon bus transportation is admittedly a work in progress and requires additional study and evaluation. As it currently stands, the new model proposes that half of the buses pick up RHS students at 3 p.m. and half of the buses pick-up RMS students at 3 p.m. The buses that started at RMS would then travel to RHS and pick-up RHS students, before departing to take students home. Likewise, the buses that started at RHS would travel to RMS to pick up the remainder of the students at RMS, before taking students home.

**Projected based on a sample size of anticipated bus routes.*

The additional time for the bus runs under this model would be longer, however the district is investigating ways to mitigate some of the time by the increasing the efficiency of the bus trips.

Private Schools and Special Needs Schools

This is a main area of investigation that is still in progress. A more detailed routing plan with associated costs is scheduled to be presented in February/March 2019.

RTSD Elementary, Middle and High Schools

3 – 3:09 p.m.

Begin picking up at RMS and RHS (22 buses needed)

Proposed RMS dismissal time: 3 p.m.

Proposed RHS dismissal time: 3:04 p.m.

3:20 – 3:27 p.m.

Buses that left RHS arrive at RMS and vice versa to finish picking up students, then depart to take them home.

3:50 p.m.

Begin picking up students from IES, RES and WES (27 buses needed)

Proposed IES, RES and WES dismissal time: 3:45 p.m.

Morning and Afternoon Supervision of Students at RMS

For the 2018-19 school year, the first bus typically arrives at RMS around 7:40 a.m. and the last bus usually arrives around 7:56 a.m. Students who arrive on the first fleet of buses go to the cafeteria until 7:50 a.m. to socialize with their peers in a supervised setting. At 7:50 a.m., students are dismissed to their lockers. The bell rings at 8 a.m. for students to begin their advisory period.

Teachers' hours at RMS are from 7:35 a.m. to 3:05 p.m. Teachers assist with supervising bus arrival and dismissal. The teaching staff can only leave after the buses have departed for the day. Teaching support staff (paraeducators) finish their workday at 3 p.m. and do not assist with supervision of arrival or dismissal.

To ensure proper supervision of students, RMS administration has the option of staggering start times for RMS faculty and staff. Radnor High School currently employs this practice. Secretarial staff start and end times are staggered to ensure coverage both before and after school. The first secretarial staff member arrives at RHS at 6:15 a.m. and ends the work day at 2:45 p.m. The last secretarial staff member arrives at 8 a.m. and ends the work day at 4:30 p.m.

Radnor High School teachers also stagger their start times. Some begin their work day at 7:15 a.m. and end at 2:45 PM, while others begin at 7:30 a.m. and end at 3 p.m. This practice allows many teachers the ability to schedule time to meet with students for extra

help before or after school. The Math Department in particular uses this model to provide assistance before and after school in the Math Center.

According to estimates regarding the length of time it would take to complete the morning bus trips should RHS adopt an 8:30 a.m. start time, the first buses may arrive at RMS as much as five minutes earlier than they currently do (7:35 a.m. versus 7:40 a.m.). Again, RMS teachers begin the work day at 7:35 a.m. For the 2018-19 school year, RMS teachers are also assigned cafeteria coverage as a morning duty.

To ensure sufficient student supervision at RMS in the morning and afternoon, it is recommended that administration work with the Radnor Township Education Association (RTEA) to stagger teacher start and end times to provide adequate student supervision in the mornings and afternoons of the student day. For example, half of the RMS teaching staff could start their work day at 7:30 a.m. and end at 3 p.m., while the other half could begin at 7:50 a.m. and end at 3:20 p.m. Should obstacles to faculty supervision of RMS students become apparent, paraeducators could be used to provide supervision of RMS students before and after school.

Morning and Afternoon Supervision of Students at RHS

For the 2018-19 school year, the first bus arrives at RHS at approximately 7:03 a.m. and the last bus around 7:18 a.m. Many of the students who arrive on the first fleet of buses go to the cafeteria to enjoy breakfast and socialize. The cafeteria is supervised by an RHS administrator. Students may also go to the library or the Quiet Study Area in the International Café. They can also converse with friends in the auditorium lobby or meet with teachers for extra help before school. The bell rings at 7:30 a.m. for students to begin moving to their homerooms.

As reviewed previously, teachers' hours at RHS are begin at 7:15 a.m. and end at 2:45 p.m. or begin at 7:30 a.m. and end at 3 p.m. Teachers at RHS are assigned duties, however none take place before 7:30 a.m. or after the school day ends at 2:27 p.m.. Paraeducators end their work day at 2:30 p.m. and do not assist in supervision of students during arrival or dismissal.

Should the proposed schedule for RHS be 8:30 a.m. to 3:04 p.m., the first buses are anticipated to arrive at RHS around 8:15 a.m. Radnor High School administration would continue to provide supervision in the cafeteria. The teacher work day would continue to be staggered.

Bus Safety in the Afternoon

The adoption of a new afternoon bus transportation model would combine the afternoon bus pick-ups for RHS and RMS. This model is used in many school districts nationally and locally, including Garnet Valley, Great Valley, Owen J. Roberts, and Unionville-Chadds Ford.

Some benefits of this model include a more efficient transportation structure, a reduction in the number of buses needed, and a shortening of the number of stops on a bus route.

There is a valid concern regarding the potential for negative interactions between middle and high school students on the bus. It is important to note that a number of Radnor Township elementary and middle school students who attend private schools currently ride the bus with RHS students in the morning and get dropped off at RHS to transfer onto other buses to their private schools. This busing structure has worked for some time without issue.

Still, other districts that utilize this afternoon bus transportation model take a number of steps to prevent and combat negative behavior on the bus, such as having middle school students sit in the front half of the bus and high school students in the back. In some districts, a bright yellow line is taped to the floor at the midpoint of the bus.

Bus drivers are provided professional development every 12 to 24 months on bullying prevention, identification and intervention. The National Association for Pupil Transportation has free comprehensive training materials available for school districts. RTSD bus drivers already get Safe Schools training, which contains a module on anti-bullying. Cameras will continue to be utilized on the buses and existing signage will be featured to let students know that cameras are active on each bus. Bullying is also expressly addressed in official district policies and in each school's student handbook.

Radnor Township School District should include survey questions about bus conduct/bullying/student overall bus experience this school year (2018-19) to gather baseline data from students and bus drivers. Surveys at the mid-point, and again at the end of next school year (2019-20) would provide valuable feedback as to student experiences. This data could be used to gauge whether the current measures are working. In cases where specific buses have high instances of student conflict, other districts have utilized bus aides to monitor student behavior. This measure could be implemented if the surveys in 2019-20 warrant an adult presence on a particular bus.

Section 4

CLUBS, ATHLETICS & ACTIVITIES

IN THIS SECTION

1. Elementary Clubs and Activities
2. RMS Athletic Practices and Competitions
3. RHS Athletic Practices and Competitions

This report is subject to change at any time based on ongoing discussions and investigation. It is current as of Nov. 15, 2018.

Athletics and extracurricular activities are an important aspect of a student's life. When considering an 8:30 a.m. start time at RHS, the impact on sports and clubs was carefully considered.

Elementary School Clubs and Activities

Ithan, Radnor and Wayne elementary schools each offer before- and after-school clubs and activities that would not be impacted by starting and ending the school day 15 minutes later.

Radnor Middle School Athletic Practices and Competitions

The proposed 8:30 a.m. start time at RHS would not result in a change to Radnor Middle School's current daily schedule (8 a.m. to 3 p.m.). Thus, the only impact to RMS sports' practices/games would be if coaches were employees at RHS. These employees would have their start and end times adjusted to ensure they were able to complete their job functions at RHS and get to practices at RMS in time.

Radnor High School Athletic Practices and Competitions

Through an examination of practice schedules in recent history, most sports teams do not hold practices prior to the start of the school day. An exception is the RHS swimming and diving team. To improve student sleep, regardless of which option is chosen to address adolescent sleep needs, all morning practices are recommended to be eliminated for RHS sports, clubs and activities.

By finding efficiencies in the Radnor High School schedule, delaying the RHS start time to 8:30 a.m. only requires the end of school to be pushed back by 37 minutes (from 2:27 PM to 3:04 PM). After-school practices would begin as soon as classes are over, essentially delaying practice schedules by approximately 37 minutes.

Radnor High School belongs to the Central Athletic League (CAL), which has standardized competition start times. However, the home team maintains purview over its facilities. Most athletic contests begin at 3:45 p.m., but home teams may move games earlier or later for a variety of reasons, including field conditions.

All of the schools in CAL value instructional time and work diligently to ensure that students do not miss class. Currently, students depart RHS at 2:35 p.m. for a 3:45 p.m. contest. Radnor High School has requested that CAL explore moving all start times from 3:45 to 4 p.m.

Under the 8:30 a.m. start time, RHS student-athletes would be dismissed from classes at 3 p.m. (four minutes early) for athletic contests to minimize the loss of instructional time and not impact their arrival at a contest and associated warm-up time. To account for lost instructional time, the last period of each 8-Period day would be extended by four minutes and 4-Block days would end with Community Period. A 15-minute delay in competition start times should also allow schools to hold all scheduled games with their existing field space.

Baseball and Softball

Varsity: 3:45 p.m. start time, 22 games (Softball has occasional night games)

Junior Varsity: 3:45 p.m. start time, 22 games

9th Grade: 3:45 p.m. start time,14 games

Basketball (Boys and Girls)

Varsity: 7 p.m. start times

Junior Varsity: 5:30 p.m. start times

9th Grade: 3:45 p.m. start times

Cheerleading

Varsity: All Friday night events

Junior Varsity: 3:45 p.m. for home JV games, approximately 6 per year

Crew (Boys and Girls)

Fall Crew

Boys and girls practice Tuesdays, Wednesdays and Thursdays, 3-5 p.m.

Winter Crew

Boys team practices at RHS

Girls team practices at the Boathouse Tuesdays, Wednesdays and Thursdays

Spring Crew

Boys and girls practice Tuesdays, Wednesdays, Thursdays and Fridays, 3-5 p.m.

Practice on Saturdays and meets on Sundays

Cross Country (Boys and Girls)

8 after school meets that start at 4 p.m.

Diving and Swimming (Boys and Girls)

20 after school meets that start at 3:45 p.m.

Field Hockey

Varsity: 3:45 p.m. start time,18 games

Junior Varsity: 5 p.m. start time, 18 games

Junior Varsity B: 3:45 p.m. start time, 12 games

Football

Varsity: All games on Friday nights at 7 p.m.

Junior Varsity: 3:45 p.m. start times on Monday afternoons,10 games

9th Grade-: 3:45 p.m. start on Thursday afternoons, 7-9 games a season

Golf

Varsity and Junior Varsity: 18 matches that start at 3 p.m. or 3:30 p.m.

Note: Start times are determined by the golf course or country club. Early dismissals may be unavoidable. As many contests as possible should be scheduled for Wednesdays and Thursday to take advantage of the Community Period time.

Ice Hockey (Boys and Girls)

Ice Hockey start times vary, but games are in the evening. Practices, however, and ice time for these practices, are right after school in West Chester, typically twice a week. For the 2018-19 school year, ice times for practices for our two teams are:

- Boys: Sundays, 7:10-8:10 p.m. and Wednesdays, 3:25-4:40 p.m.
- Girls: Tuesdays, 3:30-4:30 p.m. and occasionally Sundays, 5:10-6:10 p.m.

Finding ice time that would account for the delay in the high school's schedule may result in higher costs, and/or different availability of practice time. However, if this proves to be a significant obstacle, practices should look to be scheduled for Wednesdays and/or Thursdays. Students who participate in Ice Hockey could be dismissed at the conclusion of their last period (2:41 p.m.), meaning students would only miss Community Period to ensure they get to the rink on time.

Indoor Track (Boys and Girls)

Most Indoor Track meets take place on Saturdays

Boys Lacrosse

Varsity: 18 games, with 10 starting at 7 p.m. and remaining starting at 3:45 p.m.

Junior Varsity: 18 games, 10 of them starting at 5 p.m.

Junior Varsity B: 12 games starting at 3:45 p.m.

Girls Lacrosse

Varsity: 18 games with the majority starting at 3:45 p.m.

Junior Varsity: 18 games starting at 5 p.m.

Junior Varsity B: 12 games starting at 3:45 p.m.

Boys Soccer

Varsity: 18 games with about 6 starting at 3:45 p.m.; others at 7 p.m.

Junior Varsity: 18 games with about 6 starting at 3:45 p.m.; others at 5:30 p.m.

9th Grade: 10 games all starting at 3:45 p.m.

Girls Soccer

Varsity: 18 games, with majority starting at 3:45 p.m.

Junior Varsity: 18 games, with majority starting at 3:45 p.m.

Junior Varsity B: 10 games all starting at 3:45 p.m.

Squash

Competitions are scheduled with both public and private schools, and currently start between 3 and 4:30 p.m. depending on location. Practices are right after school at Fairmount.

Tennis (Girls in the Fall; Boys in the Spring)

Varsity and Junior Varsity: 18 matches, all starting at 3:45 p.m.

Track and Field (Boys & Girls)

10 after-school meets that start at 3:30 or 3:45 p.m.

Volleyball

Varsity: 18 matches starting at 3:45 p.m. with an occasional night game

Junior Varsity: 18 matches that start right after Varsity match

Wrestling

All wrestling matches start at 7 p.m. during the school week

Section 5

COMMUNITY YOUTH SPORTS

IN THIS SECTION

1. Minimal Impact on After-School Community Activities

This report is subject to change at any time based on ongoing discussions and investigation. It is current as of Nov. 15, 2018.

After School Community Activities and Youth Sports

The impact on community sports and activities due to a delayed start will be minimal. On competition days, games will be delayed by 15 minutes from their current start times. Practices for RHS sports teams would be delayed by approximately 37 minutes. Currently on practice days, fields are reserved for RHS athletics until 5:30 p.m. or 6 p.m., depending on the day and field. A transition period of 15 minutes falls between the end of high school athletic practices and the start of community/youth practices.

The groups with the most significant and recurrent field usages in the fall are Wayne Youth Football, Radnor Youth Lacrosse, and the Radnor Soccer Club. While field usage would be pushed back to 6:30 p.m. and 6:45 p.m., respectively, the goal of having all teams completed with their practices before 9:30 p.m. could be met a number of ways. Youth groups could increase the number of teams they schedule to practice on Encke and Prevost fields. Currently, groups do not fully use the entire field space on Prevost and Encke fields every night they have reserved the respective turfs.

Section 6

OTHER CONSIDERATIONS

THIS THIS SECTION

1. Elementary Before and After School Care
2. Technical School Considerations
3. Staff and Faculty Contractual Days

This report is subject to change at any time based on ongoing discussions and investigation. It is current as of Nov. 15, 2018.

Elementary Before and After School Care

The three elementary schools in the Radnor Township School District have similar drop-off procedures in the morning. Ithan Elementary School serves as an exchange center for private and parochial school students. Buses arrive as early as 8:12 a.m. to bring non-Radnor students to IES for Delaware County Intermediate Unit (DCIU) programming. These buses are owned by a number of other school districts and the students they transport are not Radnor residents and are supervised by the DCIU.

Currently, all three of RTSD's elementary schools have buses that begin arriving at each school around 8:40 a.m. Each school ensures faculty and staff supervise the arrival of buses and safety of students. Faculty and staff assist with getting students off the buses and out of cars in the morning and guide them into the school. Buses finish drop off at each school a few minutes before school begins at 9 a.m.

Teachers' work day at all three elementary schools begins at 8:15 a.m. and ends at 3:45 p.m. Elementary teachers typically have meetings scheduled prior to students arriving at school. Students are permitted in each school building at 8:45 p.m. and parent drop-off for students who do not ride the bus typically begins at 8:45 a.m. Paraeducators at the

three elementary schools begin their work days at 8:45 a.m. and end at 3:45 p.m.

Currently, each elementary school provides before- and after-school care for families through the outside agency Family Support Services (FSS). Families may elect, at their own expense, to obtain before and/or after-school care through FSS.

Before school care through FSS runs from 7:30 to 9 a.m. and after school care runs from 3:30 to 6 p.m. Family Support Services caps their program based on space availability and staffing constraints. Schools also have before- and after-school clubs and activities students can join.

The RTSD Adolescent Sleep and School Start Time Committee recommends the district revisit its current agreement with FSS to expand the number of students who can be served and extend the duration of before school care by 15 minutes with the understanding that parents may need to absorb additional costs.

Technical School Considerations

Each year, approximately 25 Radnor High School students attend Delaware County Technical Schools (DCTS). DCTS boasts 21 programs including, but not limited to, Construction Technology, Culinary Arts, Engineering and Computer Science, Health and Biosciences, and Hospitality Services. Campuses are located throughout Delaware County in Aston, Folcroft, and Marple. The start times for the morning sessions for these schools range from 7:45 a.m. to 10:30 a.m.

All schools in Delaware County are permitted to send their students to either session. Most students at Radnor High School elect to go in the morning session, although some students do attend the afternoon sessions.

Morning Delaware County Technical School Sessions

Currently, the majority of RHS students who attend Delaware County Technical Schools (DCTS) go to 10 a.m. session versus the 1 p.m. session. These students are picked up at the same time with their peers who attend RHS full time and transported to their DCTS programs.

The Medical Careers program is a unique program not housed at the DCTS campuses. Instead, students go to Bryn Mawr or Lankenau Hospitals from 6:45 to 8:45 a.m. Afternoon sessions of Medical Careers are available.

Afternoon DCTS Session Considerations

- Afternoon Medical Careers is 11:45/12 p.m. to 1:45/2 p.m.
- DCTS' Afternoon Session Runs from 11:30 a.m. to 2:15 p.m.

- General Construction (Skill Start Building Trades) is only held in the morning at Folcroft. No RHS student currently participates in this program.

- Emergency Services - EMT is only held in the morning at Folcroft. Currently, one RHS senior is participating in this program.

Chester County Intermediate Unit Pickering Campus Programs

A small number of Special Education students attend the Chester County Intermediate Unit's Technical College High School program at the Pickering Campus. The Day at Pickering begins at 7:45 a.m. and ends at 10:12 a.m. Students depart Pickering to return to RHS at approximately 10:40 a.m. There are also afternoon programs.

Scheduling for DCTS and Cat-Pickering Students

The RTSD School Board requires that students must earn 22.5 credits to graduate. Students must earn credits in the following areas to be eligible for a diploma:

- 4 credits in English
- 3 credits in Social Studies
- 3 credits in Mathematics
- 3 credits in Science (Biology, Chemistry, and Physics)
- 2 credits in Arts and Humanities
- 2 credits in Physical Education
- 1 credit in Health
- .5 credit in Technology or Business

Students at Radnor High School do not begin attending programs at DCTS or Cat-Pickering until their sophomore year at the earliest. A mock schedule was created to ensure that Radnor students who wish to participate in DCTS or Pickering campus programs would be able to earn the credits necessary to graduate with their peers.

Faculty and Staff Contractual Days

No provisions in the employee Collective Bargaining Agreements explicitly state the start and end times for RTSD schools.