

The Z-Factor Program: A National Science Foundation Curriculum Development Project

University of Arizona, College of Education
Catalina Foothills School District

About the Z-Factor Program?

- The National Science Foundation's Innovative Technology Experiences for Students (ITESS) program supports research and development of innovative and engaging models for K-12 students;
- The Z-Factor Program is a program developed by UA researchers with funding from NSF to engage students in science, technology, engineering, art, and math (STEAM);
- The Z-Factor is a novel science-based curriculum based on sleep science



Meet the Partners

- University of Arizona (UA)
- Catalina Foothills School District (CFSD)
 - Charlotte Ackerman, CFSD Teacher Leader for Science and Engineering Practices, District Liaison
- Biological Sciences Curriculum Study (BSCS)
- Science and Math Performance Improvement (SAMPI)



Partners continued

- Southern Arizona Regional Science and Engineering Foundation (SARSEF)
- Philips Respironics
- CogState
- And YOU—the families!!!

Meet the Faculty Collaborators

Dr. Michelle Perfect,
University of Arizona



Dr. Janet Roveda
University of Arizona
CFSD Parent



Dr. Graciela Silva
University of Arizona



Dr. Stuart Quan
Harvard Medical School



Project Assistants

- | | |
|-------------------|----------------|
| ➤ Megan Beardmore | ➤ Joshua Jewel |
| ➤ James Geiger | ➤ Elaine Acuna |
| ➤ Estrella Ochoa | ➤ Sarah Azhar |
| ➤ Ao Li (Leo) | ➤ TJ Ford |
| | ➤ Joe Graham |

Why Study Sleep?

- Studies show that good sleep is needed for good health and learning;
- Kids with insomnia have greater school and behavioral problems;
- Observations made by teachers, counselors, and health aides show that students regularly come to school tired;
- Sleep duration decreases as youth move into middle school, yet research shows their sleep need does not decrease
- Researchers are investigating ways to improve sleep habits in youth



Z-Factor's Goals: Sleep to Enhance Participation in STEM (STEPS)

- Increase elementary students' STEAM skills and interests;
- Increase parent involvement in supporting STEAM skills, attitudes, and careers;
- Engage students in using new tools and technologies;
- Improve sleep as a way to decrease learning and behavioral disruption in schools.

People remember:

- 10% of what they read
- 20% of what they hear
- 30% of what they see
- 50% of what they see & hear
- 70% of what they say & write
- 90% of what they do

People are able to:

Define, List, Describe, Explain

Demonstrate, Apply, Practice

Analyze, Define, Create, Evaluate

Passive Learning

Active Learning

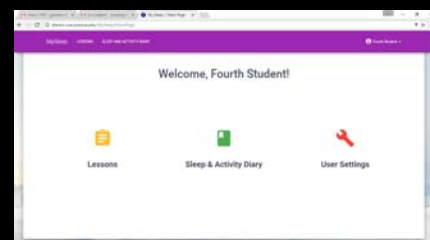
Curriculum for Z-Factor

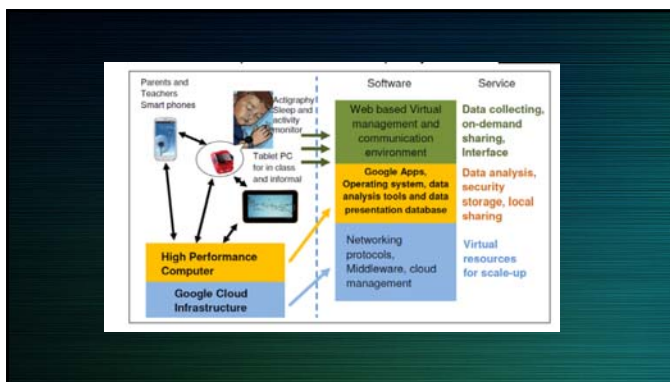
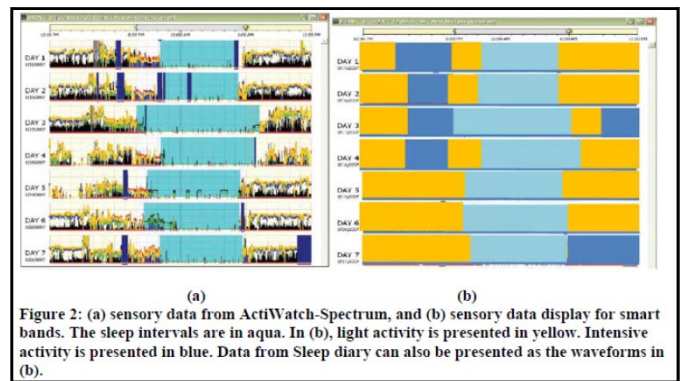
- Pre-assess what students know about sleep;
- Teach students how to measure their own sleep, areas impacted by sleep, and how to analyze the data;
- Teach physiological processes of sleep (biological clock, brain, etc.), factors that affect sleep, and sleep's impact on memory, learning, and health;
- Help students develop hypotheses about relations with sleep and other factors (e.g., T.V. viewing time and sleep duration in 4th grade; sleep duration and performance on memory tasks in 5th grade);
- Help students refine experimental design for student sleep research projects and how to analyze experimental data with students to draw conclusions;
- Assess students' learning to evaluate effectiveness of the curriculum on student learning, attitudes towards science, and sleep behaviors.

Planned Activities

- 5E Instructional Model: Engagement, Exploration, Explanation, Elaboration, Evaluation
- Learning what sleep is and why we need it
 - 4th Grade
 - Interviewing an adult on sleep (4th grade)
 - Functions of sleep stories
 - Animal Sleep
 - 5th Grade
 - Sleep in the News
 - Exploring research on the effects of sleep
- All students
 - Recording data via Actigraphy watch

Student Portal





Creating Skills for the Real World

Many of the skills and tools your child will learn through the Z-Factor program can be transferred and utilized in the real world!

- Data collection and analysis,
- Understanding and using different types of technology,
- Solving real world issues that benefit themselves and society,
- Making STEM fun!



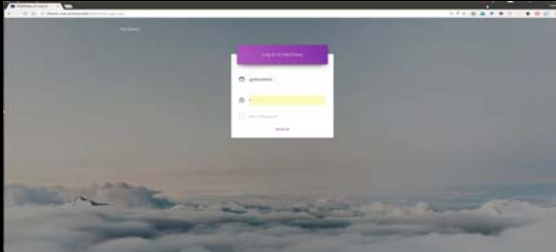
Parents' Roles

- Participate in surveys about your involvement in your child's schooling, your perception of your child's engagement in school, and your reports of your child's sleep health
 - Your participation is critical—we value your mindful responses!
- Engage with your child on "Taking It Home" activities
- Encourage your child to collect new data to answer a testable question (5th grade)
- Assist your child with refining their science project

Parent Portal



Video Demo of Linking Your Child's Account



Parent Evaluation

- You will receive a link in your email inviting you to participate in the evaluation at two time points
- By the end of next week
 - 5th grade: Complete by January 25th
 - 4th grade: Complete by February 6th
- The week of March 26
- Once you click on the link, there will be about four questionnaires in your "queue"

Parent Evaluation continued

- Once you complete each form, you will see a checkmark showing it was completed
- You will receive an email confirmation indicating you have completed
- Complete one set of forms per child
- Email us with any questions!!!

Student Evaluation

- Developing scientific investigations that all students conducted
 - How students' designed investigations
 - What data was collected
 - The role of teachers and parents/ guardians in their science learning and sleep habits
- Online surveys
 - Sleep: Quality of sleep, Quantity of sleep, Sleep habits
 - STEM Interest and Skills
 - Student engagement

Security

- We do not store users' username and password together;
- All users' password are encrypted in the database;
- Will not save users' sensitive information in our web server, such as birthday, home address, phone numbers;

Questions?