

# Exploring Sleep, Engaging Minds

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## INTRODUCTION

Our society is sleep deprived and this problem is getting worse! Sleep deprivation is a common condition that afflicts 47 million American adults, or almost a quarter of the adult population. Long term sleep deprivation symptoms in teens and adolescents can interfere with memory, energy levels, mental abilities, and emotional mood. To address this capacious issue, freshmen and sophomore students at Kapi'olani Community College enrolled in two SENCERized courses in the Spring 2007. Students were exposed to and participated in research on sleep aids and sleep disorders, age variability on circadian rhythms, and stress and sleep efficiency. Learning gains were evident on ten items in the SENCER SALG Post-test.

## SENCERIZED COURSES

**Science of Sleep - Hervé Collin**  
**Human Development - Veronica Ogata**

Kapi'olani Community College courses in Sleep Science and Family Resources (Human Development) joined forces in Spring 2007, to incorporate new strategies focusing on sleep across the human life span. The combined courses focused on sleep processes and issues for children, adolescents, teenagers, working adults, and the elderly. The intent was to integrate the active learning available in the new STEM Learning Center with community-based service-learning and undergraduate research experiences that have strong, positive **STUDENTS LEARNING OUTCOMES**

Upon completion of this course, students are able to:

- ✓ identify and relate common topics and current issues in sleep science and human development.
- ✓ present their findings in a scientific poster presentation.
- ✓ compare and contrast qualitative and quantitative data collection and analysis techniques.
- ✓ use hypothesis driven scientific methods to design research projects, collect data, analyze and present results.

## SALG ASSESSMENT

Self reported learning using the **Student Assessment of Learning Gain (SALG)** was used in both the original and SENCERized courses to evaluate students learning. Areas of significant improvement in the PRE and POST SALG survey after the implementation of the SENCER mode are shown here:

### Self Reported Learning

	Before SENCER	After SENCER
How scientists think about problems	+0.82	+1.30
How scientific knowledge can be used to help address societal issues	+0.38	+0.91
How science can assist in understanding the complex and interactive nature of the world	+0.38	+1.00
Some basic ways that scientists assemble evidence and test their theories	+0.83	+1.17
How scientific experiments are designed	+0.13	+1.15
Articles in the media with scientific findings about a topic	+0.42	+1.05
How to identify conclusions based on faulty or insufficient evidence	+0.51	+1.41
Find trends in data	+1.26	+1.38
Critically review articles	+1.04	+1.16

## TEEN AND ADOLESCENT SLEEP CURRENT SITUATION

The National Institutes of Health (NIH) has identified adolescents and young adults (ages 12 to 25 years) as a population at high risk for problem sleepiness based on "evidence that the prevalence of problem sleepiness is high and increasing with particularly serious consequences" (NIH, 1997). Teens need on average about 9 hours and fifteen minutes of sleep each night to function best (for some, 8 and one half hours is enough). Most teens DO NOT get enough sleep - one study found that only 15% of teens reported sleeping 8 and one half hours on school nights. Teens tend to have irregular sleep patterns throughout the week - they typically stay up late on weeknights and sleep in late on the weekends, which can affect their biological clocks and reduce the quality of their sleep.

## SCIENCE EDUCATION FOR NEW CIVIC ENGAGEMENT AND RESPONSIBILITIES

### Project 1 - Literature review

Students synthesized sleep related content and family resource issues and shared their work to the community through poster presentations. Students developed literature search skills, and incorporated their findings in both courses, focusing on their target audience, information validity, and source authenticity when presenting their

### Project 3 - Quantitative method

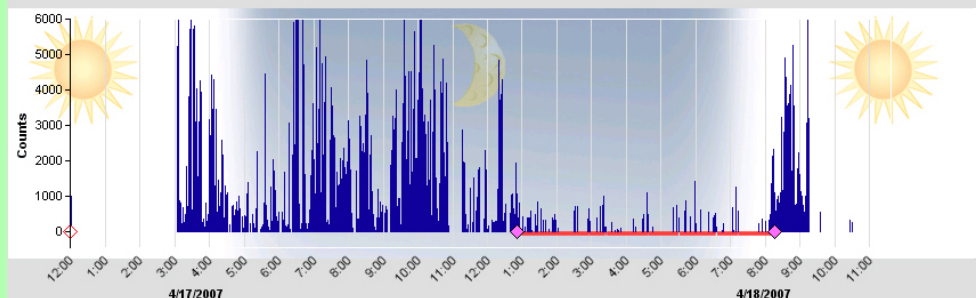
Enrolled students wore small Actigraph watches that continuously recorded calories burned, limb movements, and sleep level data. The data was then downloaded to a computer for subsequent analysis. Results were summarized and shared with fellow students and service-learning partners.

### Project 2 - Qualitative method

Students chose a topic related to both sleep and family resources. Adhering to the scientific method, they designed a scientific study by gathering survey data. They then performed simple statistical tests on the data and presented their results using tables and graphs to determine if their hypotheses were supported by the data.

Minutes Asleep: 427      Number of Awakenings: 8      Sleep Onset Occurred at: 4/18/2007 1:14:00 AM  
 Minutes Awake: 17      Avg. Time of awakenings: 2.13 Mins      Sleep Latency: 8 Minutes

Sleep Efficiency 94.26% for Day 1



Example of sleep efficiency obtained by students using Actigraph watches



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