



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY**

Name(s) Amanvir S. Parhar	Project Number J0421
Project Title Don't Let the Blue Light Bite: The Effect of Blue Light on REM Sleep	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project aimed to determine if exposure to blue light through screen time had any impact on the rapid eye movement (REM) sleep or the mood of a human sleeper.</p> <p>Methods/Materials Two Fitbit Alta HR devices, two Handheld devices with Fitbit app to collect sleep data, and a pair of Blue-light Filter Glasses. Fitbits were used to collect information on the various stages of sleep, with and without the use of Blue-light filter glasses by the participants during their exposure to electronic screens before they went to sleep.</p> <p>Results 10 human subjects participated in the research. Exposure to blue light shortened the percentage of their REM sleep. The average of REM sleep for the blue-light exposure group was 21.19% of the total sleep, while the average for the non-exposure group was 23.11%, a difference equal to approximately 8 sleeping minutes. The mood, which was a potential risk during exposure testing, was, on the scale of 1 to 5, higher for the non-exposure days with an average of 4.50, slightly topping the exposure average of 3.81. The control group days were lacking about 2% of their usual REM sleep, and had a higher percentage average for the awake time (15.58%). The non-exposure tests had a decreased awake time percentage (13.43%). The data suggests that the REM sleep was compensated for awake time during exposure, and not all sleep stages were shortened by blue light.</p> <p>Conclusions/Discussion The results showed that the blue light exposure lessened the REM sleep by 2%, and caused corresponding increase in the awake time during sleep. I concluded that the blue light does negatively affect the REM quotient and the mood of a human sleeper.</p>	
Summary Statement I found that the exposure to blue light through electronic screens before sleeping negatively impacts the REM quotient and the mood of a human sleeper.	
Help Received My elementary school science lab teacher Mr. Clyde Mann helped me come up with this interesting project idea during our science discussions.	