

Solatube International

# Daylighting Facts & Figures

## Education/Student Performance

### **Daylight improves test scores in three school systems by up to 26%**

A study of three school systems in Washington, Colorado and California found that students in rooms with the most diffuse and glare-free daylight improved their performance on standardized tests by up to 26%. The study analyzed test score results for over 21,000 students.

The Benefits of Daylighting. *Northwest Energy Efficiency Alliance*. Retrieved from <http://www.betterbricks.com/design-construction/daylighting-overview>

### **Math and reading improve with daylight**

Classroom lighting plays a particularly critical role in studies. Appropriate lighting improves test scores, reduces off-task behavior and plays a significant role in students' achievement. A study by Alberta Education titled "A Study into the Effects of Light on Children of Elementary School Age," have proven that students with the most classroom daylight progressed faster in one year on math tests and reading tests than those students who learned in environments that received the least amount of natural light.

Spector, M. (2012, May 1). Acoustics and Daylighting. *School Planning & Management*. Retrieved from <http://webspm.com/articles/2012/05/01/acoustics-and-daylighting.aspx>

### **Daylight in schools necessary to stimulating circadian system**

Having enough light in the classroom to read and study does not guarantee that there is sufficient light to stimulate our biological clocks. This is because the human visual system, which is much more sensitive to short-wavelength (blue) light and needs more light to be activated than the visual system. Most schools typically do not provide adequate electric light or daylight to fully stimulate the circadian system. However, if designers provide sufficient daylight, which contains ample, short-wavelength (blue) light, in classrooms, school buildings will be able to provide more circadian stimulation and therefore, better support for circadian entrainment.

In many schools, the desks near the window or under skylights or roof monitors provide the best area for circadian light stimulation.

Leslie, R. (2010). Patterns to Daylight Schools for People and Sustainability. *Lighting Research Center*. Retrieved from [http://www.lrc.rpi.edu/resources/newsroom/pdf/2010/USGBCPatternBook\\_8511.pdf](http://www.lrc.rpi.edu/resources/newsroom/pdf/2010/USGBCPatternBook_8511.pdf)

### **Boulder school reports 21% improvement in student learning rates through daylighting**

Several studies have shown that natural daylighting in schools increases student performance. One study, completed for the California Energy Commission, found that among 12 models considered, there was on average a 21% improvement in student learning rates from those in classrooms with the least amount of daylight compared to those with the most.

(2009, June). Boulder School Installs Daylighting Device. *The Daily Journal, McGraw-Hill Construction*. Retrieved from [http://colorado.construction.com/ddj/archive/2009/090518\\_ddj4.asp](http://colorado.construction.com/ddj/archive/2009/090518_ddj4.asp)

### **Daylighting contributes to environmental, fiscal and health benefits for schools**

Better indoor air quality, lower levels of chemical emissions, generous provision of natural daylighting, better humidity control--these and other features of green schools offer not only environmental and fiscal benefits, but health benefits as well. These health benefits, in turn, manifest in lower student and staff absenteeism, lower staff turnover, lower health care costs, and improved school and job performance.

Frumkin, H. (2006). Safe and Healthy School Environments. *National Center for Environmental Health and Agency for Toxic Substances and Disease Registry*. Retrieved from [http://www.cdc.gov/healthyplaces/publications/designing\\_and\\_building\\_healthy\\_places\\_for\\_children.pdf](http://www.cdc.gov/healthyplaces/publications/designing_and_building_healthy_places_for_children.pdf)

### **Building executives report myriad benefits to green school design**

In fall 2005 Turner Construction released a survey of 665 executives at organizations involved in the building sector. Of those involved with green schools, over 70% reported that green schools reduced student absenteeism and improved student performance.

Katz, G. (2006, October). Greening America's Schools. *The U.S. Green Building Council*. Retrieved from <http://www.usgbc.org/Docs/Archive/General/Docs2908.pdf>

### **Green school design provides financial benefits 20 times that of the cost**

This national review of 30 green schools demonstrates that green schools cost less than 2% more than conventional schools - or about \$3 per square foot (\$3/ ft<sup>2</sup>) - but provide financial benefits that are 20 times as large. Greening school design provides an extraordinarily cost-effective way to enhance student learning, reduce health and operational costs and, ultimately, increase school quality and competitiveness.

Katz, G. (2006, October). Greening America's Schools. *The U.S. Green Building Council*. Retrieved from <http://www.usgbc.org/Docs/Archive/General/Docs2908.pdf>