

Indoor Air Quality FACT SHEET

SOURCE: US Environmental Protection Agency

REPORT: Indoor Air Quality and Student Performance, Revised August 2003

www.epa.gov/iaq/schools/pdfs/publications/iaq_and_student_performance.pdf

- Evidence from schools that various environmental conditions are closely associated with the incidence of objectively measurable adverse health effects is rapidly emerging.
- Recent data suggest that poor IAQ can reduce a person's ability to perform specific mental tasks requiring concentration, calculation or memory.
- Maintaining temperature at the warm end of the comfort zone tends to increase adverse health symptoms.
- There is also good evidence that moderate changes in room temperature, even within the comfort zone, affect children's abilities to perform mental tasks requiring concentration, such as addition, multiplication, and sentence comprehension. Overall, warmer temperatures tend to reduce performance, while colder temperatures reduce manual dexterity and speed. In general, the need to avoid extreme conditions and to provide for as much individual temperature control as possible is strongly supported.
- Early studies in schools have found that air conditioning is associated with lower absentee rates or improved performance, and that schools with humidification systems are also associated with lower absentee rates.
- The U.S. Environmental Protection Agency has published voluntary guidance that addresses indoor air quality in schools. The IAQ TFS (Tools for Schools) Kit is free to schools and school districts who make the request on school letterhead.

REPORT: Indoor Air Quality Tools for Schools Program: Benefits of Improving Air Quality in the Indoor Environment

www.epa.gov/iaq/schools/pdfs/publications/tfsprogram_brochure.pdf

- Asthma is a primary cause of school absenteeism, accounting for 10 million missed school days per year. Nearly 1 in 13 children of school age has asthma.
- Reported asthmatic symptoms were less common in schools that had installed a new ventilation system. The new system resulted in higher air-exchange rates, lower concentrations of several airborne pollutants, and lower relative humidity.

SOURCE: International Centre for Indoor Environment and Energy, Technical University of Denmark

STUDY: Investigated whether IEQ can affect the performance of schoolwork by children.
<http://www.ik.mek.dtu.dk/English/Research/Indoor%20environment%20and%20learning%20in%20schools.aspx>

- Reduced temperature significantly increased the rate at which pupils subtracted numbers and performed a reading and comprehension task and the rate at which pupils

categorized logical statements as true or false. It tended to reduce errors when they proof-read.

- Increased outdoor air supply rate significantly improved the performance of the following individual tasks by from 3% to 35%: addition, multiplication, number checking and subtraction in summer, and reading and comprehension, sentence comprehension, subtraction and multiplication in winter. In all the tasks mentioned, there was a statistically significant improvement in the work rate, while the error rate remained constant.

SOURCE: Pennsylvania Department of Health

REPORT: Indoor Air Quality Guidelines for Pennsylvania Schools *May 2002*
www.health.state.pa.us/pdf/hpa/epi/revised_indoorair.pdf

- To prevent or help resolve indoor air quality problems effectively and efficiently, schools must ensure that recommended temperature and relative humidity ranges be maintained in the indoor air and that the HVAC system is working properly.
- The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 55-1992 describe the temperature and humidity ranges that are comfortable for most people. Generally, temperature and humidity should be maintained within the comfort zone of 68 to 78 degrees and 30% to 60% relative humidity, depending on the season.
- The definition of good indoor air quality management includes control of airborne pollutants, introduction and distribution of adequate outdoor air, and maintenance of acceptable temperature and relative humidity.
- Temperature and humidity can also affect indoor contaminant levels.
- Children may be especially susceptible to air pollution. The same concentration of pollutants can result in higher body burden in children than adults because children breathe a greater volume of air relative to their body weight.

Wallingford Swarthmore School District Issues

- Indoor classroom temperatures regularly exceed 80 degrees and occasionally reach as high as 95 degrees.
- The architecturally designed windows at SRS were intended for a building with central air conditioning and do not open wide enough to provide proper ventilation.
- Abutting classrooms can have temperature variations of 20-25 degrees, a situation that can cause dampness and harmful mold within the building structure.
- There are frequent anecdotal reports of students exhibiting dangerous signs of heat exhaustion including headaches, fatigue and irritability.
- At least one classroom per grade has air conditioning, thereby giving a clear academic advantage to some students.

Wallingford Swarthmore School District

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