



# Designing for Children: Healthy Schools by Design

Children's Health  
and the Environment


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Healthy Schools Network, Inc.

# The School Building as the Environment

- ✎ 54 million students and 6 million adults 120,000 American schools
- ✎ Schools are in worse shape than prisons
- ✎ Indoor air pollution affects half of schools
- ✎ Pollutants affect children's health, learning and behavior
- ✎ Building design can improve the health and learning of students

# Healthy and High Performance Schools

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- ✎ **Protect vulnerable students and adults who are occupants of the building**
  - ✎ **Foster a learning environment for students and staff**
  - ✎ **With:**
    - ✎ **Acoustic, thermal and visual elements**
    - ✎ **Superior IAQ**
    - ✎ **Use of non-toxic building materials, cleaners and school supplies**
    - ✎ **Ventilation to replenish fresh air and dilute and remove pollutants**

# Healthy and High Performance School

“High performance school design uses a “whole building” approach to school planning that incorporates current technology to protect health while saving energy, natural resources and money.”




“Indoor Air Quality: Design Tools for Schools.” US EPA

# Benefits of a Healthy and High Performance School

- ✎ Better student achievement
- ✎ Increased average daily attendance
- ✎ Reduced operating/maintenance costs
- ✎ Positive influence on environment of the community
- ✎ A community asset and a teaching tool

# Recommended Best Practices

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- ✎ **Based on peer-reviewed published scientific research**
  - ✎ **Incorporate different areas of school building design and construction**
  - ✎ **Recommendations to prevent indoor and outdoor pollution problems from affecting school users**

# Biological Agents and IAQ

- ✎ Water damaged buildings/materials breeding grounds for molds and bacteria
  - ✎ Air/surface concentrations higher in problem schools
  - ✎ Leads to respiratory problems for occupants
- ✎ Recommendations
  - ✎ Keep construction materials dry
  - ✎ Prevent/repair leaks and other sources of moisture
  - ✎ Replace wet or damaged materials

# Chemical and Physical Agents and IAQ

- ✎ **Volatile Organic Compounds (VOC's)**
  - ✎ Found in materials to construct buildings and furniture off-gas toxic fumes
  - ✎ Children's respiratory system adversely affected by VOC's
  - ✎ Carpets, shelving, adhesives and office equipment are sources
  - ✎ Particulates, allergens, and pesticide residue present
  - ✎ Other chemical sources: paints, markers, chem and art labs

# IAQ Recommendations

- ✎ **Keep floors and surfaces clean**
  - ✎ **Minimize airborne bacteria and pet allergens**
- ✎ **Use non-toxic cleaners and school supplies**
- ✎ **Avoid building schools near freeways**
- ✎ **Provide adequate ventilation to classrooms**
- ✎ **Use operable windows**
- ✎ **Move loading areas/reduce idling time of buses**
- ✎ **Ban pets at school; ban carpeting**

# Thermal Comforts in the Classroom

- ✎ Temperature and humidity
- ✎ Ventilation can affect occupant thermal comfort
- ✎ Use ASHRAE Standard 55
  - ✎ Guidelines for acceptable occupant thermal comfort
- ✎ Conduct HVAC system inspections
- ✎ Clean, monitor and adjust systems

# Acoustic Comforts



- ✎ **Noise**

- ✎ Any unwanted, extraneous sound

- ✎ Children require better acoustic quality than adults

- ✎ Sources of Noise need to be eliminated

- ✎ Outdoor noise  
(construction/playground/traffic)

- ✎ Mechanical noise (HVAC system)

- ✎ Indoor noise  
(classrooms/hallway/gym/cafeteria)

- ✎ Reduce sound reverberations



Daylighting Options

# Resource Efficiency

- ✎ Evaluate IAQ impact of construction materials selected
- ✎ Allow storage for recycling by school
- ✎ Implement pollution prevention policies
  - ✎ Construction and interior finish materials
  - ✎ Classroom supplies
  - ✎ Maintenance and cleaning supplies
- ✎ Plan for reduced energy and water uses
- ✎ Sort and recycle construction waste

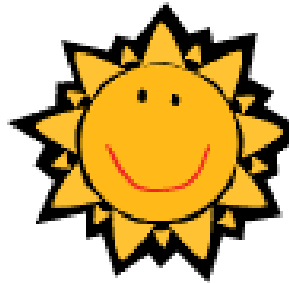


# Energy and Efficiency

- ✎ Reduce electricity costs
  - ✎ Daylighting/Energy Star Products
- ✎ Stress energy conservation
- ✎ Use renewable energy sources
- ✎ Plan to keep building well-maintained with savings from reduced energy costs

# Visual Comforts

- ✎ Illumination and lighting associated with decreased fatigue/eye symptoms
- ✎ Daylight associated with fewer headaches, better test scores
  - ✎ Natural sunlight through windows and skylights
- ✎ Integrate natural and electric lighting options
- ✎ Reduce glare from incident sunlight
- ✎ Turn off lights when natural light is sufficient



# What can you do?



## Locally:

ask about the new construction project;  
ask to have HHPS features part of your  
school



## State:

create a state reform coalition or task  
force to study needs, create and carry  
out an agenda to improve all schools for  
all children

# Resources *(a very short list)*



**US EPA:** [www.epa.gov/schools](http://www.epa.gov/schools), the place to find links to dozens of EPA school-targeted programs (energy, IAQ Tools for Schools, Buy Clean, drinking water, mercury, asbestos, IPM and more)



**US Dept. of Education:** [www.edfacilities.org/healthy\\_school\\_environment](http://www.edfacilities.org/healthy_school_environment), for extensive online library of reports, essays, research, guide not necessarily reviewed by environment or health experts



**Healthy Schools/Healthy Kids Clearinghouse:** [www.healthyschools.org](http://www.healthyschools.org), for Clearinghouse guides and reports, links to other organizations

# Healthy Schools Network, Inc.

For research, guides, reports, technical assistance, and coalition-building that empower and encourage parents, schools, and others to improve our children's workplaces.

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