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LEED for Schools Committee
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Who Will Help Our District?

Green Schools Advocates:
• Asthma and Allergy Foundation of America
• American Lung Association
• U.S. EPA
• Other School Districts
• Researchers
• Building Consultants
• Architects
• Builders
• Mayors
• Many others
Learning Objectives

• Identify at least three simple steps used to determine Indoor Environmental Quality issues.
• List at least three upgrades that can be done to existing schools to improve their sustainability within a traditional school budget.
• Name the five key components of the LEED for Schools Rating System and describe at least one issue addressed by each of the key components.
• Identify at least three benefits realized by students attending a green school.
Green in a Box

LEED

- Site Planning
- Water Management
- Energy
- Material Use
- Indoor Environmental Quality
Why Green in a Box?

• USGBC goal is that every child is in a green school within this generation.
• Many schools have poor physical plant.
• We can help you spend more on students and less on buildings.
• Increase Indoor Environmental Quality (IEQ) = increase test scores  
  - Average productivity loss due to poor IAQ is between 3 and 7 percent.  
  Occupational Safety and Health Administration

  “What if we could raise each child’s test scores by 3% to 7%?” - Your school district

• Increase IEQ = decrease absenteeism = more $ in funding  
  - 50% of all illness is caused or aggravated by poor IAQ  
  American College of Asthma & Immunology

  “Asthma affects 1 in 4 of our students and it’s getting worse”. - North Texas School District

• Green schools are designed to save money on utility bills and water usage. It’s how we build in the 21st century.  
  - “We can’t afford not to address IEQ but we don’t know how” - Your school district
School Indoor Environmental Quality (IEQ) – What’s in it for me – the Facilities Staff?

- More durable materials
- Utility & water use reduced
- Use of fewer, less toxic cleaning products
- Savings of time and money

“We cut buses, we even cut some football (In Texas!) but we did not cut our IEQ Program.”

- Frank DiNella, Director of Operations, Keller ISD
School IEQ – What’s in it for me – School Administrators?

• Fewer student absentees = more kids in seats
• Fewer student absentees = higher test scores
• Fewer staff absentees
• Lower utility and water bills
• Lower O&M costs
• More money for my program
## School Lifecycle Costs

### 50-75 Year Building

<table>
<thead>
<tr>
<th>Duration</th>
<th>Lifecycle Cost Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st 2-5 years</td>
<td>30-40%</td>
</tr>
<tr>
<td>45 - 48 (70 –73)</td>
<td>60 to 70%</td>
</tr>
</tbody>
</table>

- **1st 2-5 years**: Includes design and construction, O&M
- **45 - 48 (70 –73) years**: Includes everything: operations, maintenance, upgrades

• 16,500 Students
• 1 month= $200k elec, $20k H20, $23k gas = $243k /month
• Approx $3M spent annually
• What if you could save 10%? 50%?
• = savings of +$300K
• Roadmap
Keller ISD Results after implementing IEQ Measures using EPA Tools for Schools

- **Test Scores Increased**
  - 2007  2008  2009  2010  % INC
  - 79    82    85    87    10.1%

- **Scholarships Increased** (in millions)
  - 2007  2008  2009  2010  % INC
  - $24.3  $30.7  $37.2  $40.2  65.4%

- **Reduced Cost per Sq Ft (Operations)**
  - 2006  2007  2008  2009  % DEC
  - $.234  $.243  $.227  $.232  .008%

A Decrease in Operations Costs
“When we followed a protocol for asthma, we cleaned up 90% of our breathing problems.” North East ISD, San Antonio

- Institute District-wide IEQ program – from the top.
- Collect and review school nurse data on inhaler use, absenteeism.
- Each IEQ step taken will reduce need for inhalers – continue to track school nurse data.
- Institute strict hand-washing protocol with foam soaps.
- Institute green cleaning and green O&M
- Build green – new, additions, renovations, upgrades.
- Purchase green Furniture, Fixtures and Equipment (FFE).
- You will reduce absences.
Green in a Box (GIB)

- North Texas US Green Building Council Chapter LEED for Schools Committee
- Lending library includes information and instructions, handheld testing equipment, software and instructions including DVD’s
- Volunteers can provide LEED charette
- School you build in-house IEQ Team to use GIB and “7 steps to 21st Century School Performance”
1. **Form a team** and obtain buy-in from top administration – best is District-wide IEQ Program

2. **Educate** the team.

3. Determine Green in a Box **goals**.

4. **Divide** your school into team sectors with a floor plan, walk the school and take notes.

5. Use the Green in a Box tools to **test** for Temperature, CO2, % relative humidity, and particulate size. Option: electricity usage, HVAC air flow, other.

6. **Log** IEQ Equipment data.

7. **Make improvements.**
### Tools

**Walkthrough:**
- Teams work in pairs
- Clipboard or ipad
- Floor Plan

**IAQ Testing Equipment:**
- Temperature, CO2, % Relative Humidity
- Particulate size
- HVAC pressure drop /air flow
- Kill-a-Watt for plug load

### Method

1. GIB Questionnaire/ interview teachers, nurses before walkthrough to find out if there are problem areas of the building or other issues.
2. Do walkthrough with floor plan and clipboard or tablet.
3. Then use IAQ testing equipment in each room of building. This needs to be done while building is fully occupied, no earlier than mid-morning. Use class schedules to determine where to test. If classroom is unoccupied then wait until 2 or more classes have been through.
GIB walkthrough

Six Areas:
- HVAC
- Mold/Moisture
- Integrated Pest Management (IPM)
- Cleaning & Maintenance
- Materials Selection
- Aggressive Source Control

Walk the site (exterior)
Check building envelope
Water infiltration, roof leaks
Mold, Smells
Plumbing problems
HVAC problems
Pests – rodents, insects
Chemicals
Motor vehicle exhaust
Cleaning issues/cleaning products
Fabric furniture
Formaldehyde-containing products (furniture, building)
Carpet
Plug point load / electrical
Lab hoods, exhaust vents
Teacher reports
On the GIB walkthrough - outdoors

Diesel is a listed carcinogen. Implement a no-idling policy. Build sidewalks so children can walk and ride bikes to school rather than have parents drive.

Check for idling near air intake, HVAC, buildings, doors. Move air vents/intakes away from driveways and parking.
What are these? Supply? Exhaust? Crawl space ventilation? There may be a problem if air circulation is too close to each other. Track and record, trace out location and put on a set of as-built plans, paper or electronic, for Facilities staff.
Slope of lawn and leaking downspout have led to water running into the building when it rains. Fix this. Investigate what looks like crumbling pieces of the building and fix. The air intakes turn into water intakes when it rains hard. Examine sprinkler patterns, water should never be hitting any building.
Does your community have bad air? If so the health of your students is impacted with a high incidence of respiratory problems – asthma, colds, and other disease. Ozone and asthma lead to permanent lung damage. Advocate for clean air.
On the GIB walkthrough - Indoors

Study: Allergens in School Settings: Results of Environmental Assessments in 3 City School Systems Stuart L. Abramson, MD, PhD, et al

What's microscopically found in common dust in the classroom:

1) Dust mites
2) Cat Allergens
3) Cockroach droppings

How do custodial staff vacuum or dust this classroom? (Need to make schools cleanable by removing junk and clutter).
• Filters – do you know where they all are located?
• Filters – do you have a replacement schedule?
• Duct cleaning – needs to be done on a schedule.
• Measure: does HVAC have sufficient air flow?

Aargh!
Physical barriers to HVAC operation: dusty stored materials, air dampers can't operate and this space is not cleanable. You should be able to eat off the floor. Check for asbestos in the pipe insulation.
- Green in a Box tools measure CO2, temperature, % relative humidity and particulate size. Anything 10 microns or above is indicative of mold.
- Use your nose: what does the building smell like?
- Take “smells bad” complaints seriously.
Stained ceiling tiles – evidence of something that can send a child to the hospital. Explore leaks and fix them “for real”. Explore HVAC, plumbing, roof, overflowing condensate drains/pan. Flush condensate lines on a quarterly basis. If it smells bad it is bad.
 Fix the leaks. Remove the jar of mystery substance. Black adhesive – is it asbestos? Is there mold underneath the base cabinet or behind the base cabinet?
When queried, the majority of Facilities people asked said, no they would not remove rubber base. You should remove rubber base, check for mold behind rubber base, cut a small hole in the wall above the bottom plate level in each stud bay to find out where the water’s coming from and if you have mold in the stud bays.
Pets or Pests? It depends, do you feed them or not? If you want to reduce asthma you’ll need to get rid of pets.
Implement an Integrated Pest Management (IPM) Program. Remove infestations, droppings, and avenues of entry. Get rid of in-classroom refrigerators, microwaves, coffeemakers, etc.
Abate environmental hazards: asbestos, mold, radon, soil contamination of hydrocarbons. Have water pipes tested for lead.
Chemical Storage

- What does your building smell like?
- It shouldn’t smell like cleaning products or chemicals.
• What does your building smell like?
• It shouldn’t smell like “heavily used restroom”, mold, or floor drains whose trap primers are not working.
• Fix trap primers, get higher CFM exhaust fans in restrooms, and if it smells like mold, that’s because there IS mold.
• Liability issues: if it smells like human waste, that means there are molecules of human waste floating in the air spreading disease. If it smells like mold that’s because there is mold being breathed in.
After the Walkthrough

Step 6: Compile your data
• Prioritize fixes

Step 7: Make Improvements
• Triage
• Make long-range plans/budgets
• Work on district-wide IEQ
• Educate teachers, students, parents, administration
• Include IEQ measures when hiring architects, contractors, subcontractors
Resources

• US Green Building Council North Texas Chapter, LEED for Schools: we are your resource for Green in a Box www.northtexasgreencouncil.org
• US Green Building Council www.usgbc.org
• Center for Green Schools www.centerforgreenschools.org
• EPA Tools for Schools www.epa.gov/iaq/schools/toolsforschools Also http://www.epa.gov/schools/healthyseat/index.html
• Education Facilities Clearinghouse www.efc.gwu.org