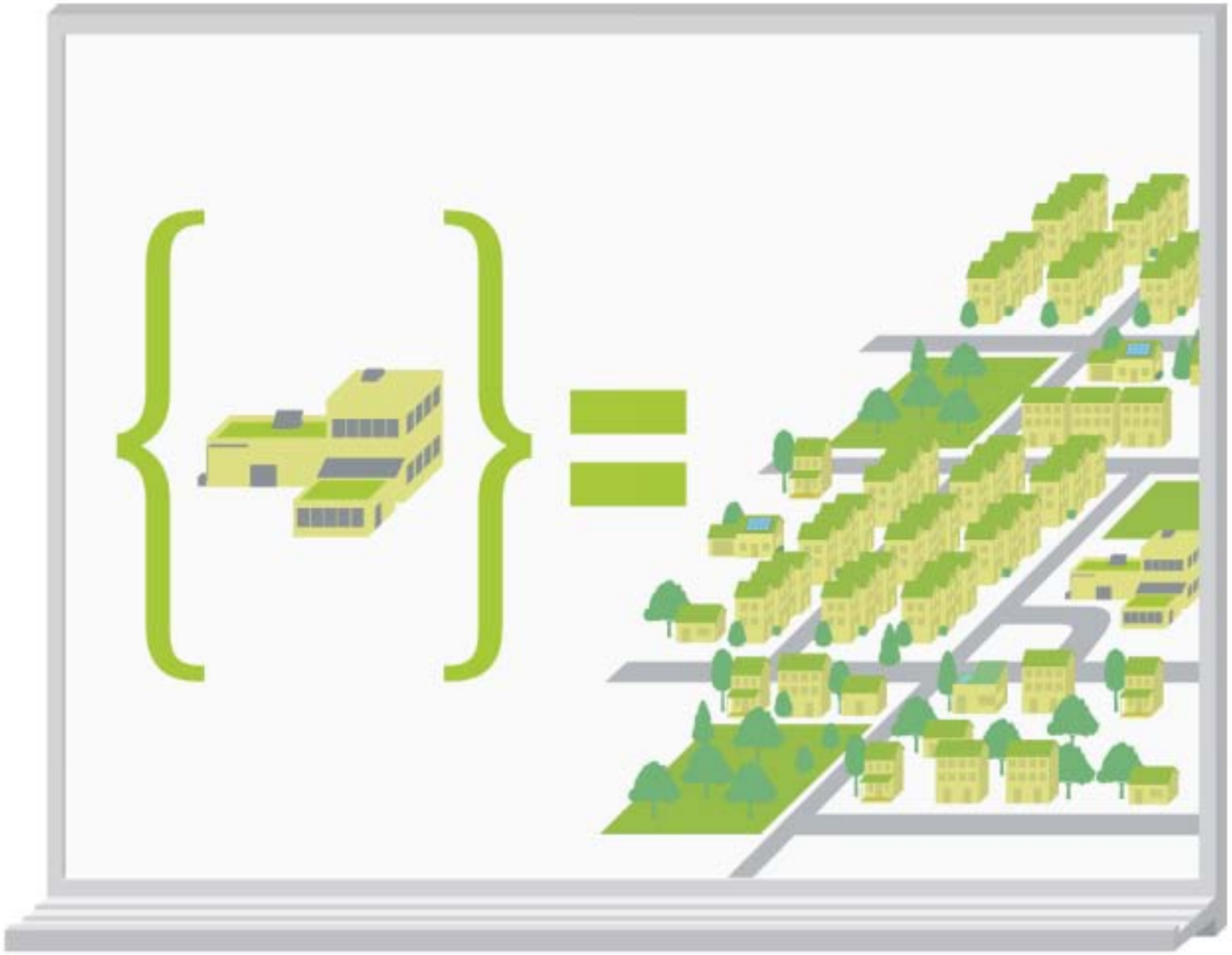
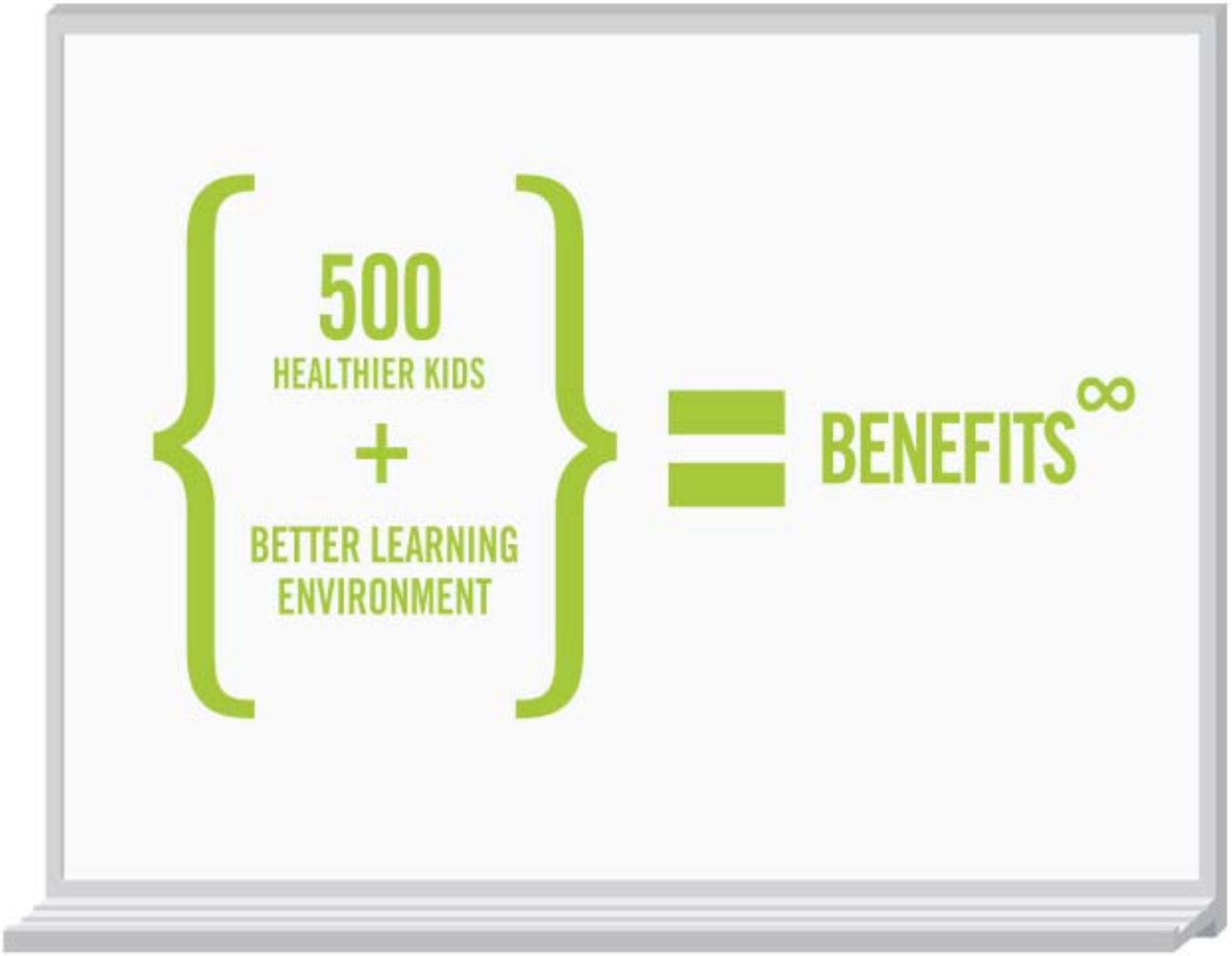



500
HEALTHIER KIDS
+
BETTER LEARNING
ENVIRONMENT
BENEFITS∞

55 million students

and 5 million faculty

20% of America's population

spend over

$35,000,000,000

in tax dollars annually

CASE STUDY

30 Schools Studied

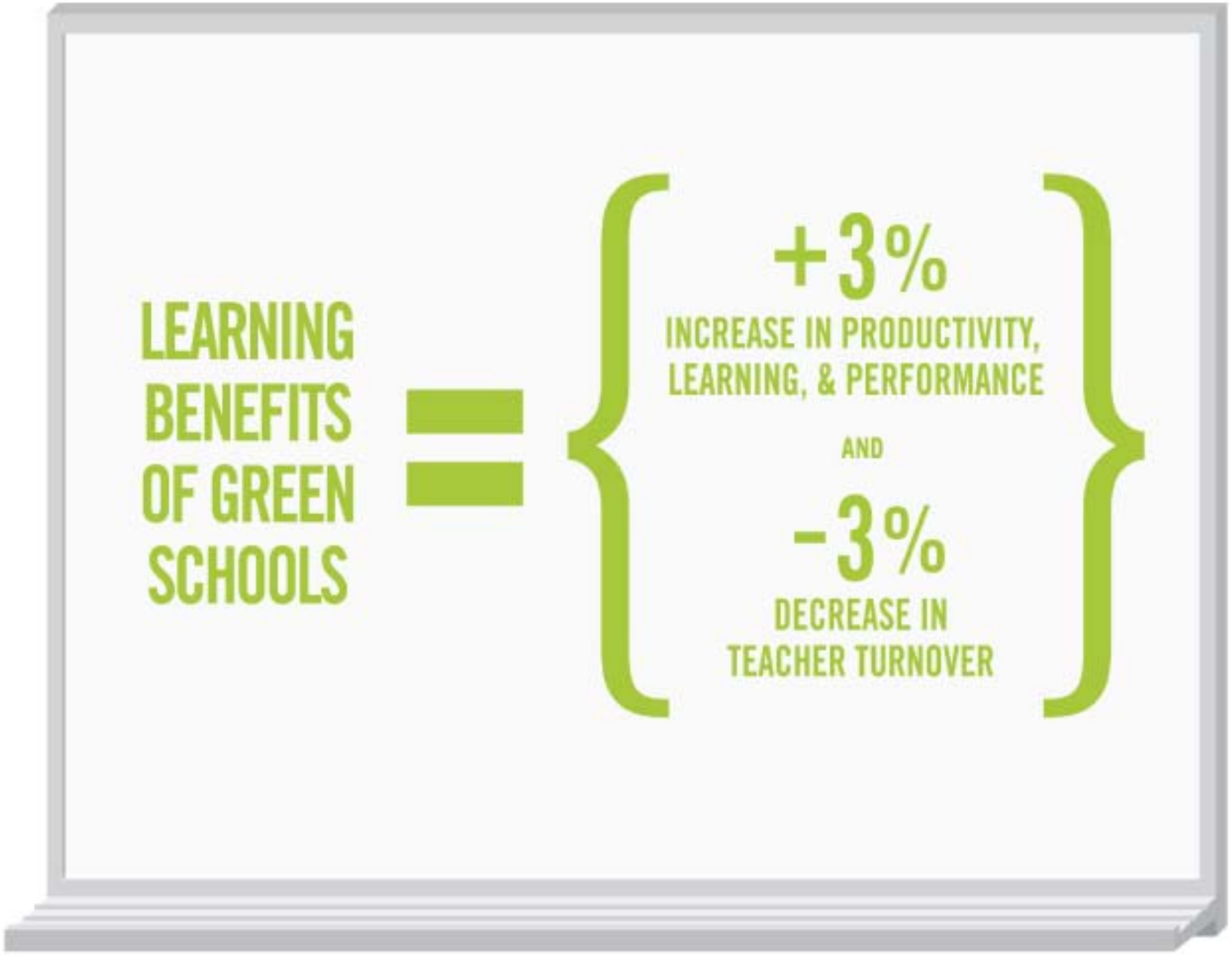
33.4%
Average direct energy savings

50%
Average indirect energy savings

32.1%
Average water savings


DIRECT SAVINGS
FOR AN AVERAGE
GREEN SCHOOL
$47,880
Annual Direct Energy Savings Per School
$95,760
Annual Total Direct Savings Per School

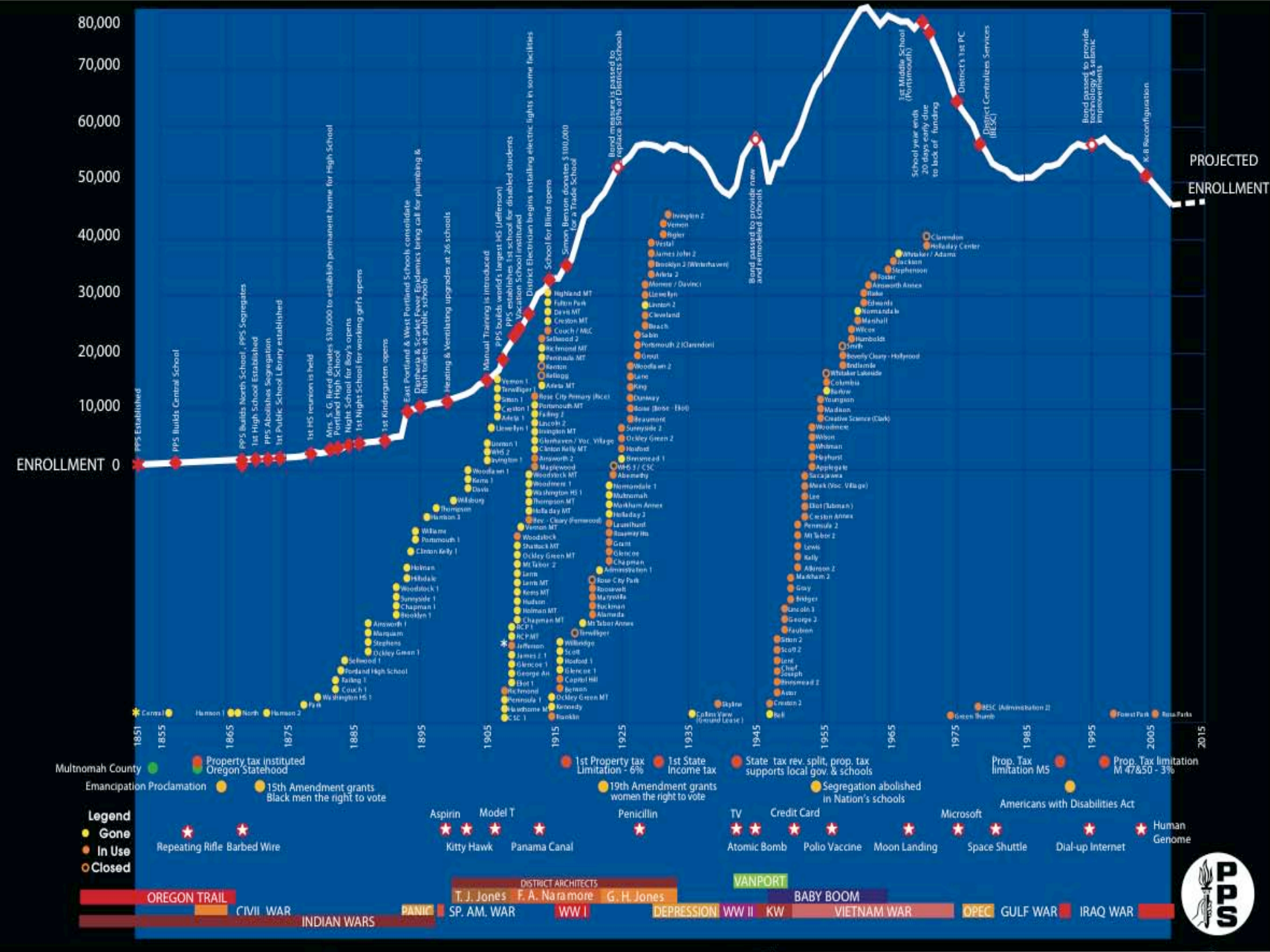

ENERGY &
WATER COSTS
STUDENT HEALTH
& TEST SCORES


LEARNING BENEFITS OF GREEN SCHOOLS
=
+3%
INCREASE IN PRODUCTIVITY, LEARNING, & PERFORMANCE
AND
-3%
DECREASE IN TEACHER TURNOVER

Day Lighting

Ventilation

Healthy Learning Environment


80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
ENROLLMENT 0
PROJECTED ENROLLMENT
PPS Established
PPS Builds Central School
PPS Builds North School , PPS Segregates
1st High School Established
PPS Abolishes Segregation
1st Public School Library established
1st HS reunion is held
Mrs. S. G. Reed donates $30,000 to establish permanent home for High School
Portland High School
Night School for Boy's opens
1st Night School for working girl's opens
1st Kindergarten opens
East Portland & West Portland Schools consolidate
Flush toilets & public showers
Heating & Ventilating upgrades at 26 schools
Manual Training is introduced
PPS builds world's largest HS (Jefferson)
PPS establishes 1st school for disabled students
Vocation School instituted
District Electrician begins installing electric lights in some facilities
School for Blind opens
Simon Benson donates $100,000 for a Trade School
Bond measure is passed to replace 59% of District Schools
Bond passed to provide new and remodeled schools
1st Middle School (Portsmouth)
School year ends 20 days early due to lack of funding
District's 1st PC
District Centralizes Services (IESC)
Bond passed to provide seismic improvements
K-8 Reconfiguration
1851
1855
1865
1875
1885
1895
1905
1915
1925
1935
1945
1955
1965
1975
1985
1995
2005
2015
Multnomah County
Property tax instituted
Oregon Statehood
Emancipation Proclamation
15th Amendment grants Black men the right to vote
1st Property tax Limitation - 6%
1st State Income tax
State tax rev. split, prop. tax supports local gov. & schools
19th Amendment grants women the right to vote
Segregation abolished in Nation's schools
Prop. Tax limitation M5
Prop. Tax limitation M 47&50 - 3%
Americans with Disabilities Act
Legend
Gone
In Use
Closed
Repeating Rifle
Barbed Wire
Aspirin
Model T
Kitty Hawk
Panama Canal
Penicillin
TV
Atomic Bomb
Credit Card
Polio Vaccine
Moon Landing
Microsoft
Space Shuttle
Dial-up Internet
Human Genome
DISTRICT ARCHITECTS
T. J. Jones
F. A. Naramore
G. H. Jones
VANPORT
OREGON TRAIL
CIVIL WAR
INDIAN WARS
PANIC
SP. AM. WAR
WW I
DEPRESSION
WW II
KW
BABY BOOM
VIETNAM WAR
OPEC
GULF WAR
IRAQ WAR

65 years old

aging schools
declining population
disproportionate
enrollments


250,000 units on order
$15 billion industry
*USGBC survey, May 2010

green schools of the future

PI's: Judi Heerwagen and Sergio Palleroni

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Brief

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The planning grant will support rethinking both new schools and renovation of existing schools in the urban context. Three key principles will guide this effort:

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How this Differs from Current Green School Efforts.

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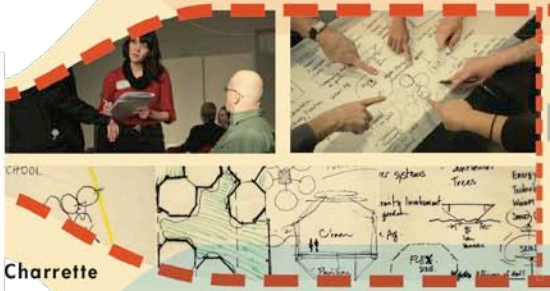
We also integrate others – teachers, parents, health professionals, economists, business partners – in addressing how the Green School of the Future can look outwards to the community and dissolve the barriers that separate "learning" from "life."

Beginning with the Child.

In addressing the needs of children and school design, we will go well beyond the current narrow approach that looks at test scores as the key indicator of green school benefits. Performance on standardized tests is but one of many valuable developmental outcomes. Decades of research in the social sciences and medicine show that features of the physical environment can have strong effects on children's health and learning, both negative and positive. Our goal is to identify and substantiate the beneficial contributions of the school context and the physical environment on health and learning and to eliminate the negative.

PUBLIC INTERFACE



Charrette

Design / Build

RESEARCH INTERFACE

Forums

Book Series

(visit portables.ning.com)

our call to

ACTION

LEARNING ACTIVISM

April 9-10 2010

An AIA Portland FRED SYMPOSIUM

Portland American Institute of Architects, in conjunction with Portland State University's Department of Architecture and in support of Portland Public Schools, will be hosting a Symposium that looks at the growing role of the citizen architect. This movement redefines the traditional practice of architecture to include tangible service to the public good. Meet the visionary leaders of this shift, take part in discussions with other community-minded designers and be an activist; if only for a day. Presentations and forums will conclude with a group design Charrette to address one of the real needs in Portland's schools.

$50.00 for AIA members; $60.00 for non-members
100 free tickets are available for UO and PSU students
Scholarships generously provided by Architects Without Borders
Register at http://www.aiaportland.com/

Friday, April 9th FORUMS

Location: Shattuck Hall Annex, Portland State University

Panel 1: Activism within the Profession
8:30-10:00 — Dave Otte – Holst
1 CEU — John Peterson – Public Architecture
Moderators – PSU and UO student

Panel 2: Learning Activism through Education
10:15-11:45 — Michael Hughes - University of Arkansas professor
1 CEU — Danny Wicke – Rural Studio
Moderator – PSU and UO student

Panel 3: In the Trenches with Communities in Need
1:00-3:30: — John Blumthal - Architects Without Borders - Oregon
2 CEUs — Margarette Leite & Sergio Palleroni – BASIC Initiative/Adopt a School Program, PSU professors
Moderator – PSU and UO student

Saturday, April 10th CHARRETTE

Location: Shattuck Hall Studio, Portland State University

Portland Public School District, like many school districts, struggles with shifts in enrollment at its neighborhood schools. The most common solution for temporary enrollment increases is to install modular classrooms. While PPS invests in improvements, the products that are available and economical have a long way to go to be the high quality learning environments our students deserve. What if there was a better way to design truly modular, scalable, sustainable, beautiful, and affordable temporary classrooms that also provide a great learning environment? Join us as we work together to brainstorm solutions to a problem faced by school districts across the country.

Charrette Schedule

8:00-3:00: — PSU Student Research Presentation
5 CEUs — Modular Building Presentation (Paul McKean)
Description of Charrette Options
Break into Groups

Topic options:
1. New Modular design options for PPS
2. Existing Modular – What do we do with them?
3. Permanent Modular

Guest facilitated by: Judith Heerwagen

Register at http://www.aiaportland.com/

SUNNYSIDE RAIN GARDEN

AIA/PPS/PSU/INDUSTRY/COMMUNITY

Design FORUM

School & Community involvement.

- Invention Convention
- Surveys
- Design chorrettes
- Interviews with students
- PTA meetings
- sesoutdoorclassroom.blogpot.com

TAKING THE DISCUSSION OUT TO THE SCHOOLS

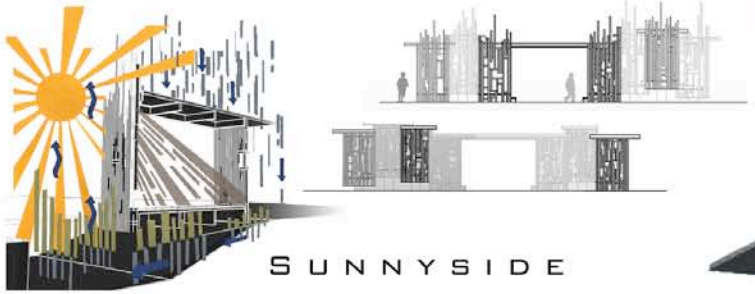
How do we communicate with our client?

Enter the classrooms

Organize meetings with parents and teachers

Advertise in on-line newsletters, posters, blog sites, word-of-mouth

Show up at events

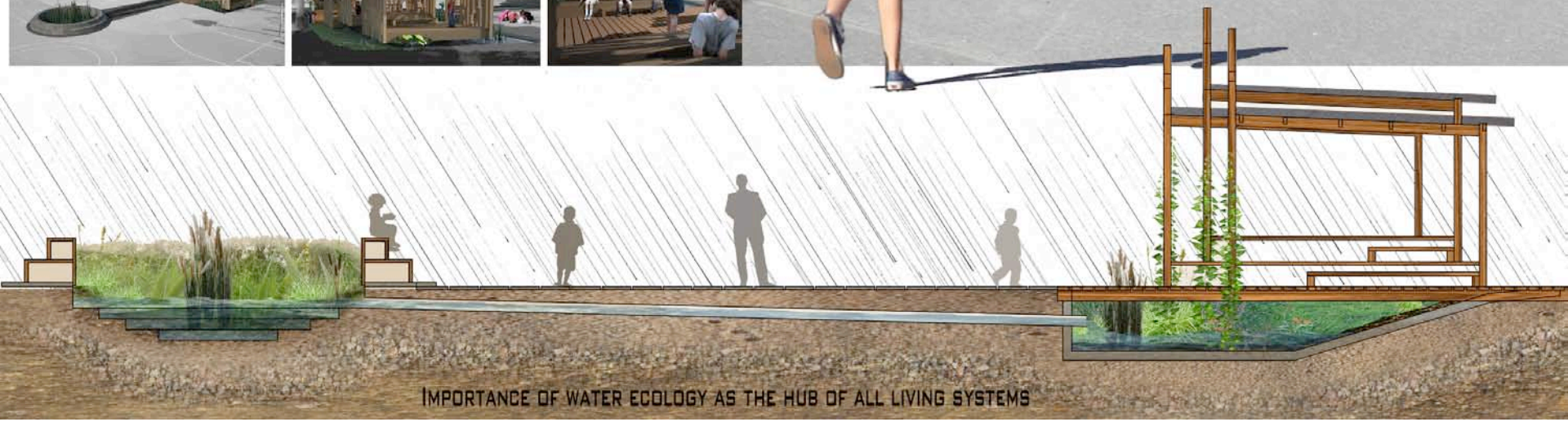


Sunnyside Rain Garden

Outdoor Classroom
Designed to embrace the water cycle in everyday life

Modular Simplicity
A structure composed of units set atop a water havesting bio-swale

Recycling
Implements scrap wood (2x4s) from construction sites or dilapidated homes



small actions can build consensus for the larger vision..

participation needs to be sustained to build lasting consensus

green schools of the future

Project Team:

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Judith Heerwagen
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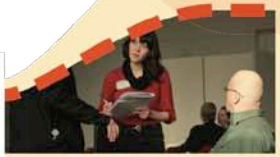

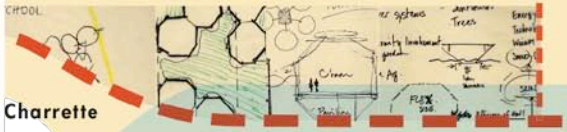

Charrette

Design / Build

RESEARCH INTERFACE

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Thermal Comfort in Laurelhurst Elementary

Abstract

The thermal conditions of two classrooms at Laurelhurst Elementary School are measured and analyzed in conjunction with ASHRAE Standard 55-2004: Thermal Environmental Conditions for Human Occupancy. One classroom is in the original school building and the other is a temporary portable structure. The main building classroom is found to much more closely adhere to standard 55-2004 than the portable classroom. Students experience acceptable conditions 86% of the time in the main building classroom as opposed to 45% of the time in the portable classroom.

Introduction

The classroom environment has long been suspected to influence student performance. Studies show that students commit few errors and are generally more attentive in learning environments that adhere to ASHRAE thermal comfort standard 55-2004 (Wargocki & Wyon, 2007), (Schneider, 2002), though some data are more loosely correlated (Mendell & Heath, 2005). ASHRAE Standard 55-2004 specifies the combination of indoor thermal environmental factors, namely temperature, humidity, thermal radiation, and air speed, that will produce conditions acceptable to a majority (about 80%) of the occupants within the space (ASHRAE, 2004).

Laurelhurst Elementary School consists of an original building, built in 1923, two annexes, built in 1951 and 1968, and a portable classroom structure, in use temporarily while parts of the main building are renovated. The use of temporary portable classrooms by Portland Public Schools is becoming more common, both for construction situations and to relieve overcrowding. The original building and the portable classrooms have two very different heating systems. The original building is heated by large wall mounted radiant panels, while the portables are heated by a roof-mounted forced-air system. The purpose of this study is to compare thermal comfort in the older, original classrooms with the newer, portable classrooms, to determine whether the portables offer an acceptable learning environment.

Method and Site

ASHRAE Standard 55 lists six primary factors to consider when evaluating thermal comfort: Metabolic rate, clothing insulation, air temperature, radiant temperature, air speed, and humidity. The ASHRAE recommended and experimental measurement procedures are listed in Table 1. Additional guidelines are:

- Measurements should be taken where the most extreme values of thermal conditions are estimated or observed.
- Heating period (winter) measurements should be taken when the indoor-outdoor temperature difference is not less than 50% of the difference used for design and when sky conditions are cloudy to partly cloudy.
- Simulation of heat generated by occupants is recommended

measured for two consecutive occupation cycles. Radiant temperature measurements were taken in the morning, when the surface temperature differences were expected to be greatest.

Table 1: Experimental Protocol

Factor	ASHRAE 55 Measurement Protocol	Experiment
Metabolic Rate	Estimate mean values 0.5 to 1 hour before temperature measurements.	Assumed 1.0 met, typical for sedentary office or classroom activity.
Clothing Insulation	Estimate mean values 0.5 to 1 hour before temperature measurements.	Assumed 1.0 clo, typical for cool weather.
Air Temperature	Measure at 4, 24, and 43 inch heights at locations where occupants are known or expected to spend their time.	Measured using HOBO U12-012 datalogging temperature and RH sensors in 6 locations per room at 24 inches and one location per room at 43 inches. [1]
Radiant Temperature	Measure at 24 inch height for seated occupants.	Measured at 24 inches in the interior classroom using an infrared thermometer. [2]
Air Speed	Measure for minimum of 3 minutes duration at same height and location as air temperature measurements.	Neglected, sensors not available.
Humidity	Measure in one location in the occupied zone, unless large humidity variations are suspected.	Measured (with air temperature) by HOBO U12-12 sensors.

1. The 4 inch measurements were neglected due to concerns of tampering or damage to the sensors.
2. The portable classroom had no radiant heat sources and was not measured.

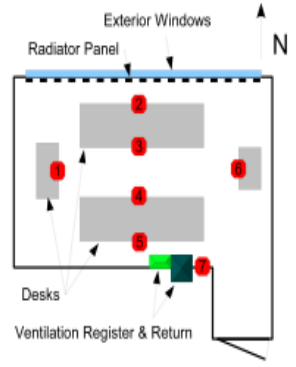


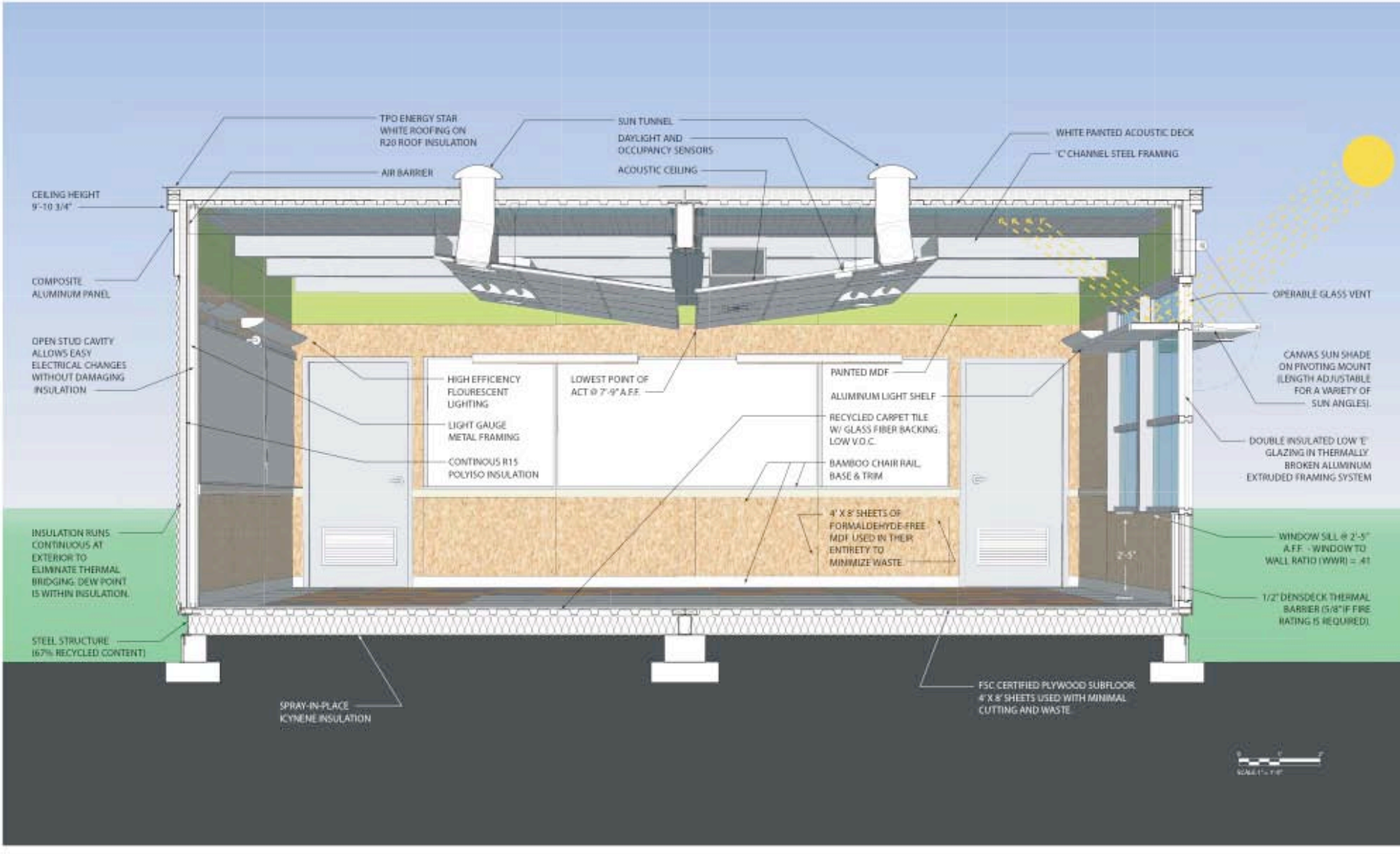
Figure 1: Interior Classroom Layout

Number of research papers prepared	4
Number of graduate students involved	22
Number of undergraduate students involved	32
Number of sustainability events held	6
Number of sustainability courses developed and/or taught	Three (two in architecture and urban studies, one a capstone
Number of proposals submitted for external funding	One, to HUD, three more in process
Number of external partnerships formed (please list the organizations/institutions)	>AIA (Portland and Oregon) >Albina Bank >Portland Public Schools (PPS) >David Douglas Public School District >Parkrose School District >Visual Online Solutions and Zen Freese (donation of film production of "*PSU & AIA Rethinks Modular Schools* "and documentation of public Symposium and Charrette > Council of Educational Facility Planners International >Modern Building Systems >Blazzer Industries >KPFF Engineering
Number of internal partnerships formed	8 department formal collaboration relationships 5 departmental research relationships

WHERE NEXT?

public / private collaboration in the creation of a prototype project

Learning from the solar decathlons and industry


TPO ENERGY STAR WHITE ROOFING ON R20 ROOF INSULATION
SUN TUNNEL
DAYLIGHT AND OCCUPANCY SENSORS
ACOUSTIC CEILING
WHITE PAINTED ACOUSTIC DECK
'C' CHANNEL STEEL FRAMING
AIR BARRIER
CEILING HEIGHT 9'-10 3/4"
COMPOSITE ALUMINUM PANEL
OPERABLE GLASS VENT
OPEN STUD CAVITY ALLOWS EASY ELECTRICAL CHANGES WITHOUT DAMAGING INSULATION
CANVAS SUN SHADE ON PIVOTING MOUNT (LENGTH ADJUSTABLE FOR A VARIETY OF SUN ANGLES).
HIGH EFFICIENCY FLOURESCENT LIGHTING
LOWEST POINT OF ACT @ 7'-9" A.F.F.
PAINTED MDF
ALUMINUM LIGHT SHELF
RECYCLED CARPET TILE W/ GLASS FIBER BACKING. LOW V.O.C.
LIGHT GAUGE METAL FRAMING
CONTINOUS R15 POLYISO INSULATION
BAMBOO CHAIR RAIL, BASE & TRIM
DOUBLE INSULATED LOW 'E' GLAZING IN THERMALLY BROKEN ALUMINUM EXTRUDED FRAMING SYSTEM
4' X 8' SHEETS OF FORMALDEHYDE-FREE MDF USED IN THEIR ENTIRETY TO MINIMIZE WASTE
INSULATION RUNS CONTINUOUS AT EXTERIOR TO ELIMINATE THERMAL BRIDGING. DEW POINT IS WITHIN INSULATION.
WINDOW SILL @ 2'-5" A.F.F. - WINDOW TO WALL RATIO (WWR) = .41
2'-5"
1/2" DENSDECK THERMAL BARRIER (5/8" IF FIRE RATING IS REQUIRED)
STEEL STRUCTURE (67% RECYCLED CONTENT)
SPRAY-IN-PLACE KYNENE INSULATION
FSC CERTIFIED PLYWOOD SUBFLOOR 4' X 8' SHEETS USED WITH MINIMAL CUTTING AND WASTE

MEMBER WORK AREA

GREEN SCHOOLS OF THE FUTURE

News

Website Kick-Off
11 Sep 2010

Feature

09.05.10

The Learning Activism Symposium featured a day-long design charrette that focused on the development of well designed, sustainable and affordable modular classrooms.

Read the Entry

film on the charrette

- http://schools.basicinitiative.com/