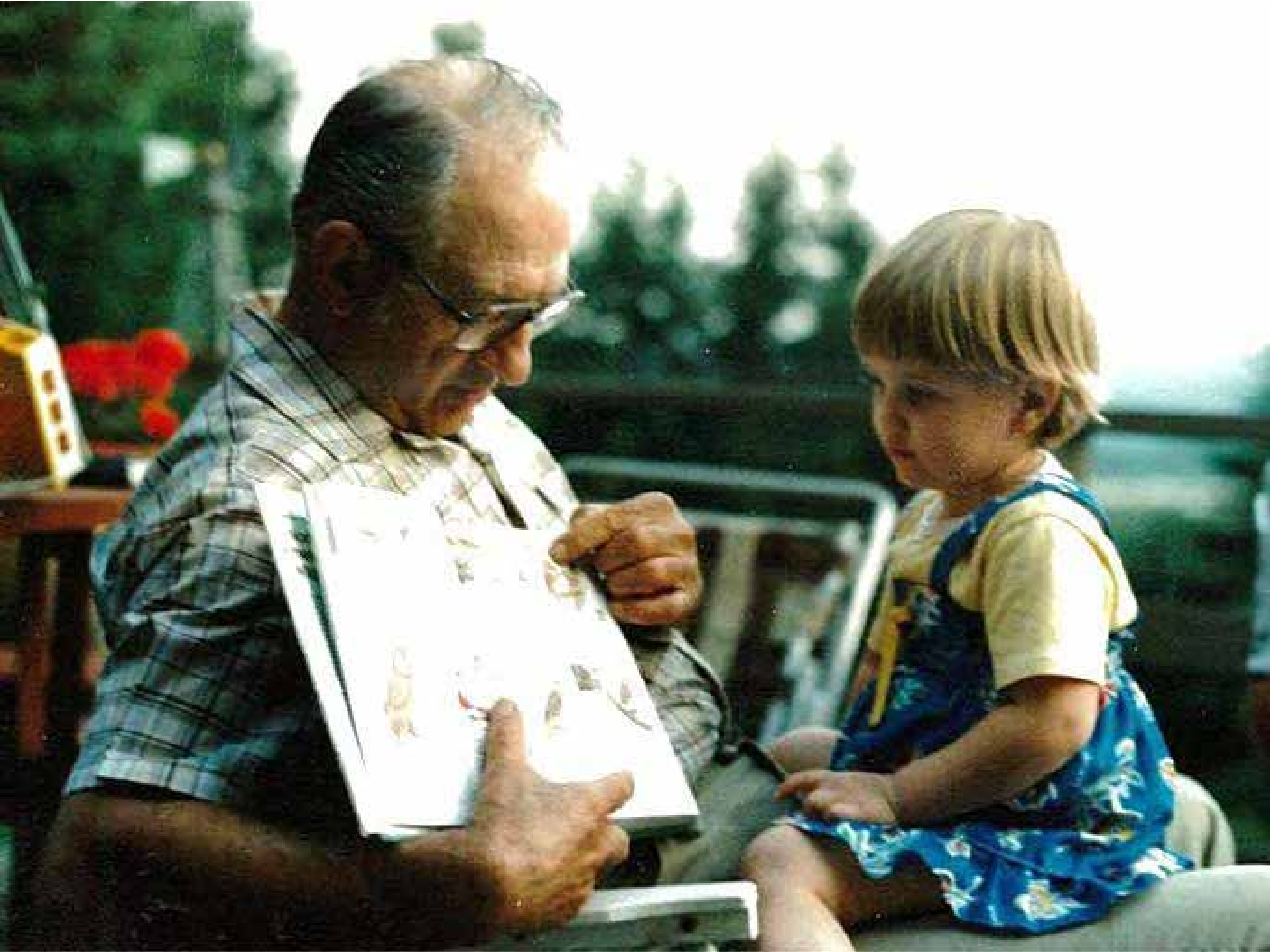
Why Can't Every Building Be LIVING?

The SEED Collaborative
Stacy H. Smedley
James Jenkins

@ ELUG / 3.19.2013




1996


KMD ARCHITECTS

Bertschi School

CULTIVATING CREATIVITY, CONFIDENCE AND COMPASSION.

Bertschi School educates children to become compassionate, confident and creative learners in a global community.

Founded 1975

- **Pre-K through 5th**
- **228 Students**
- **30 Faculty**

SCHOOL VALUES:

Our community values integrity, inclusiveness, respect, and a commitment to **sustainable** practices.

20 imperatives

Site

01 Limits to Growth

02 Urban Agriculture

03 Habitat Exchange

04 Car Free Living

Water

05 Net Zero Water

06 Ecological Water Flow

Energy

07 Net Zero Energy

Health

08 Civilized Environment

09 Healthy Air

10 Biophilia

Materials

11 Red List

12 Embodied Carbon Footprint

13 Responsible Industry

14 Appropriate Sourcing

15 Conservation + Reuse

Equity

16 Human Scale + Humane Places

17 Democracy + Social Justice

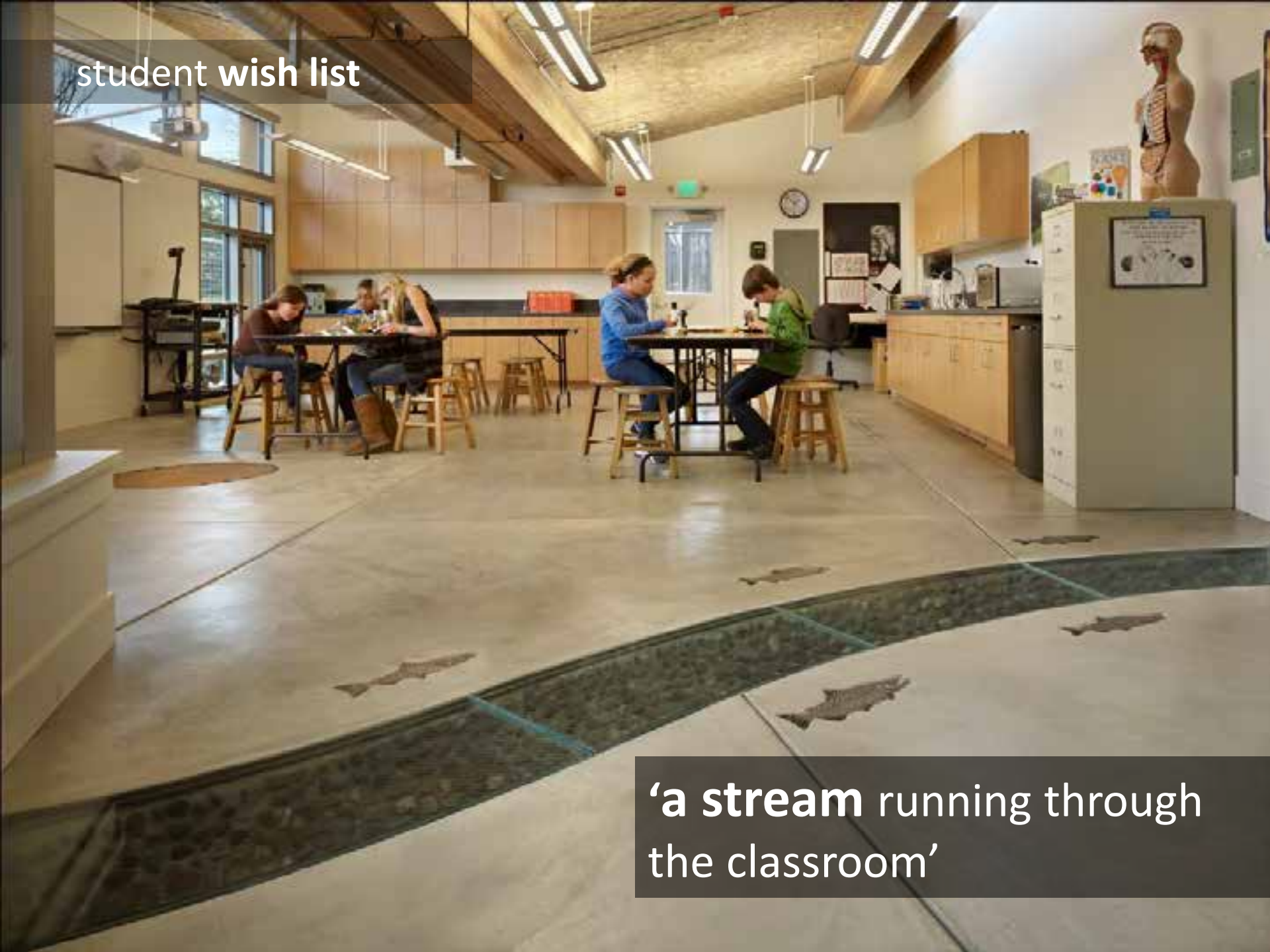
18 Rights to Nature

Beauty

19 Beauty + Spirit

20 Inspiration + Education


student **wish list**
‘a greenhouse where
something is always growing’

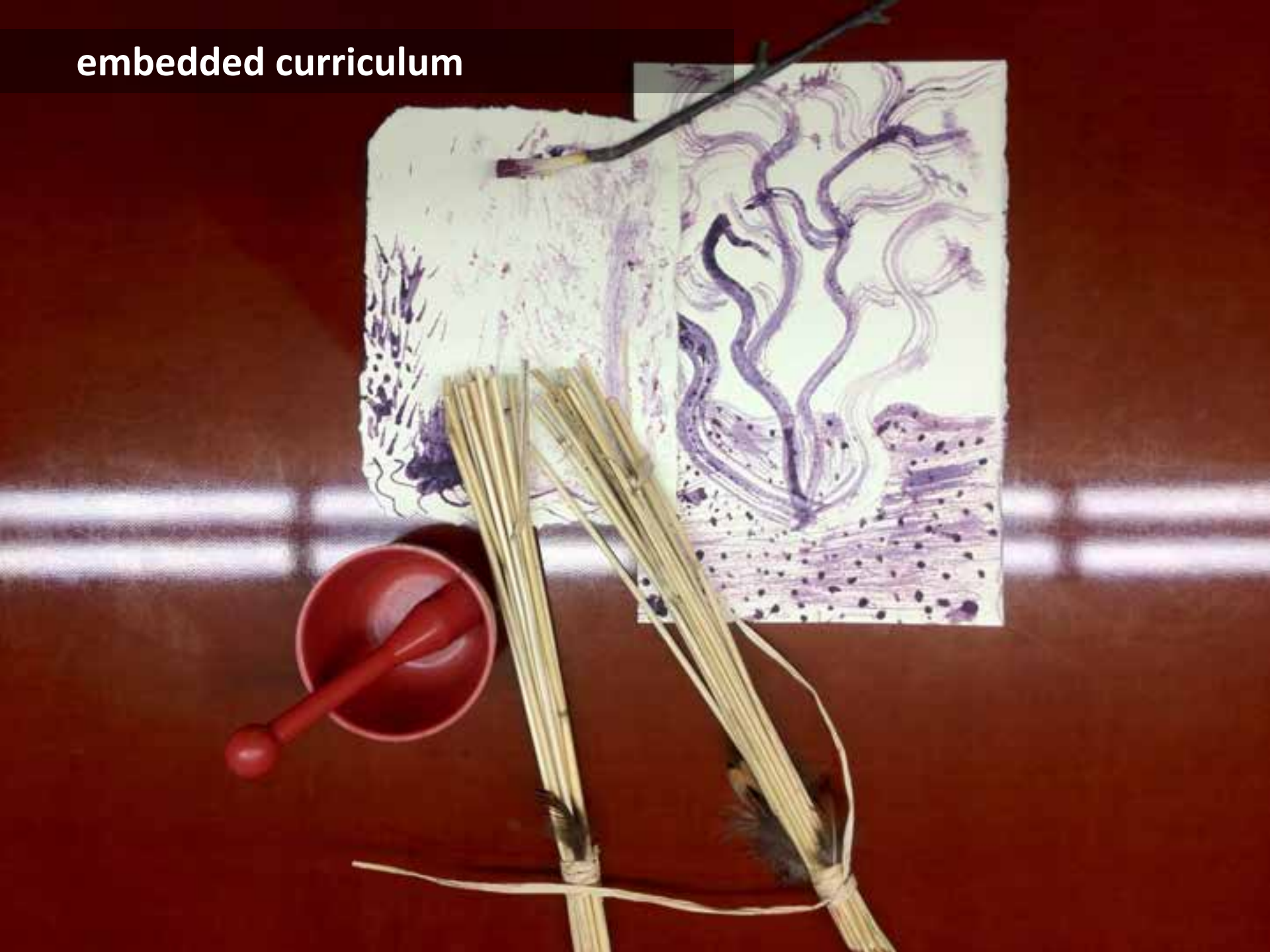

student **wish list**
‘a stream running through the classroom’


student **wish list**
‘a bamboo fountain to relieve stress’


student **wish list**
'cisterns to collect water for students to see and monitor rainfall'


student **wish list**
‘a composting toilet’

embedded curriculum



embedded curriculum

“Now I wonder why all buildings aren’t living…”

-Bertschi School 5th Grader

So do we…


Create. Educate. Innovate.
JSC
JASPER SUSTAINABILITY CLUB FOR YOUTH
method homes
seed
sustainable education every day

The SEED Collaborative

what if... my classroom **contained no toxic materials**?

what if... the water I used in the sink **came from the rain**?

what if... I could **grow my own snacks** to eat at school?

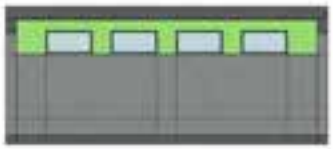
what if... the toilet I used **composted my waste**?

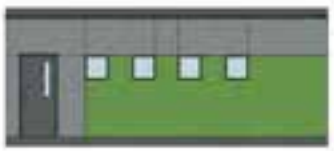
what if... the energy my classroom needed **came from the sun**?

what if... **my classroom was my teacher**?

Why **portables**?

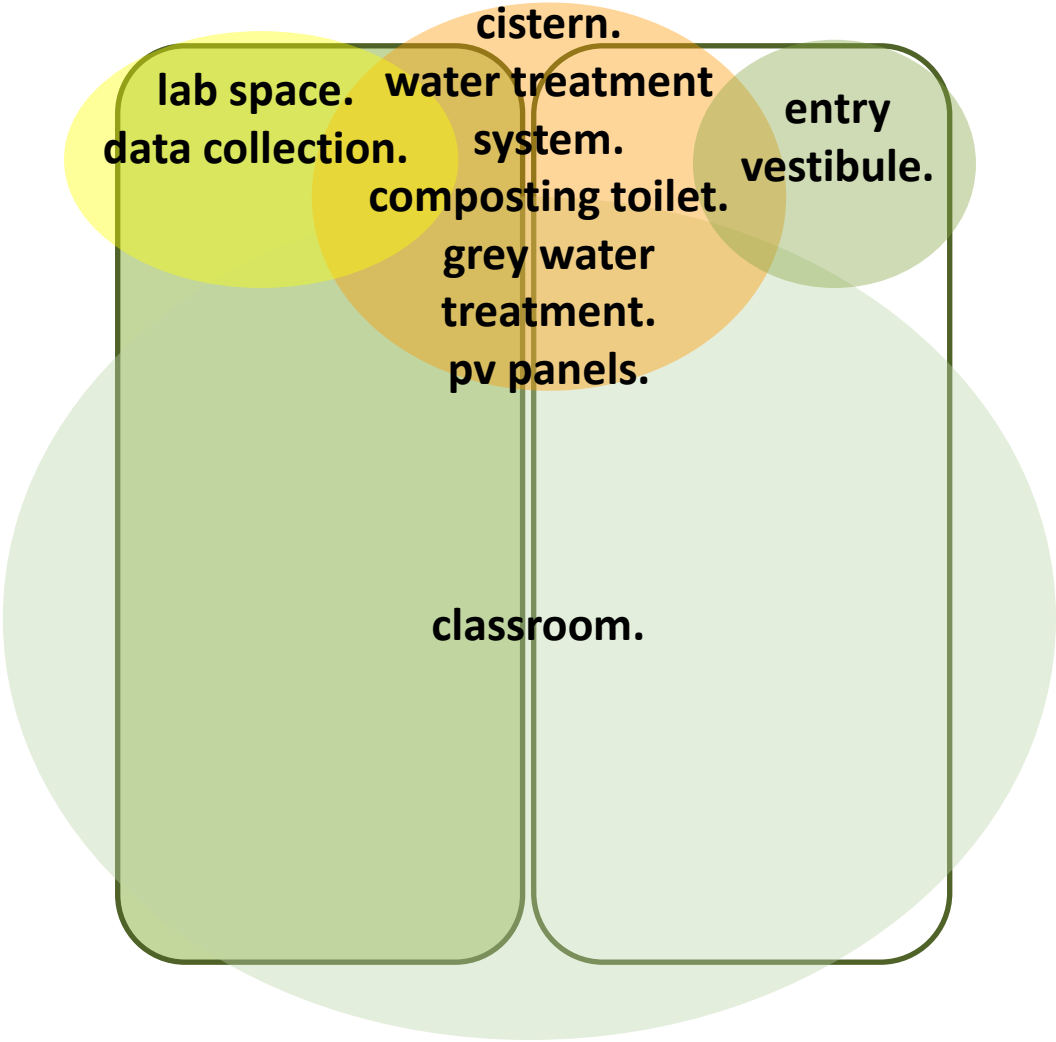
SEEDClassroom

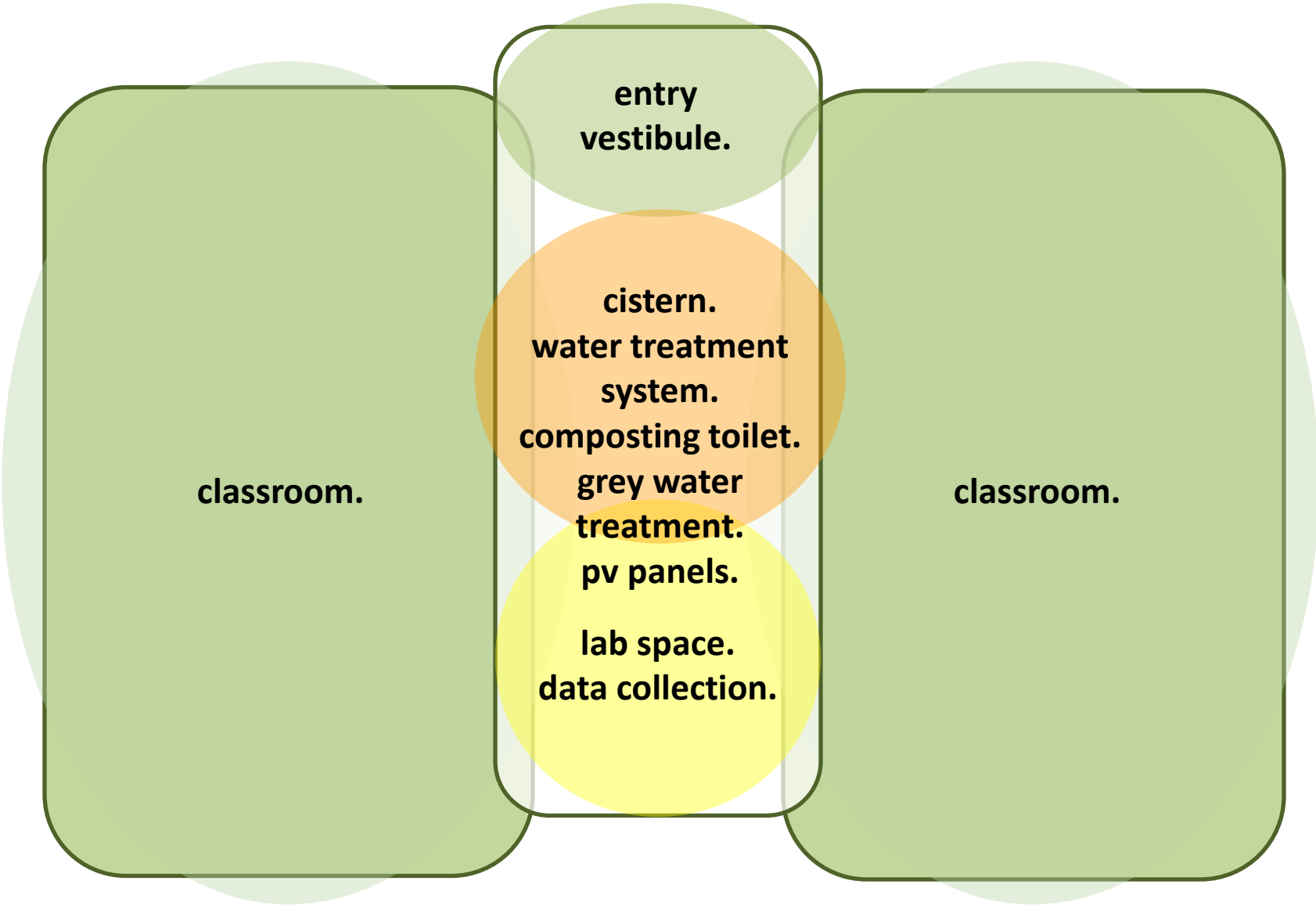




SEEDClassroom

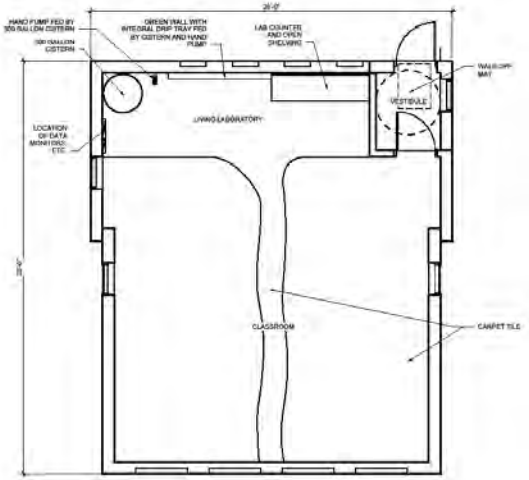
- Living Building
- Net-zero energy
- Net-zero water
- 100% non-toxic
- 100-year construction
- STE[A]M ready

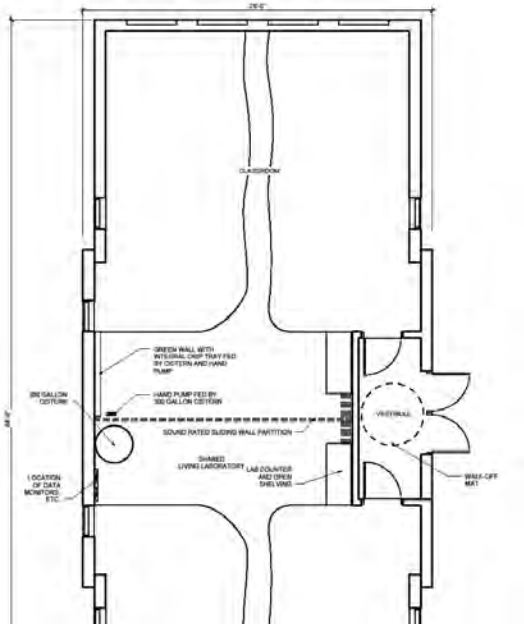


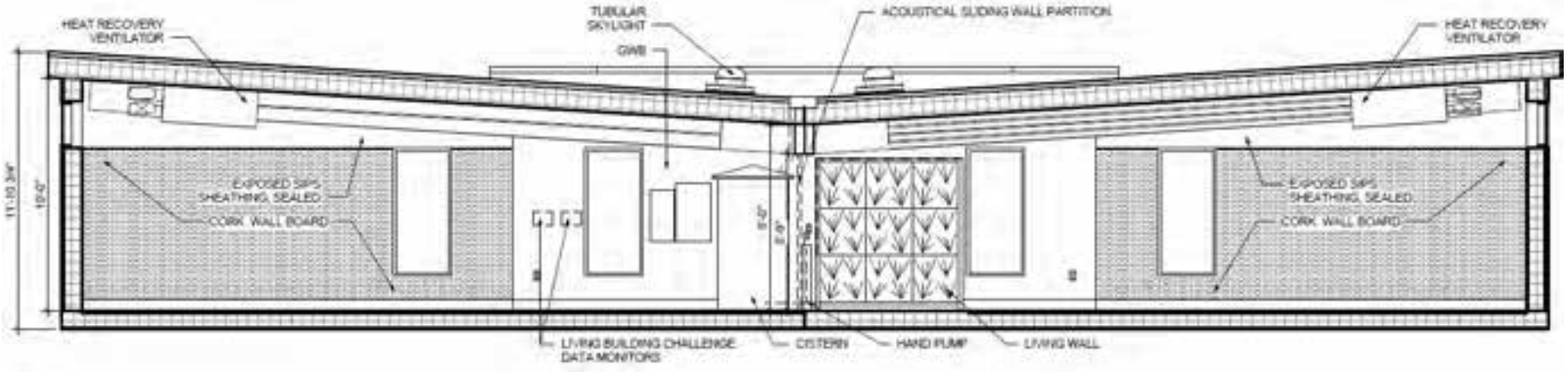

entry
vestibule.
classroom.
cistern.
water treatment
system.
composting toilet.
grey water
treatment.
pv panels.
lab space.
data collection.
classroom.


28'-0"
32'-0"
HAND PUMP FED BY 300 GALLON CISTERN
300 GALLON CISTERN
GREEN WALL WITH INTEGRAL DRIP TRAY FED BY CISTERN AND HAND PUMP
PROPOSED LOCATION OF TELE-COMM BOARD
WALK-OFF MAT
VESTIBULE
LIVING LABORATORY
LOCATION OF DATA MONITORS, ETC
OPTIONAL RESTROOM WITH COMPOSTING TOILET LOCATED HERE
CLASSROOM

1 FLOOR PLAN


HAND PUMP FED BY 500 GALLON CISTERN
500 GALLON CISTERN
GREEN WALL WITH INTEGRAL DRIP TRAY FED BY CISTERN AND HAND PUMP
LAB COUNTER AND OPEN SHELVING
WALL-OFF MAT
VESTIBULE
LIVING LABORATORY
LOCATION OF DATA MONITORS, ETC.
CLASSROOM
CARPET TILE


CLASSROOM
GREEN WALL WITH INTEGRAL DRIP TRAY FED BY CISTERN AND HAND PUMP
500 GALLON CISTERN
HAND PUMP FED BY 500 GALLON CISTERN
SOUND RATED SLIDING WALL PARTITION
VESTIBULE
SHARED LIVING LABORATORY
LAB COUNTER AND OPEN SHELVING
WALL-OFF MAT
LOCATION OF DATA MONITORS, ETC.


HEAT RECOVERY VENTILATOR
TUBULAR SKYLIGHT
GWB
ACOUSTICAL SLIDING WALL PARTITION
HEAT RECOVERY VENTILATOR
EXPOSED SIPS SHEATHING, SEALED
CORK WALL BOARD
EXPOSED SIPS SHEATHING, SEALED
CORK WALL BOARD
LIVING BUILDING CHALLENGE DATA MONITORS
CISTERN
HAND PUMP
LIVING WALL

SEEDClassroom Design

Envelope:

- SIPs construction
- R-40 floor / R-48 wall / R-56 roof

HVAC:

- Mini-split ductless heat pump
- HRV
- 10 operable windows

Materials:

- 100% non-toxic materials
- Local sourcing

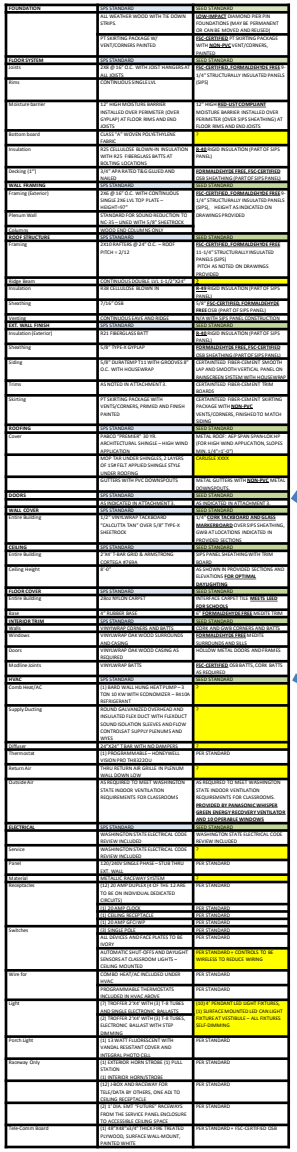
Net-Zero Energy:

- 6 kWh PV system
- LED lighting

Net-Zero Water:

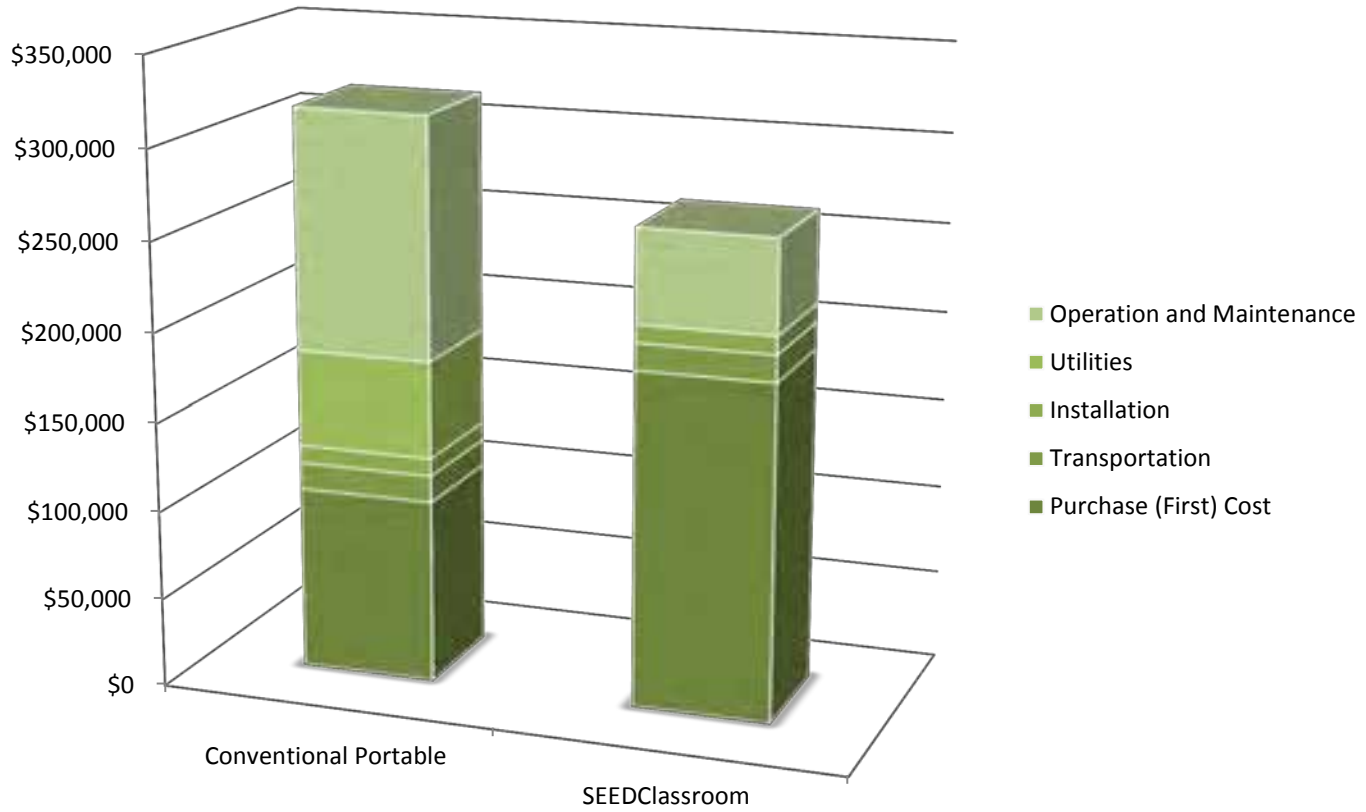
- Rainwater harvest
- Graywater recapture
- Composting toilet
- Living Wall

Corrective Action…

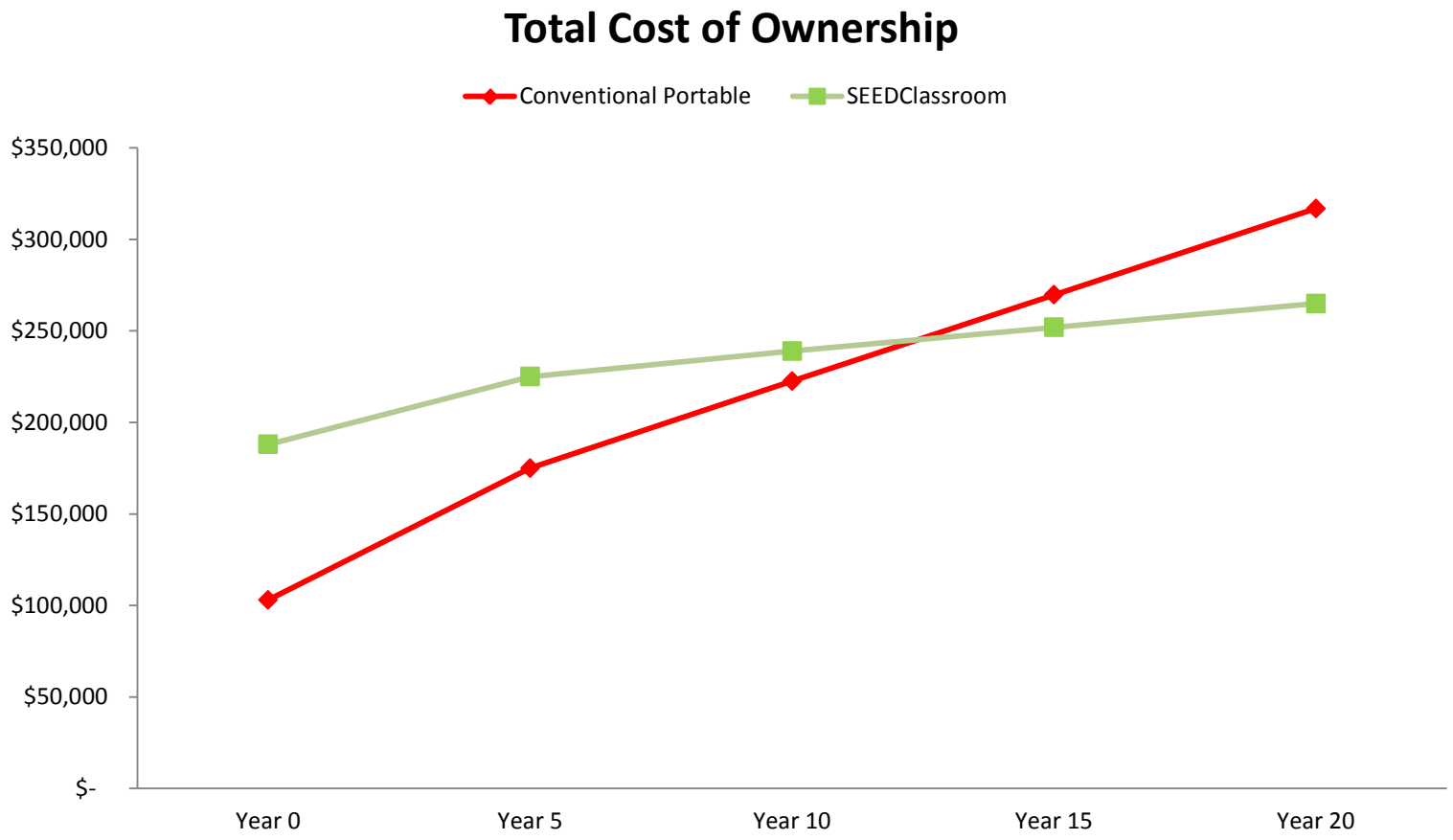


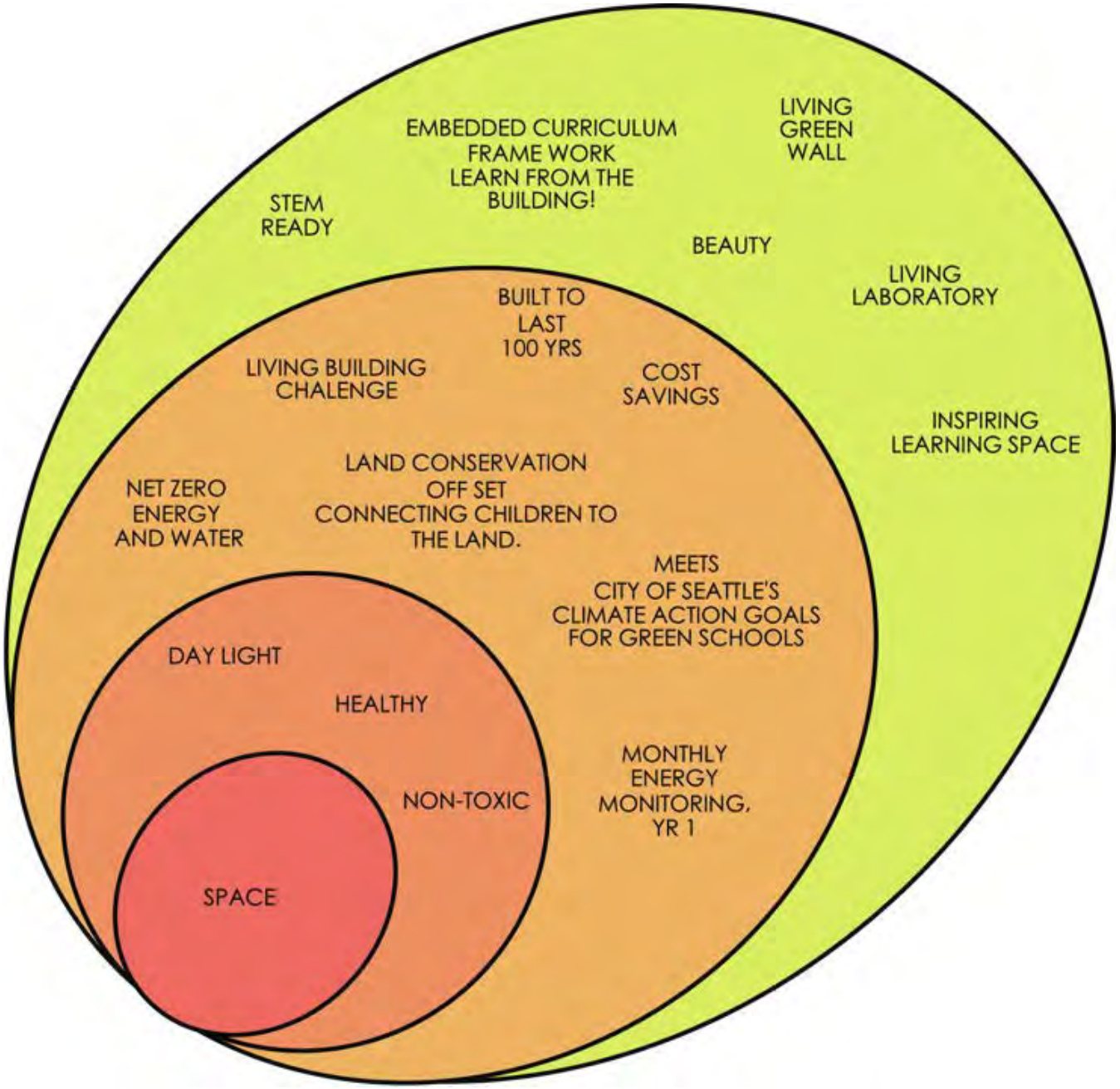
WALL COVER	SPS STANDARD	SEED STANDARD
Entire Building	1/2” VINYLWRAP TACKBOARD “CALCUTTA TAN” OVER 5/8” TYPE-X SHEETROCK	1/4” **CORK TACKBOARD AND GLASS MARKERBOARD** OVER SIPS SHEATHING, GWB AT LOCATIONS INDICATED IN PROVIDED SECTIONS
CEILING	SPS STANDARD	SEED STANDARD
Entire Building	2’X4’ T-BAR GRID & ARMSTRONG CORTEGA #769A	SIPS PANEL SHEATHING WITH TRIM BOARD
Ceiling Height	8’-0”	AS SHOWN IN PROVIDED SECTIONS AND ELEVATIONS **FOR OPTIMAL DAYLIGHTING**
FLOOR COVER	SPS STANDARD	SEED STANDARD
Entire Building	28oz NYLON CARPET	INTERFACE CARPET TILE **MEETS LEED FOR SCHOOLS**
Base	4” RUBBER BASE	6” **FORMALDEHYDE FREE** MEDITE TRIM
INTERIOR TRIM	SPS STANDARD	SEED STANDARD
Walls	VINYlWRAP CORNERS AND BATTS	CORK AND GWB CORNERS AND BATTS
Windows	VINYLWRAP OAK WOOD SURROUNDS AND CASING	**FORMALDEHYDE FREE** MEDITE SURROUNDS AND SILLS
Doors	VINYLWRAP OAK WOOD CASING AS REQUIRED	HOLLOW METAL DOORS AND FRAMES
Modline Joints	VINYLWRAP BATTS	**FSC-CERTIFIED** OSB BATTS, CORK BATTS AS REQUIRED
HVAC	SPS STANDARD	SEED STANDARD

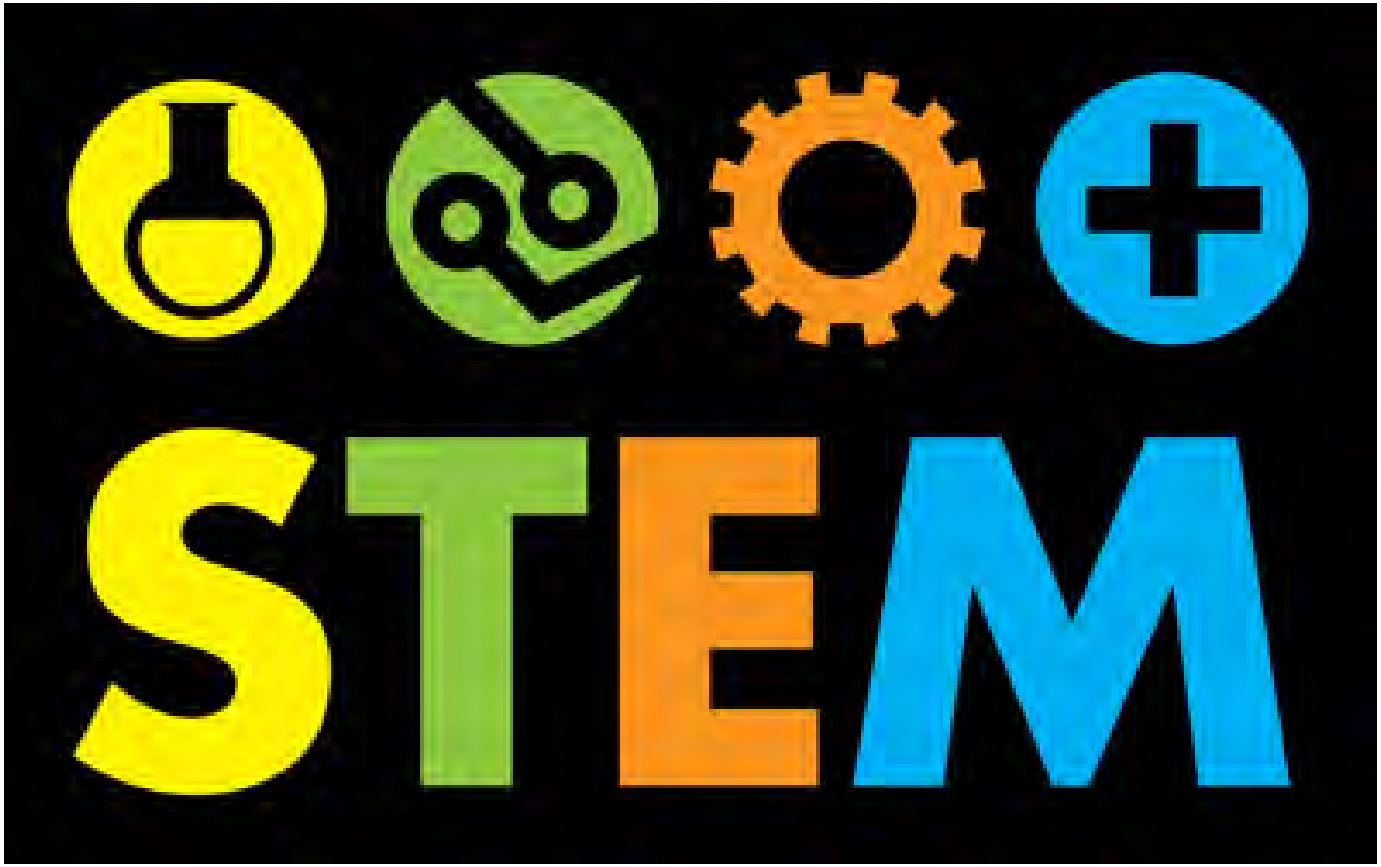
Total Cost of Ownership

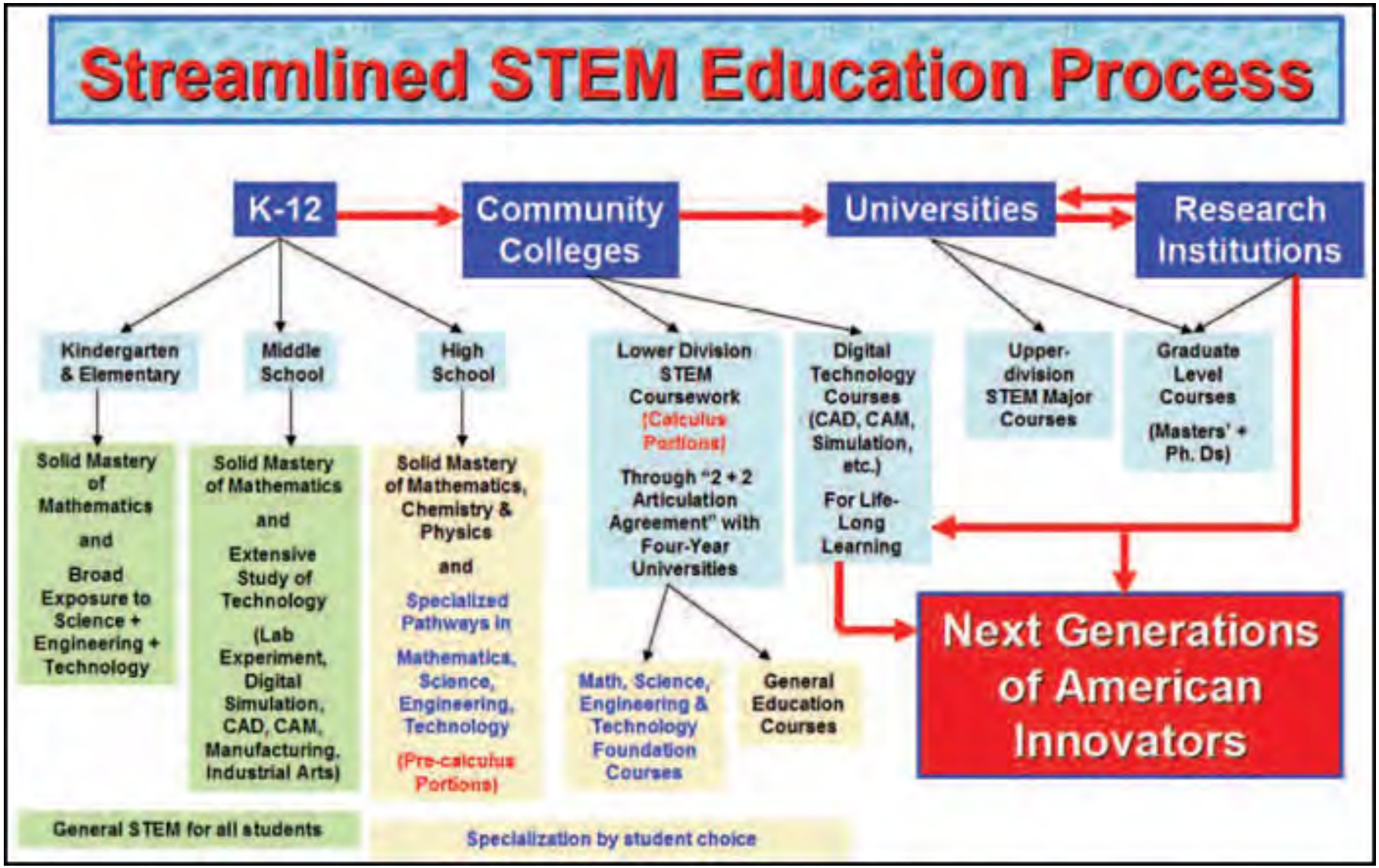


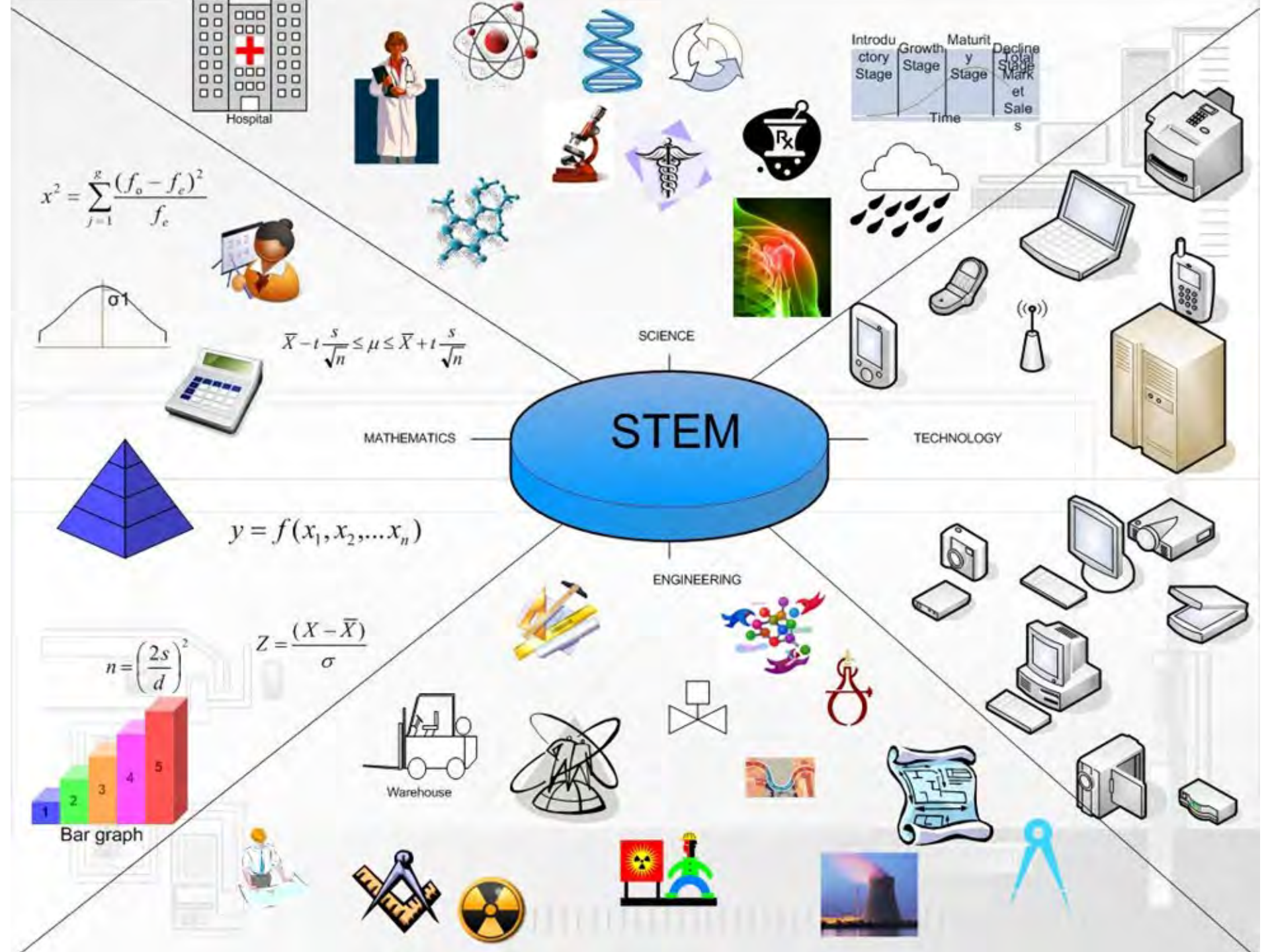
Lifecycle Analysis




EMBEDDED CURRICULUM
FRAME WORK
LEARN FROM THE
BUILDING!
LIVING
GREEN
WALL
STEM
READY
BEAUTY
LIVING
LABORATORY
BUILT TO
LAST
100 YRS
LIVING BUILDING
CHALENGE
COST
SAVINGS
INSPIRING
LEARNING SPACE
LAND CONSERVATION
OFF SET
CONNECTING CHILDREN TO
THE LAND.
NET ZERO
ENERGY
AND WATER
MEETS
CITY OF SEATTLE'S
CLIMATE ACTION GOALS
FOR GREEN SCHOOLS
DAY LIGHT
HEALTHY
MONTHLY
ENERGY
MONITORING,
YR 1
NON-TOXIC
SPACE


STEM


Streamlined STEM Education Process
K-12
Community Colleges
Universities
Research Institutions
Kindergarten & Elementary
Middle School
High School
Lower Division STEM Coursework (Calculus Portions) Through "2 + 2 Articulation Agreement" with Four-Year Universities
Digital Technology Courses (CAD, CAM, Simulation, etc.) For Life-Long Learning
Upper-division STEM Major Courses
Graduate Level Courses (Masters' + Ph. Ds)
Solid Mastery of Mathematics and Broad Exposure to Science + Engineering + Technology
Solid Mastery of Mathematics and Extensive Study of Technology (Lab Experiment, Digital Simulation, CAD, CAM, Manufacturing, Industrial Arts)
Solid Mastery of Mathematics, Chemistry & Physics and Specialized Pathways in Mathematics, Science, Engineering, Technology (Pre-calculus Portions)
Math, Science, Engineering & Technology Foundation Courses
General Education Courses
Next Generations of American Innovators
General STEM for all students
Specialization by student choice

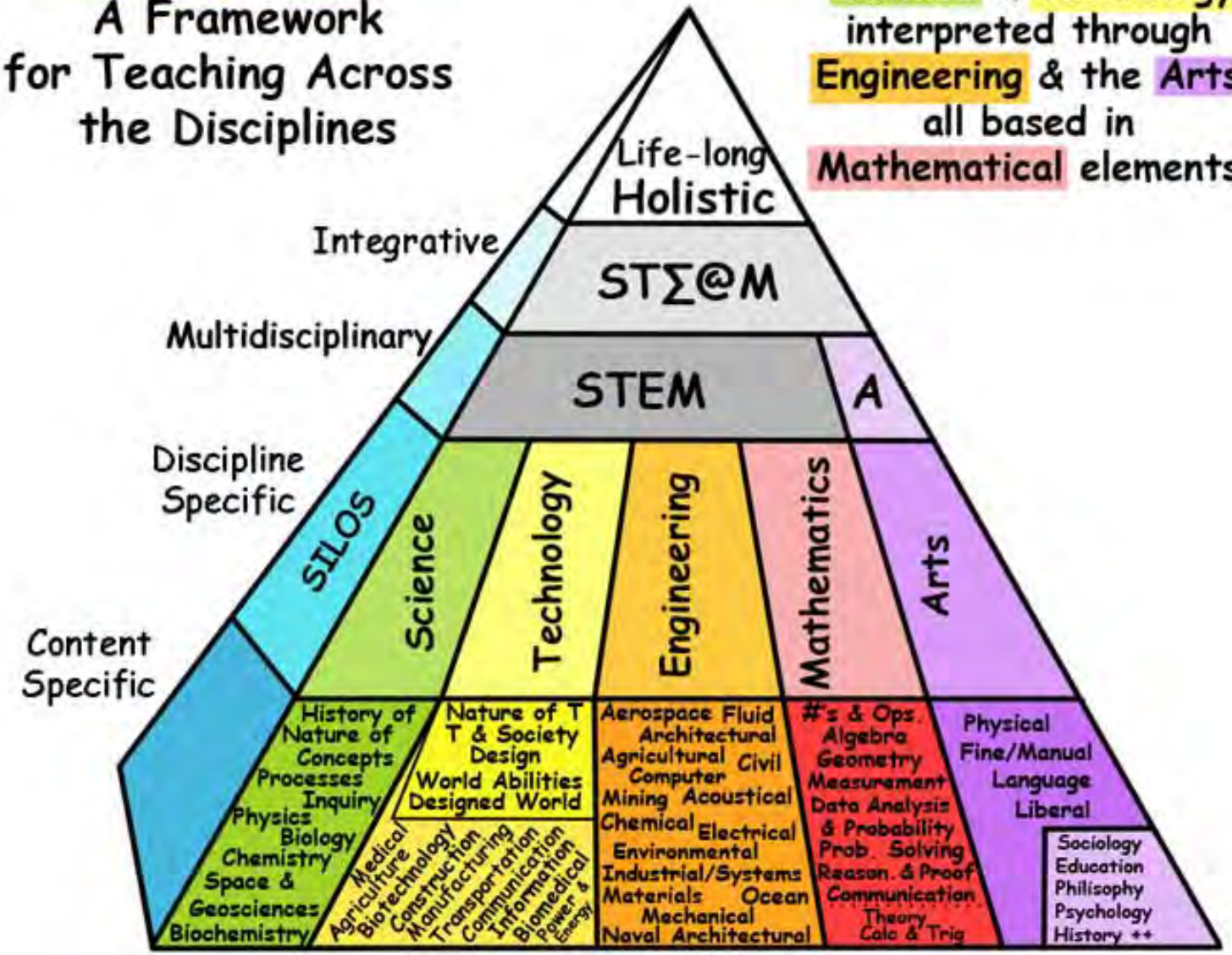

Hospital
Introductory Stage
Growth Stage
Maturity Stage
Decline Stage
Total Market Sales
Time
$x^2 = \sum_{j=1}^{g} \frac{(f_o - f_e)^2}{f_e}$
σ1
$\bar{X} - t\frac{s}{\sqrt{n}} \le \mu \le \bar{X} + t\frac{s}{\sqrt{n}}$
SCIENCE
MATHEMATICS
STEM
TECHNOLOGY
ENGINEERING
$y = f(x_1, x_2, \ldots x_n)$
$Z = \frac{(X - \bar{X})}{\sigma}$
$n = \left(\frac{2s}{d}\right)^2$
1
2
3
4
5
Bar graph
Warehouse

problem
critical
development
communication
collaboration
assessment
project-based
solving
creativity
engagement
research
inquiry
thinking
hands-on
integration
comprehensive
intentional
engineering
disciplinary
cognitive
math
practices
teaching
student-centered
innovations
skills
involvement
professional
modern
tools
technological
integrated
career-college
global
applied
economy
success
access
Authentic
parent
science
interdisciplinary
learning
readiness
synergistic
application
metacognition
Integration
innovation
universal
Professional
skill-based
transfer
enthusiasm


STE[+a]M™

STΣ@M:
A Framework for Teaching Across the Disciplines

STΣ@M = Science & Technology interpreted through Engineering & the Arts, all based in Mathematical elements.



www.STEAMedu.com

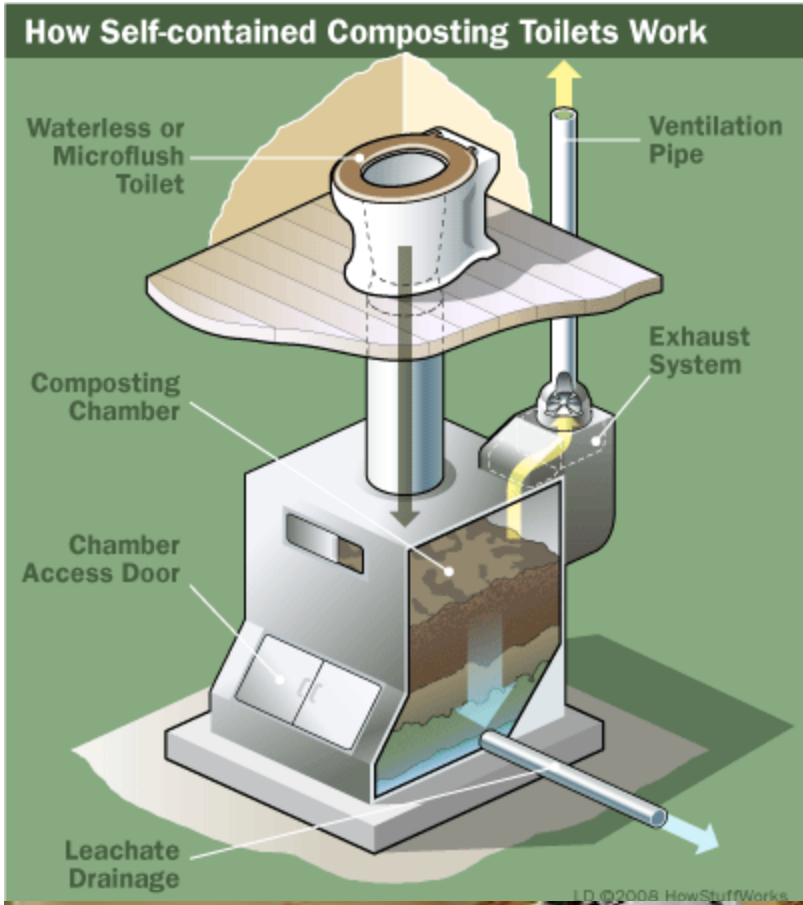
S Science

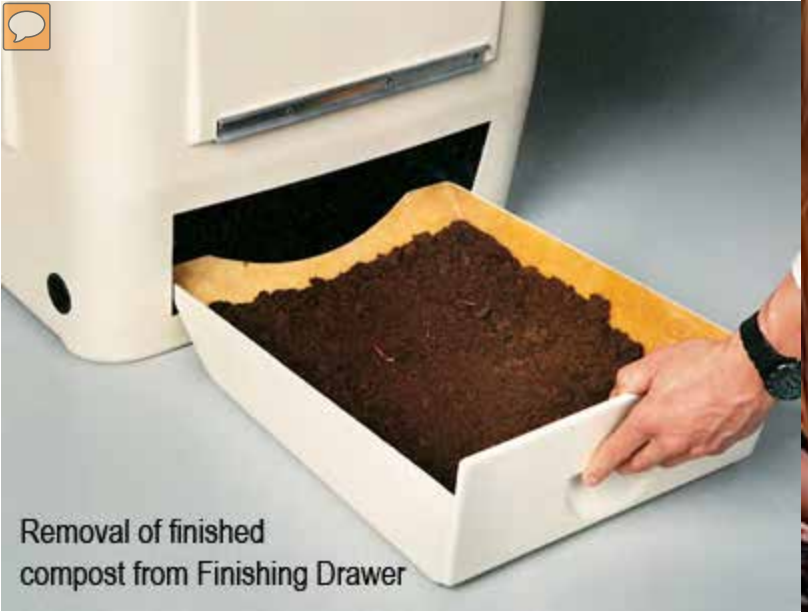
T Technology

E Engineering

M Mathematics

=





Removal of finished
compost from Finishing Drawer

Next Steps…

- Prototype – Living Future 2013
- Select pilots throughout Puget Sound – Interested School Districts
- SEEDClassroom curriculum plug-ins – SEEDPacket
- Train the Teacher workshops
- Living Building Classroom consulting

A self-sustaining , modular living classroom that teaches

Why can’t every building be **LIVING**?

www.theseedcollaborative.org