STEAMing Down River

A Fresh K-8 Model

A4E
ARCHITECTURE FOR EDUCATION INCORPORATED

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Design Principal

What is STEAM and why is it important?

Research

Adding the arts to STEM

Why Add the arts?

- Emphasize cross-curricular learning:
  - critical thinking skills,
  - cooperative learning
  - technological fluency
- Integrating the arts in math 3X = student proficiency in math increased by 23%
- Nobel laureates in the sciences were 22 times more likely involved in the performing arts

Science is looking for Answers

+

Art is looking for Questions

=

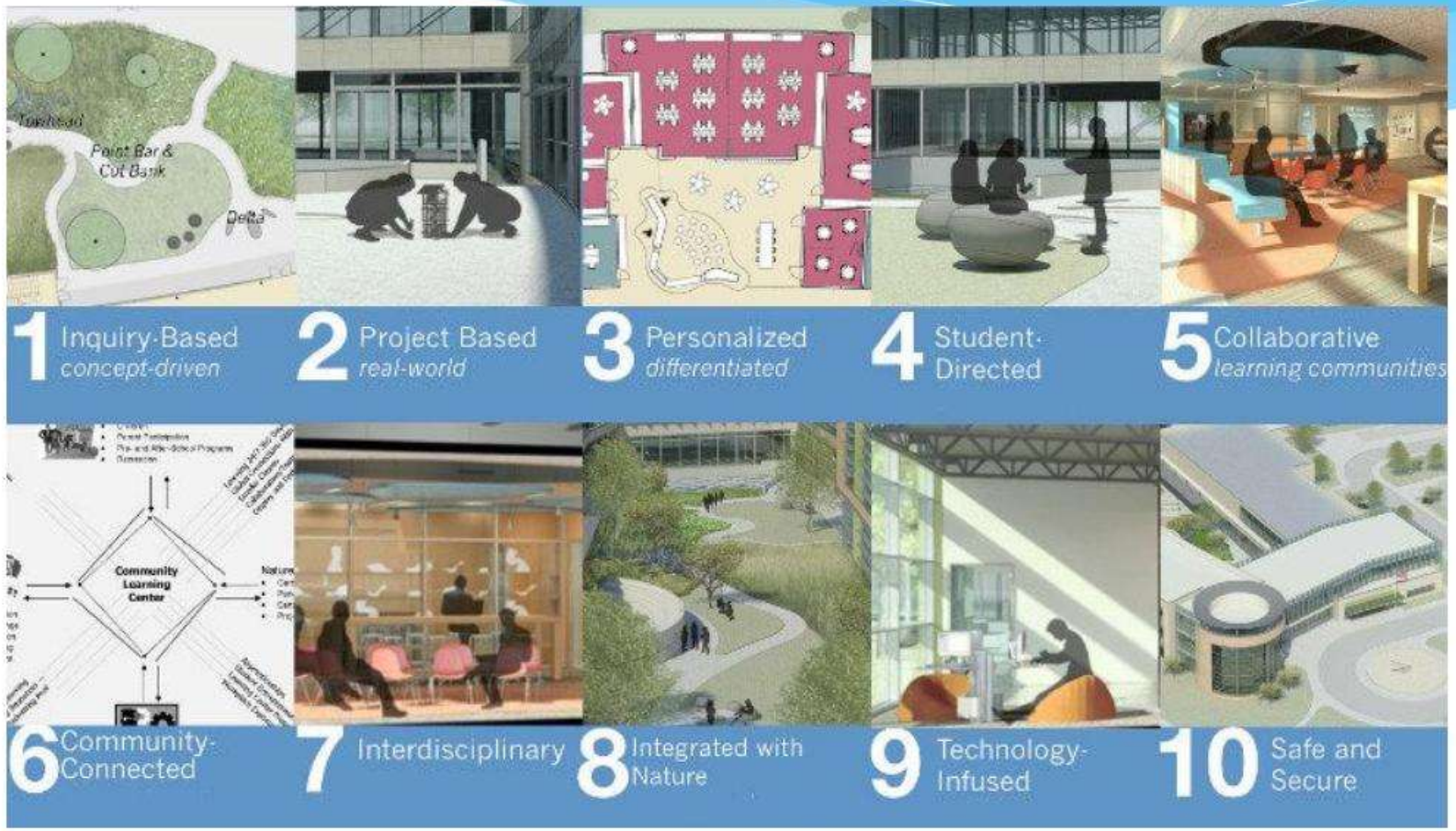
Maker Spaces

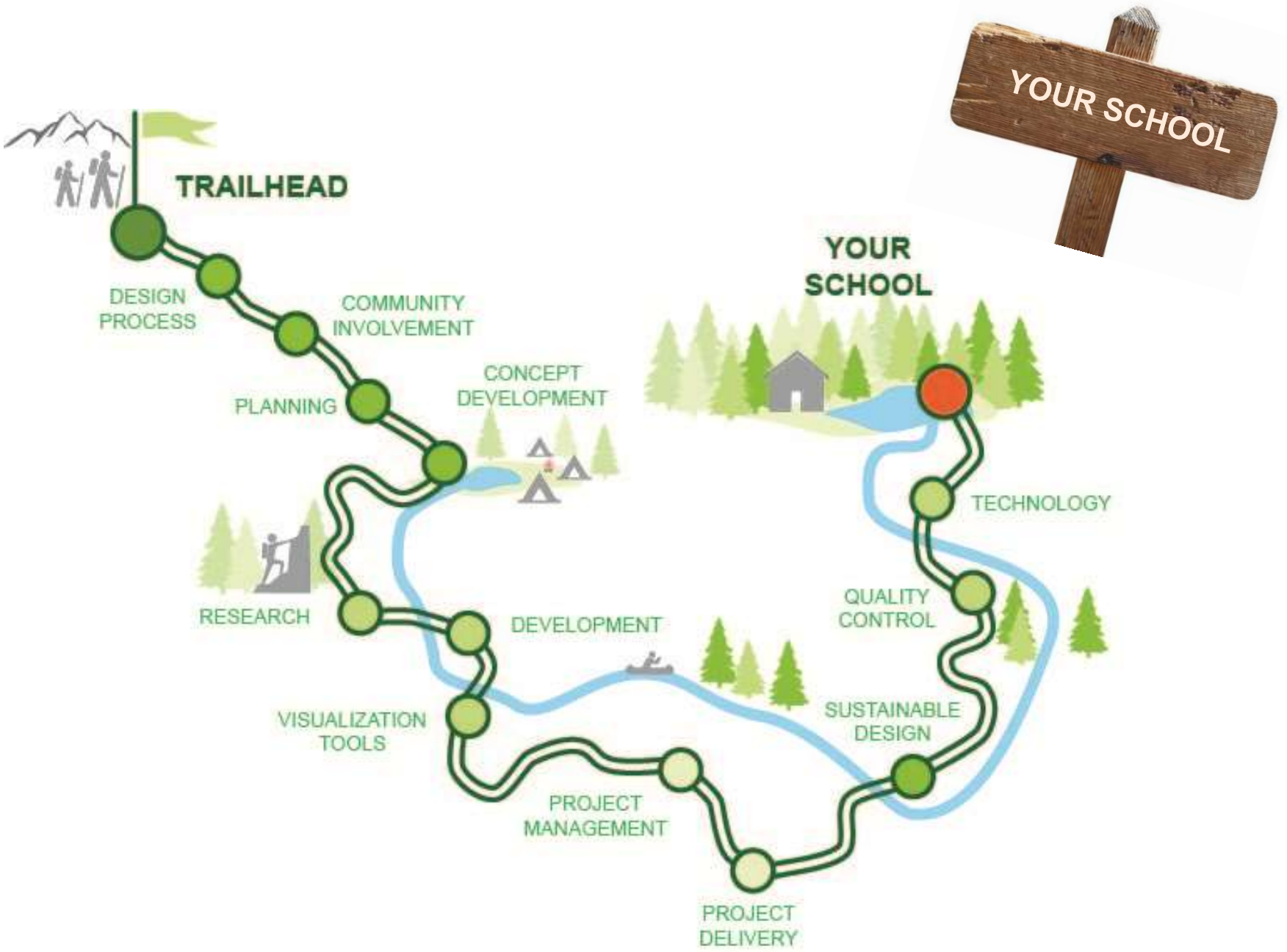
so S.T.E.A.M. it is...

it's interdisciplinary - rather than compartmentalized
its connecting - rather than disconnected
its problem solving - rather than regurgitative
its thinking-based - rather than mindless conformity

its about **INQUIRY**- making up problems and trying to solve them…leading to new problems…

S.T.E.A.M. SCHOOL




YOUR SCHOOL
TRAILHEAD
DESIGN PROCESS
COMMUNITY INVOLVEMENT
PLANNING
CONCEPT DEVELOPMENT
YOUR SCHOOL
TECHNOLOGY
QUALITY CONTROL
SUSTAINABLE DESIGN
RESEARCH
DEVELOPMENT
VISUALIZATION TOOLS
PROJECT MANAGEMENT
PROJECT DELIVERY

Rio K-8 STEAM School

Concept
Design Development
Integrating Landscape
Integrating Interiors

RIO SCHOOL DISTRICT

EDUCATING LEARNERS FOR THE 21ST CENTURY

putting the S.T.E.A.M. in the river

S.T.E.A.M. – What's it all About?

March 16, 2015 / 0 Comments / in District News, Superintendent Blog, Uncategorized, VCSTEAMN /

is learning that focuses on **science,technology,engineering, the Arts, and mathematics.** The Rio School District is working to imbue STEAM learning in all our 8 schools in a variety of ways. In addition, we are in the planning process for constructing a new K-8 STEAM school that will combine architecture, curriculum, and instruction in innovative ways.

I could go on and on about the benefits of STEAM learning and STEAM schools, however, I thought It would useful to provide some basic ideas to respond to the question; **Why STEAM?**

S……. Science learning in the past has often been de-contextualized and relegated to text book work. We think Science learning needs to include doing science, learning the history of science, developing an Inquiry Lens for life, and learning to use scientific perspectives for life-long problem solving.

T……. Technology attracts and engages learners. It can provide rich and speedy feedback. It too needs to be contextualized and "historicalized." It needs to be put into the service of problem solving at local and global levels. It needs to break down institutional barriers to learning. It needs to empower learners. It needs to take into consideration the story of the Luddites.

E……. Engineering is a great and under-exposed field for young learners. It helps solve problems. It's all about design, form, and function. Its about the applied use of math/science, design, and technology which addresses the relevance of learning.

A……. Arts are about being human. We need to allow and teach learners to create art. Art leads to other things. Art separates man from beast. Art is often under-taught and usually includes the misconception that to be good at the arts it is all about what talent you are born with rather than what you learn and how hard you work. The same is true for mathematics.

M…… Mathematics is rarely taught in context. Math needs to be taught in ways that make it real to learners. Learners need to see math in action. They need to see the beauty and creativity in math work. They need to develop the right balance of procedural and conceptual understanding. All of these math learning opportunities are availed in STEAM learning. STEAM learning can engage the math learner in their development as speakers of the universal language of math which is perhaps, the universal language of the universe or at least, the human mind.

Funding/Designing K-8 STEAM School

- 2Yrs Rio developed a Master plan
- Includes Ventura County's first K-8 STEAM school.
- District's enrollment growth & lack of capacity
- Neighborhood and community choice school
- This will be a "maker place."

RIO SCHOOL DISTRICT

EDUCATING LEARNERS FOR THE 21ST CENTURY

Rio School District
Facilities Master Plan 2014
2500 Vineyard Avenue
Oxnard, CA 93036

September 1, 2014

A4E
ARCHITECTURE FOR EDUCATION INCORPORATED

sage institute

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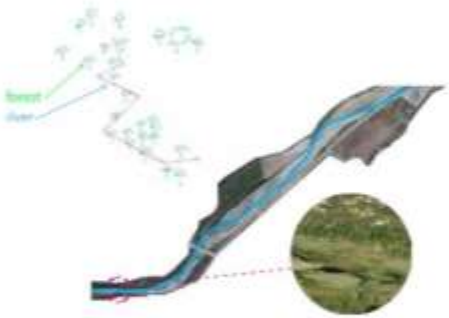
Rio Real Elementary School

concept: river through a forest



inspirations

campus improvements overview

Bond Improvements

1. add a new kindergarten
2. expand administration building
3. bus drop off zone on kenny st.

Campus Transformation

4. transform existing classrooms and add classroom visual presentation system
5. upgrade campus security
6. upgrade campus district technology

Future Improvements

7. construct 2-story classroom bldg
8. convert building 8 to STEAM Center
9. construct multipurpose gymnasium

vignettes

New Entry+Administration Building

New Kindergarten+Playground

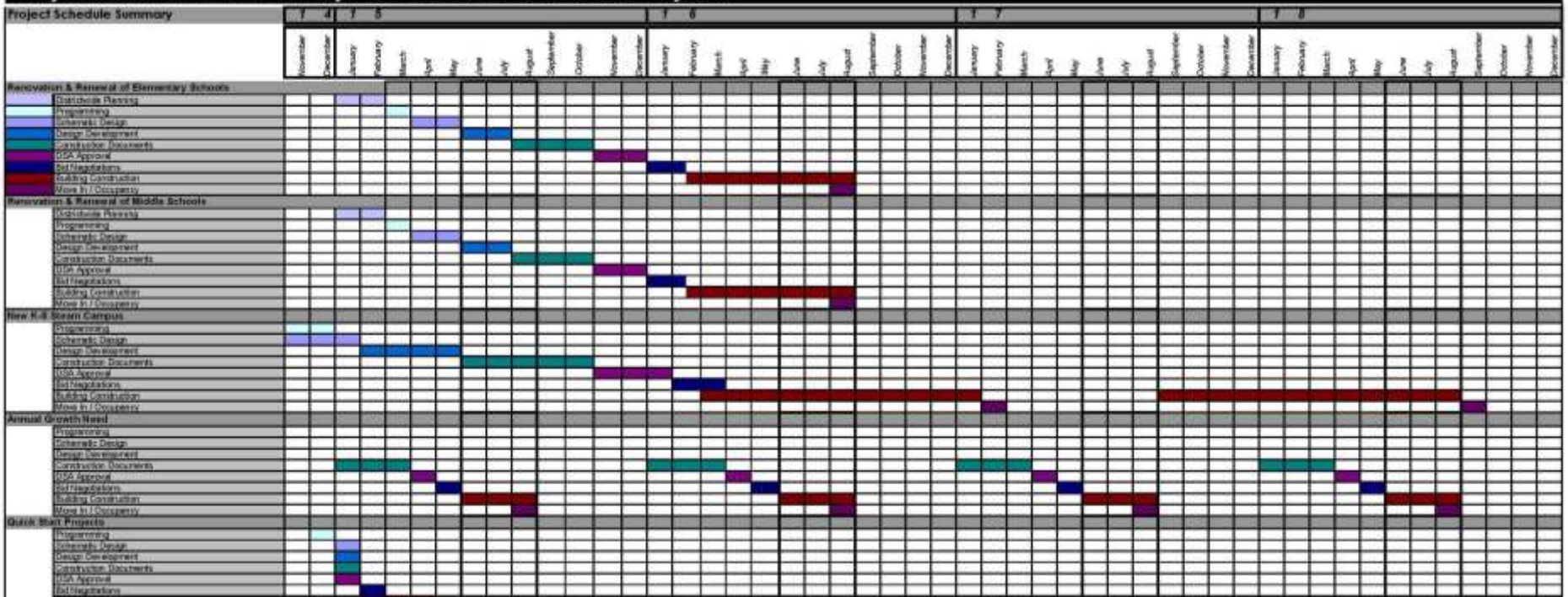
New Gymnasium

District Cost Estimate Summary

GO BOND FINANCIAL ANALYSIS - SUMMARY

Name	Site Improvements Subtotal	Building Exterior Subtotal	Modernization Subtotal	New Construction/ Additions Subtotal	Campus Security Subtotal	Technology Subtotal	Accessibility Upgrades Subtotal	Mechanical Subtotal	Plumbing Subtotal	Electrical Subtotal	Campus Soft Costs*	Construction Cost Estimate
Elementary School Campuses												
Rio del Mar	$ 120,750	$ -	$ -	$ 1,668,250	$ 187,938	$ 165,000	$ -	$ -	$ -	$ -	$ 650,740	$ 2,792,678
Rio del Norte	$ -	$ -	$ -	$ 1,792,300	$ 184,046	$ 217,500	$ -	$ -	$ -	$ -	$ 607,134	$ 2,800,980
Rio Lindo	$ 399,425	$ -	$ 2,741,975	$ 2,216,800	$ 191,830	[1]	$ -	$ -	$ -	$ 44,000	$ 1,670,526	$ 7,264,558
Rio Plaza	$ 313,432	$ -	$ 3,888,600	$ 1,523,950	$ 147,938	[2]	$ -	$ -	$ -	$ -	$ 1,882,294	$ 7,756,215
Rio Real	$ 228,276	$ -	$ 4,128,711	$ 4,049,500	$ 137,666	[3]	$ -	$ -	$ -	$ -	$ 2,707,370	$ 11,251,525
Rio Rosales	$ 895,514	$ -	$ -	$ 170,000	$ 126,480	$ 515,040	$ -	$ -	$ -	$ -	$ 507,221	$ 2,214,255
Sub-total	$ 1,957,396	$ -	$ 10,759,286	$ 11,420,800	$ 975,899	$ 897,546	$ -	$ -	$ -	$ 44,000	$ 8,025,284.40	$ 34,080,211
K-8 Campuses												
Improvements to Rio K-8 Steam School				$ 25,000,000								$ 25,000,000
Sub-total	$ -			$ 25,000,000							$ -	$ 25,000,000
Middle School Campuses												
Rio del Valle	$ 439,056	$ -	$ 7,851,937	$ 1,810,100	$ 143,373	$ -	$ -	$ -	$ -	$ -	$ 3,156,273.86	$ 13,400,740
Rio Vista	$ 389,056	$ -	$ 838,425	$ -	$ 163,743	$ 346,720	$ -	$ -	$ -	$ -	$ 573,521.52	$ 2,311,466
Sub-total	$ 828,112	$ -	$ 8,690,362	$ 1,810,100	$ 307,116	$ 346,720	$ -	$ -	$ -	$ -	$ 3,729,795.39	$ 15,712,206
Subtotal Costs	$ 2,785,507	$ -	$ 19,449,648	$ 38,230,900	$ 1,283,015	$ 1,244,266	$ -	$ -	$ -	$ 44,000	$ 11,755,080	$ 74,792,416

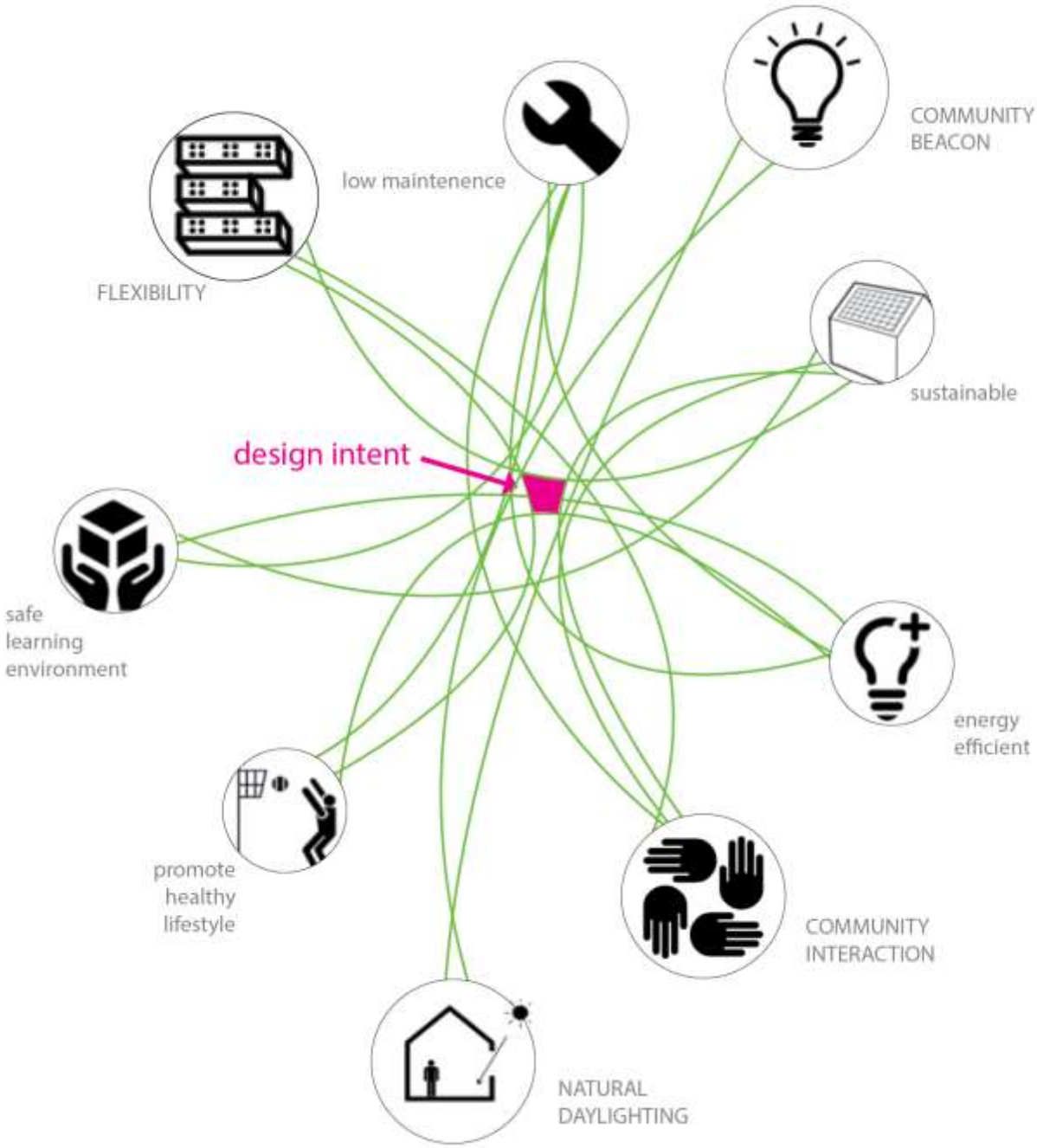
Project Schedule Summary for Rio School District Projects



Funding/Designing K-8 STEAM School

Rio's Measure "G" School Bond was approved by the voters by more than 70%

Rio has established a STEAM School Design Committee that engages staff, parents, experts, and community partners


COMMUNITY
BEACON
low maintenence
FLEXIBILITY
sustainable
design intent
safe
learning
environment
energy
efficient
promote
healthy
lifestyle
COMMUNITY
INTERACTION
NATURAL
DAYLIGHTING

OR THE 21ST CENTURY

RIO SD K-8 COMMUNITY STEAM SCHOOL VISIONING

IDENTIFIED AT COMMUNITY PLANNING MEETING ON OCT. 30, 2014

1. How can a school have no barriers?

Built Environment	Outdoor Environment	Curriculum
Many windows: illusion of open space.	Easily accessible from any location.	Promote access to the world & other classrooms.
Wide hallways & walk areas.	Many paths to travel around campus.	Mission Statement/Sign: "Our campus has no barriers."
Low separations with transparency.	"Green" screens.	No curriculum restrictions.
Natural lighting/skylights & fresh air.	Large open spaces.	Equitable technology in classrooms.
Co-mingling areas & open space.	If fencing is required, create an inviting separation between fencing and outside.	Access to teachers, work areas, other classes/grade levels.
Space & time for creating/exploration & communication.	Nowhere for a student to hide.	All cultures/languages valued.
Classrooms meld into outdoors.	Feeling of openness.	Physically / emotionally safe.
Welcoming to the community.	Access to outside off-campus.	Multiple pathways of communication
Spaces to be alone and together.	Outdoor classrooms for a variety of topics.	Easy access to community resources thru technology, walking field trips, & equipment that encourages exploration.

2. What makes a space life-changing, inspirational and memorable?

Built Environment	Outdoor Environment	Curriculum
Safe, comfortable spaces.	Fountains/water features; music.	Staff works as a team and cares.
Open, interactive, light; provokes curiosity; inviting.	Beautiful; connected with nature & the environment.	Students are valued, respected.
Detailed; hands-on.	Sustainable, self-sufficient; create own electricity.	Provokes active & critical thinking.
Generates creativity; evokes a sense of flow and deep engagement; lose sense of time.	Changing wall or landscape.	New ideas educationally/ideologically.
Light, colors, shapes; visually stimulating.	Easy access to sunshine, fresh air.	Learning while discovering/exploring.
Interactions of people and space; dynamic work spaces.	Areas for growing plants.	Cutting-edge technology.
Feeling of security and freedom.		Project-based/problem-based curriculum.
Size – the bigger, the better!		Inspire students to come every day.
Open, clean space: students can fill it with their own ideas, thoughts, objects, décor, color; things that inspire wonder and questions.		Connection to the future and to history; tied to the positives in the community.

3. What are the essential learning activities that students can engage in and collaborate on at each STEAM Center?

Grades K-2	Grades 3-5	Grades 6-8
The arts, music; experiments with multiple media; project-based learning is a must.	Engineering design/thinking. Designing/building/testing.	Design work that tests theories; example: use computer to design a bridge & calculate weight limit.
Small group activities; together on the floor.	Place for independent work; ability to spread out.	Math on the playground; building structures.
Dramatic acting/Reader's Theater.	Gardening.	Community-based learning; field trips, authentic learning experiences/service.
Cooking (math/measurement; socializing)	Thought process involves multiple layers of thinking. Challenge Activities related to math/science.	Multi-disciplinary activities: history/math/ science/English/geography combined with life skills.
Water & sand play; science experiments.	Environmental activities.	Activities that build social interaction/ communication.
Building with blocks, legos; puzzles; drawing. Eye/motor skills.	Activities related to reading; sharing items read.	Money management skills thru activities.
Singing/music; "loud room" (soundproof?)		6-8 Students can teach
Outdoor exploration; interaction with plants and animals.		Wood Shop with tools.
Example: build a Lego Robot to achieve stated project goal.		
Language development; reading.		
Observing; learning to use various tools.		
Animal studies: hatching chicks.		

Presenting/performing; exploring, interacting, equipped with resources to conduct experiments.

Quiet nooks, lofts.

Open kitchen for viewing.

Pulleys, levers

Writing, building, reading, arts, mathematics, collaborative creative work.

Interactive Museum: upper grades create Museum experiences based on a theme that changes every quarter. Lower grade students can create museum exhibits, too.

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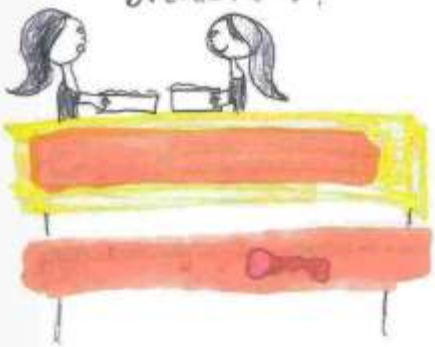
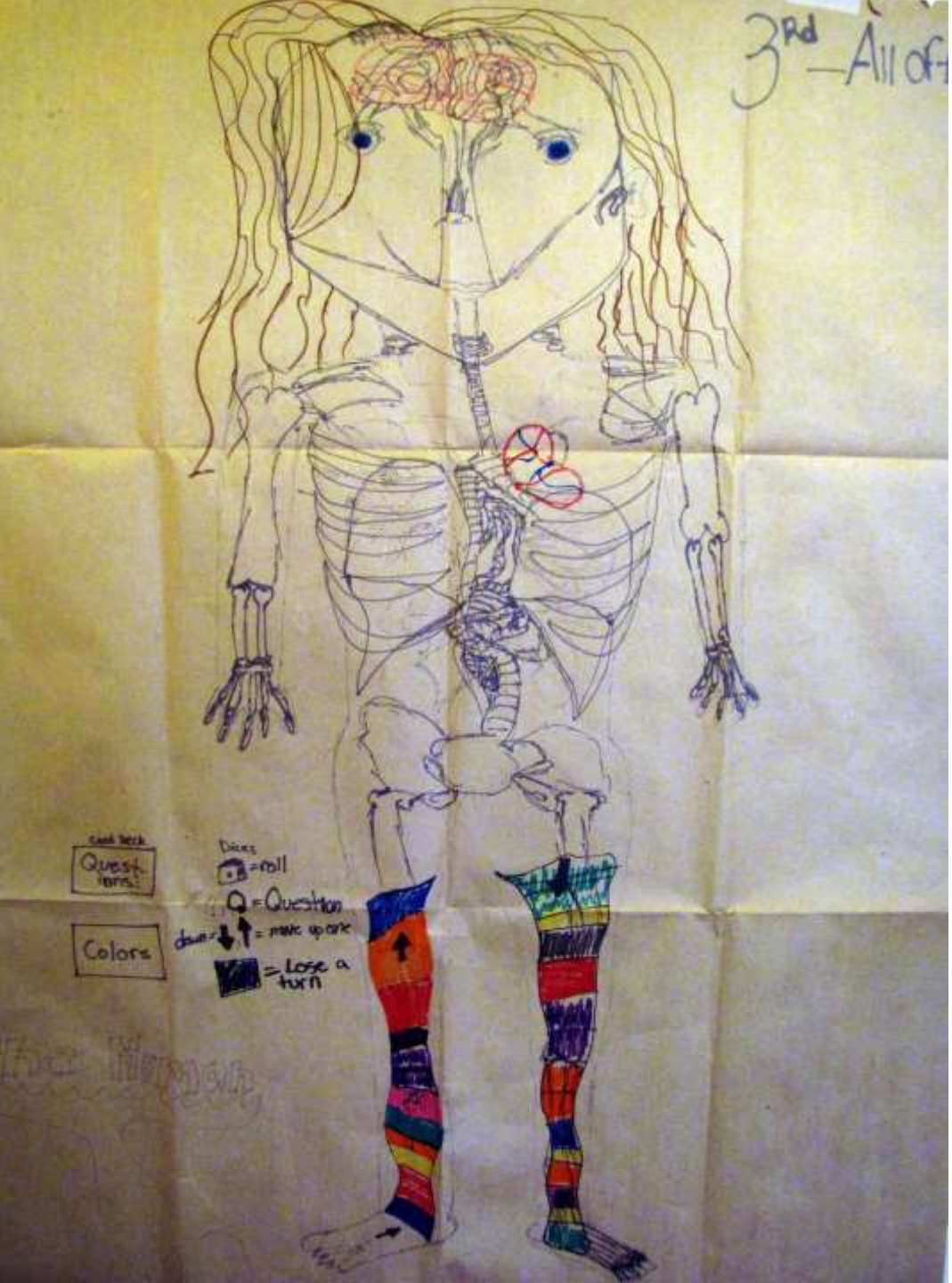
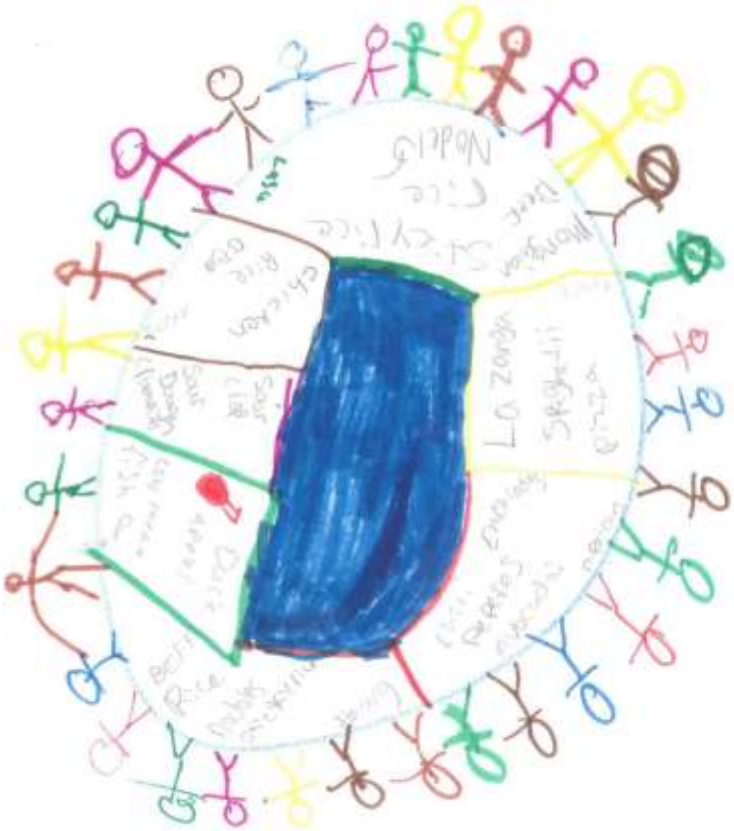
a perfect day is go out & play
Like this

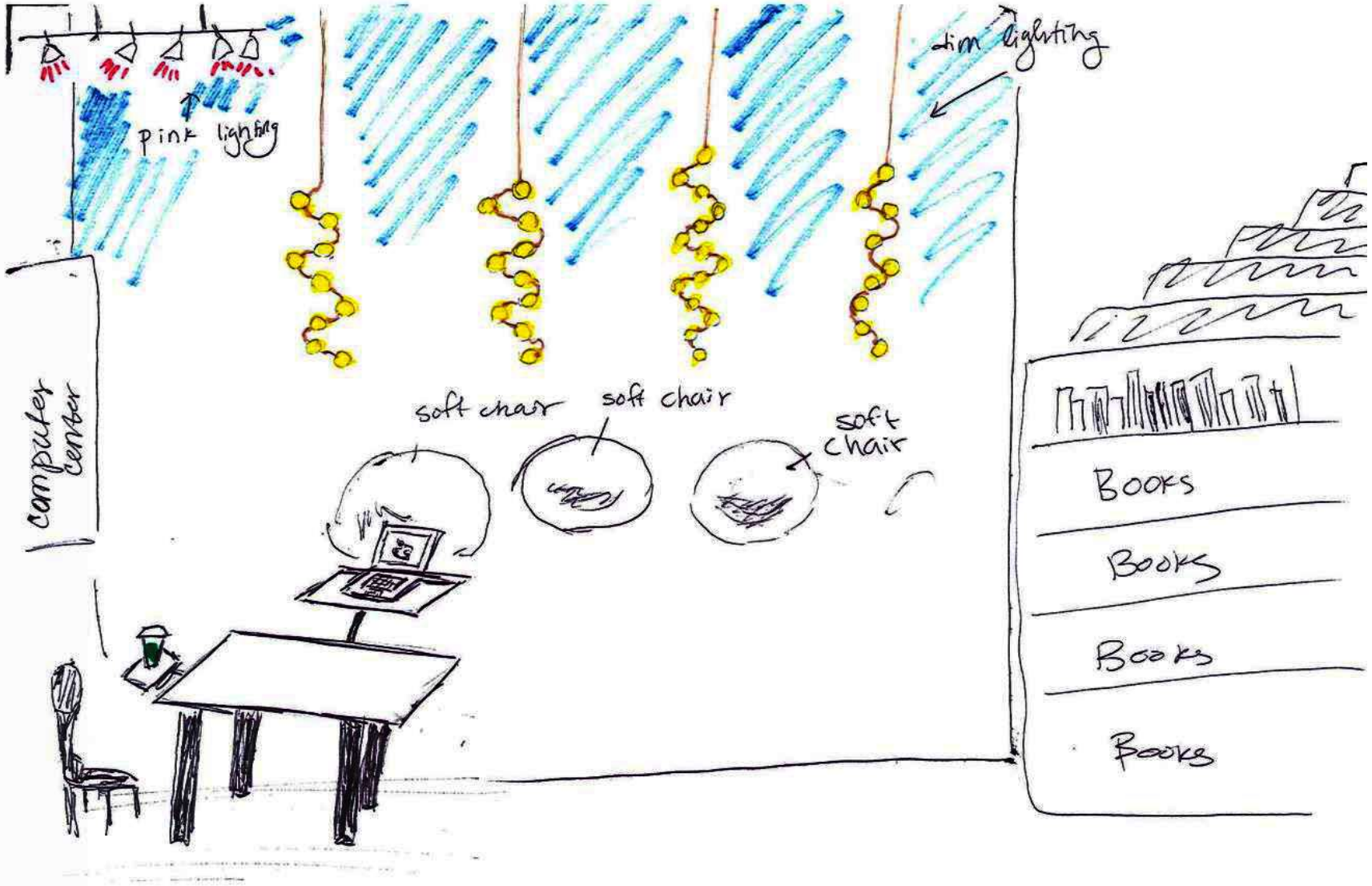
Eat a good breadc Feast



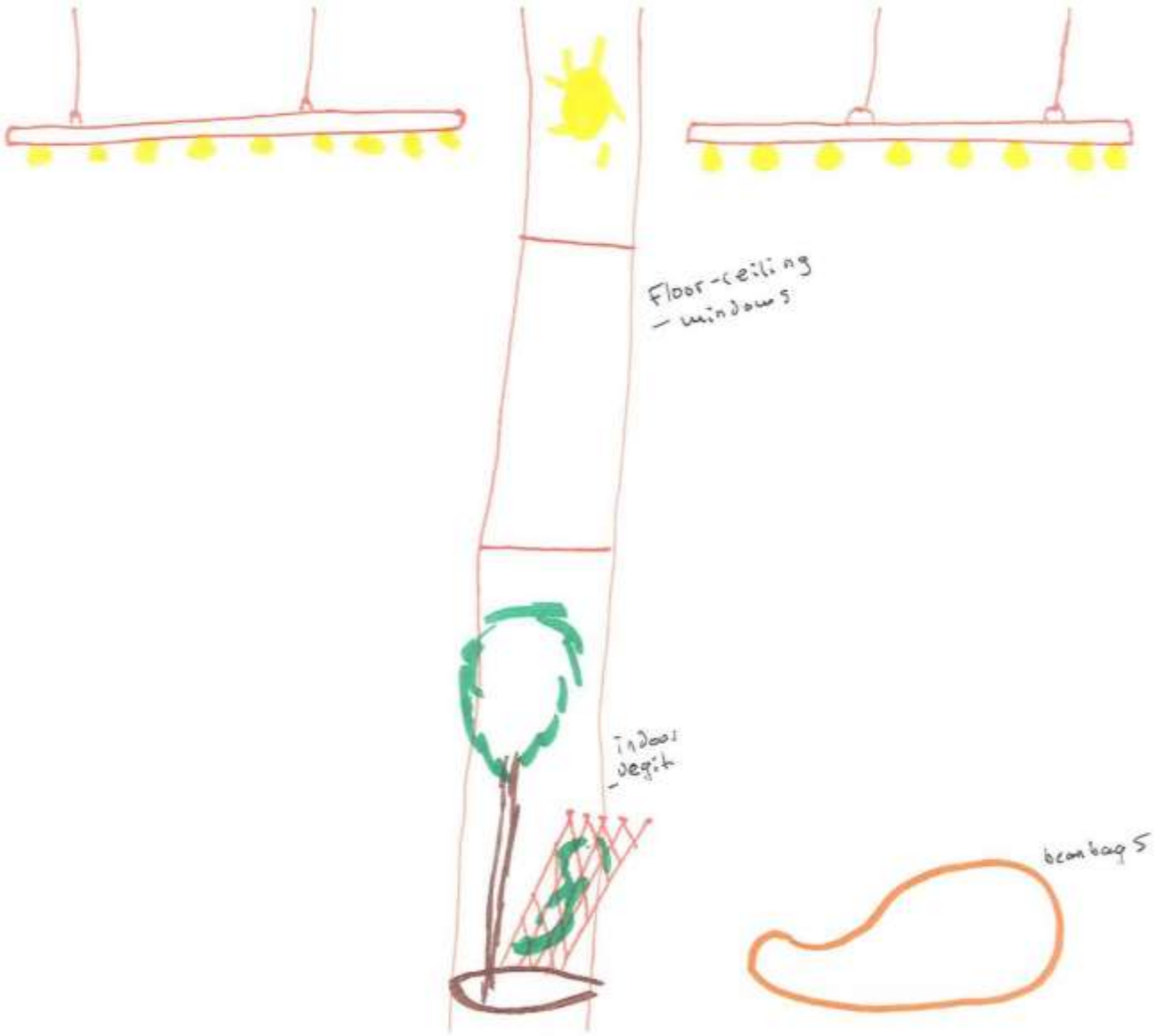
Café


3Rd
Quest ions
Colors
Dices
= roll
= Question
= move up one
= Lose a turn

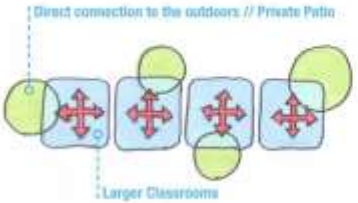


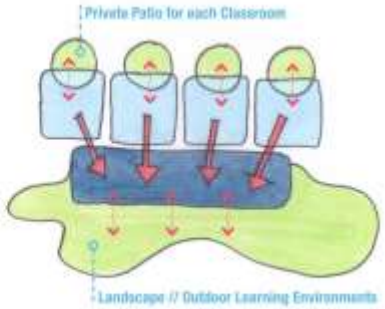

dim lighting
pink lighting
computer center
soft chair
soft chair
soft chair
Books
Books
Books
Books

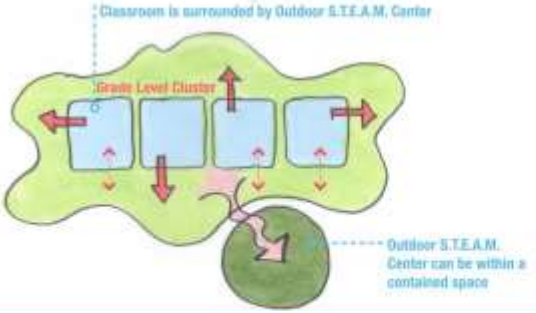
Veronika :)

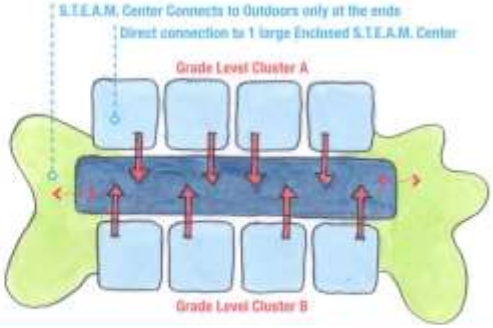

Floor-ceiling
- windows
Indoor
- depth
beanbags

Learning Environment Configurations and Connections

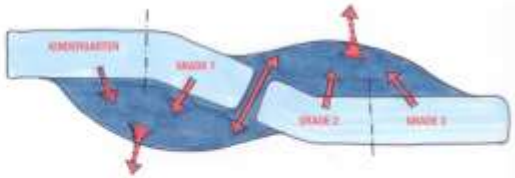


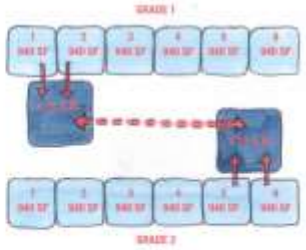






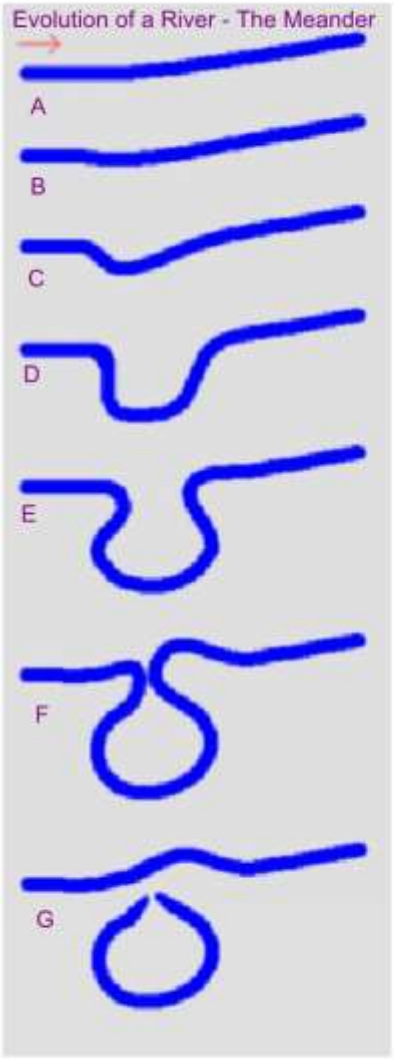
Types of S.T.E.A.M. Centers by Grade Level





putting the S.T.E.A.M. in the river

Meander:
is a bend in a sinuous watercourse or river.



Concept Statement:

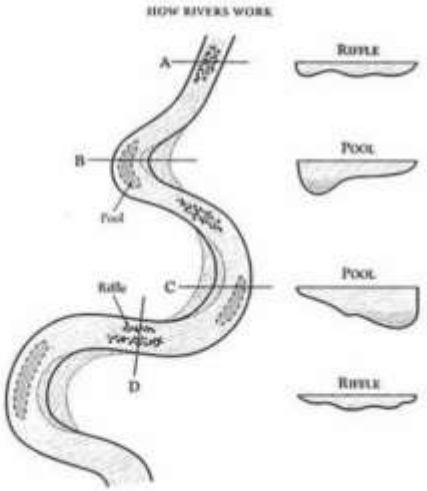
A meander is a bend in a sinuous watercourse or river. A meander forms when moving water in a stream erodes the outer banks and widens its valley. Using this metaphor, the "river" that runs through the site, erodes and creates the forms of the building around the central waterway. Over time, the meander takes different paths, evolving into various shapes. This concept is represented in the different types of spaces and STEAM centers – they follow a path based on developmental age similar to how students grow and their learning -like the meander- evolves.

The Educational Meander:

The RIO Community STEAM School will encourage innate learning and deep study in every aspect of its design. As students arrive on campus, they may see seventh and eighth-graders working on long-term projects, visually demonstrating the integration of science, technology, engineering, art and mathematics in a single endeavor.

The learning environments will flow naturally from one to another, like the neighboring river, encouraging students to move easily from lecture, to lab, to special project centers. Teacher supervision of all activities will be simple and direct, with clear lines of sight and few constructed barriers to impede the sense of openness.

The Meander will be evident outdoors, as students take a " walk of knowledge" with opportunities to stop along the way at outdoor classrooms.



Rio School District // K-8 Community S.T.E.A.M. School

Rio School District // K-8 Community S.T.E.A.M. School

Rio School District // K-8 Community S.T.E.A.M. School

Rio School District // K-8 Community S.T.E.A.M. School

FULL BUILD OUT

LEARNING RESOURCE CENTER
RIO STEAAM SCHOOL
GC

RIO STEAAM SCHOOL

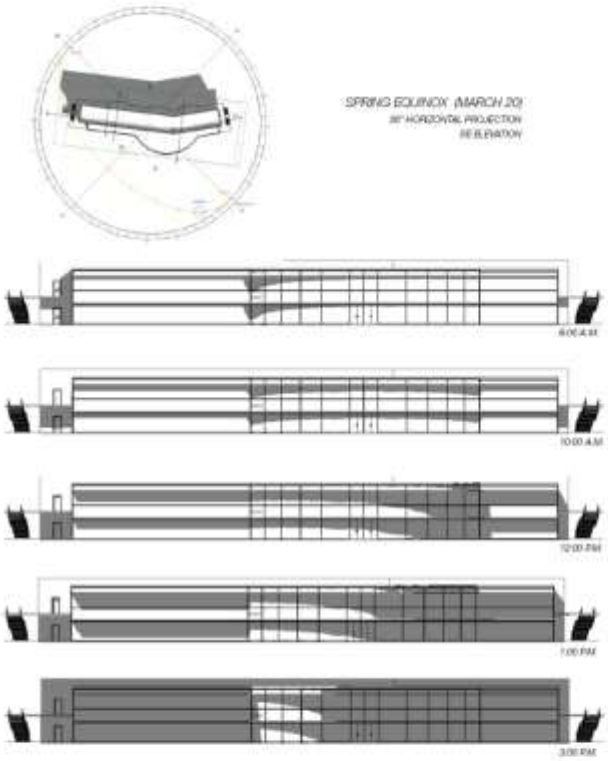
LANDSCAPE CONCEPT DESIGN

SCALE: 1" = 40'

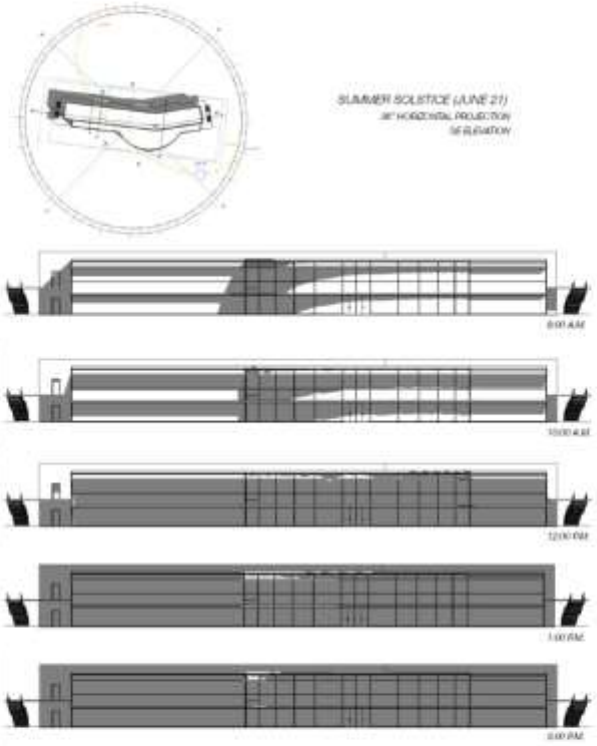
Katherine Spitz Associates, Inc.
Landscape Architecture

May 21, 201

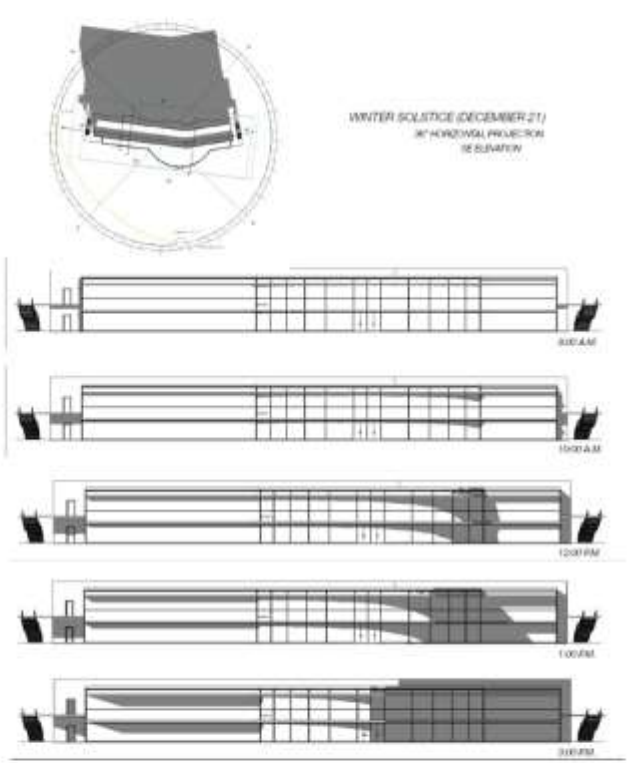
OVERALL FIRST FLOOR PLAN



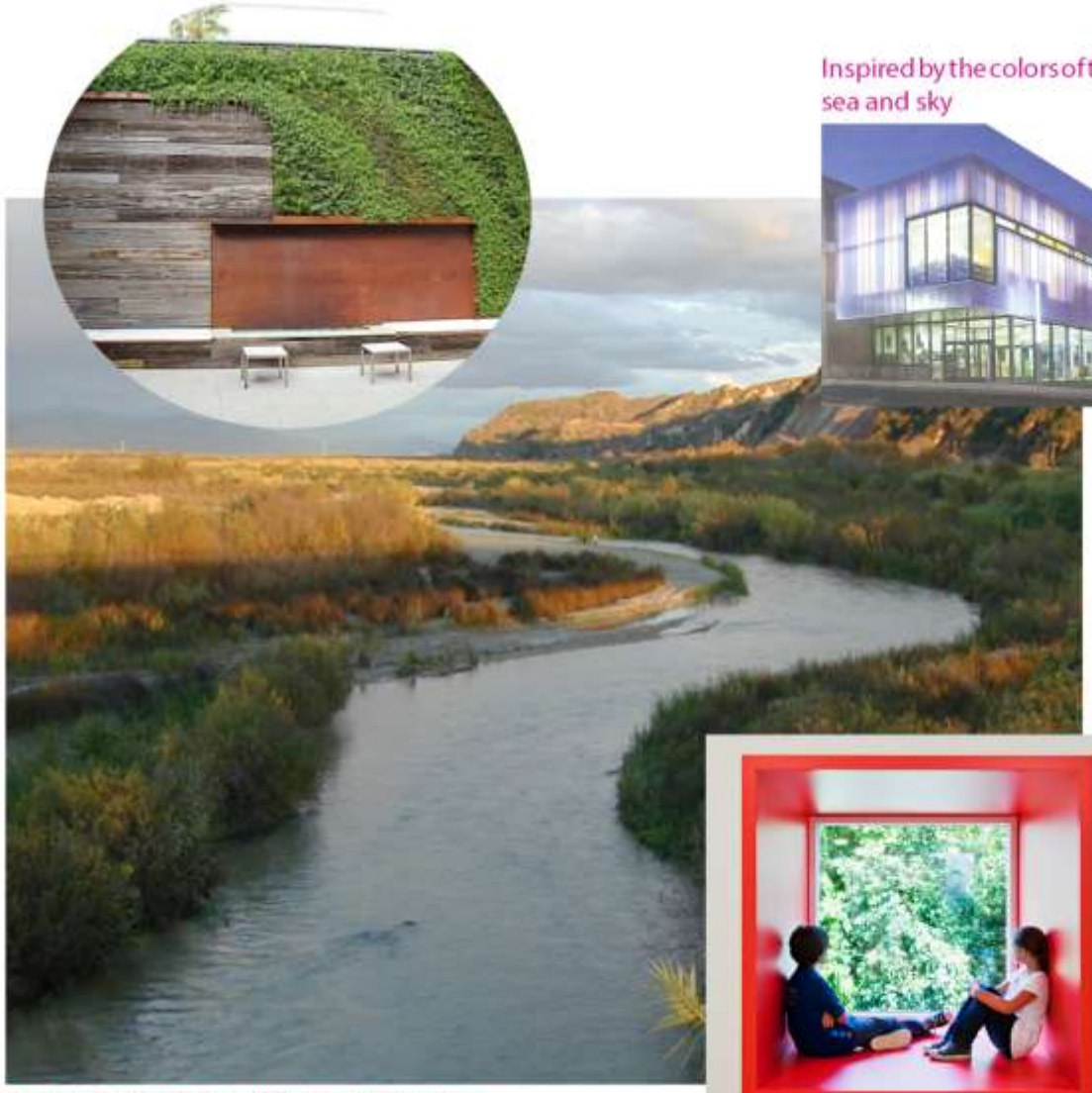
36" EYEBROW - SPRING



36" EYEBROW - SUMMER

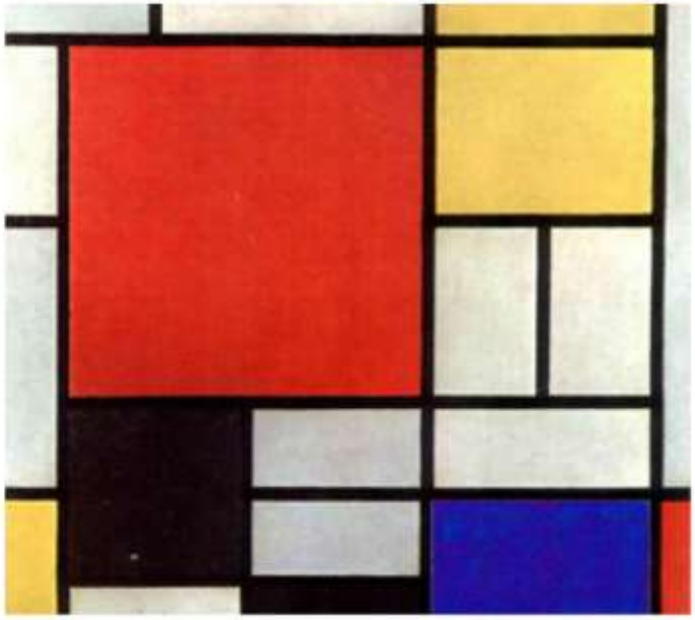


36"EYEBROW -WINTER



Inspired by the Colors of the Santa Clara River

Inspired by the colors of the sea and sky

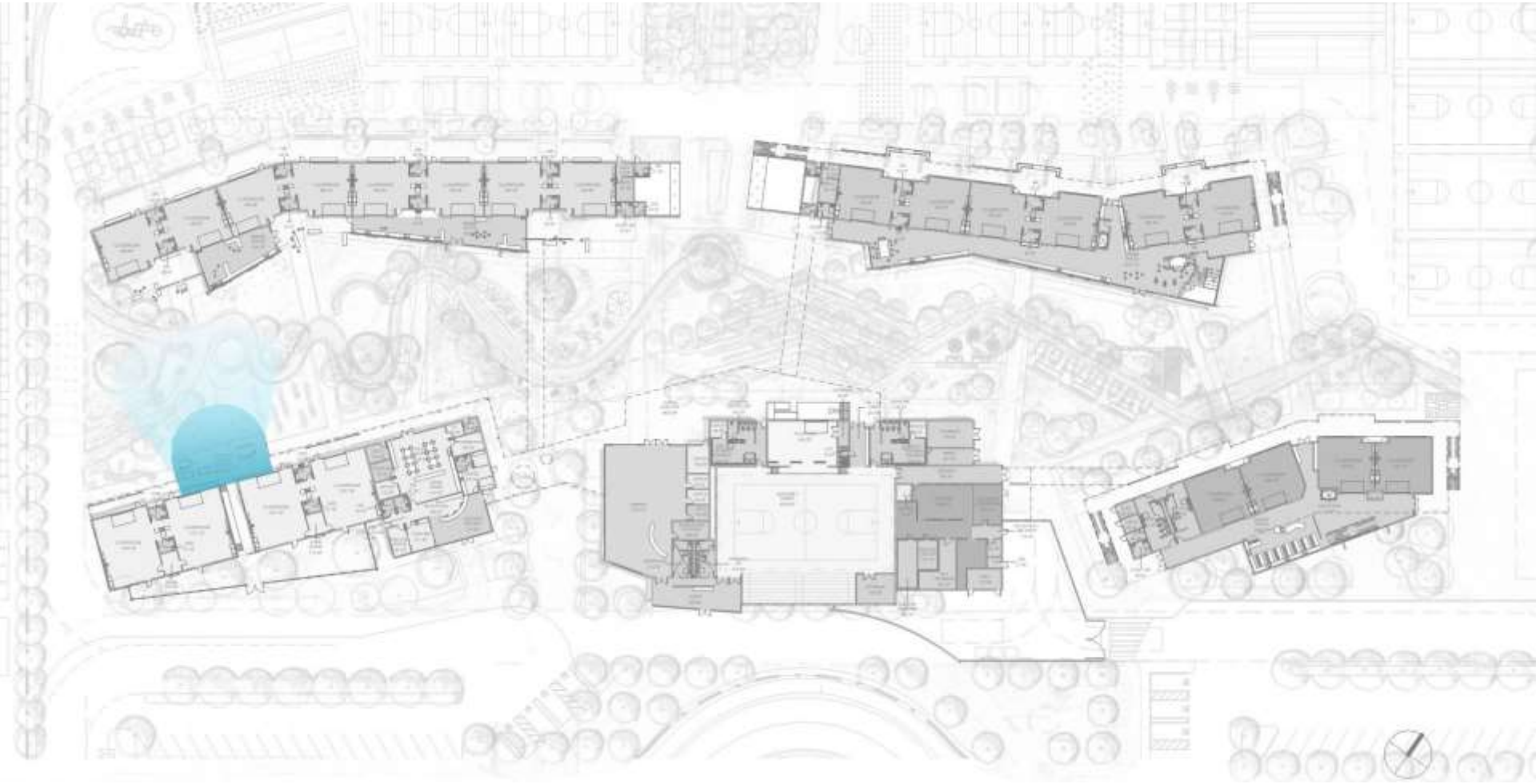


Inspired by art and playful spaces

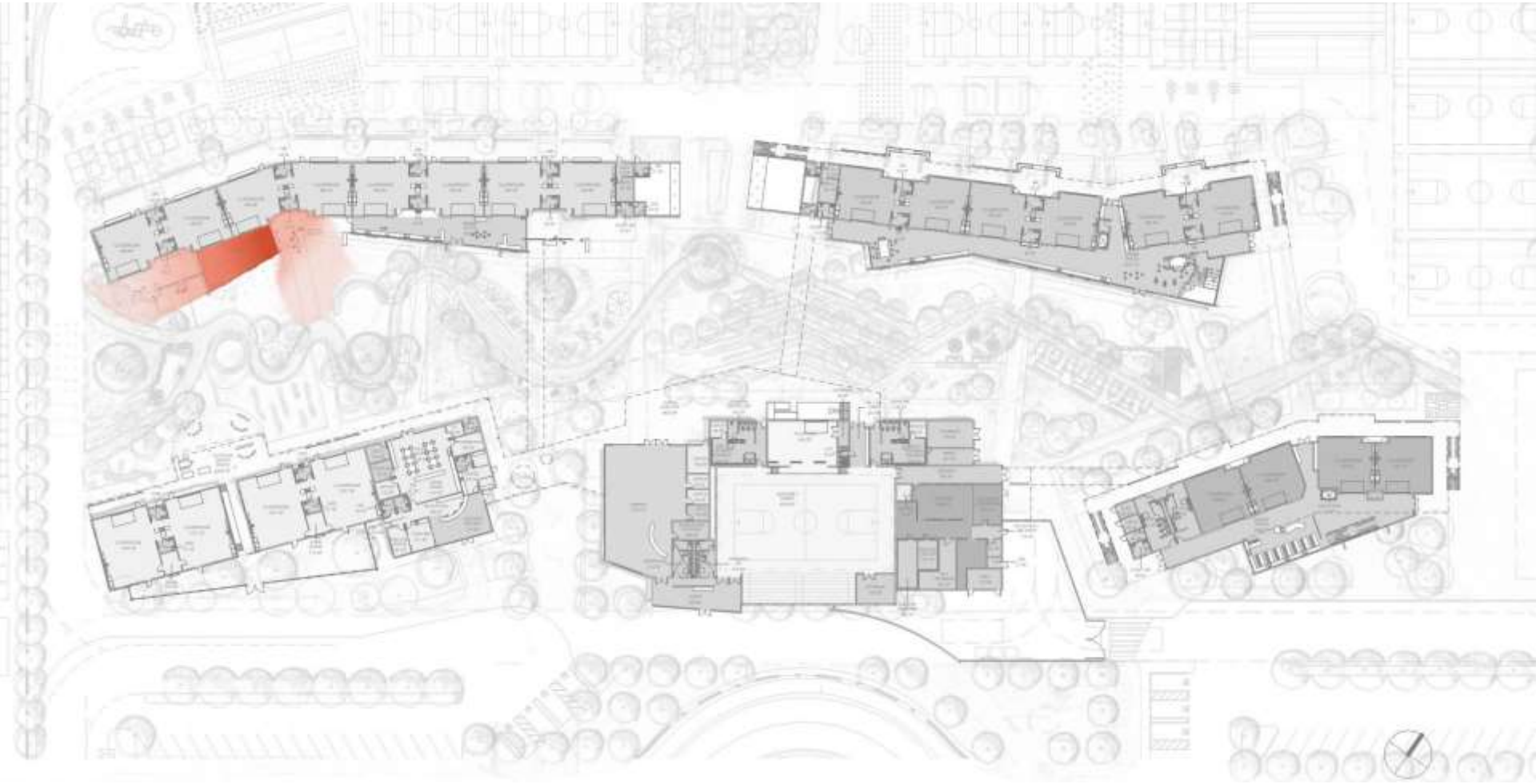
AESTHETIC + BUILDING MATERIAL INSPIRATION

B
1

Nature



Building/ The Workshop



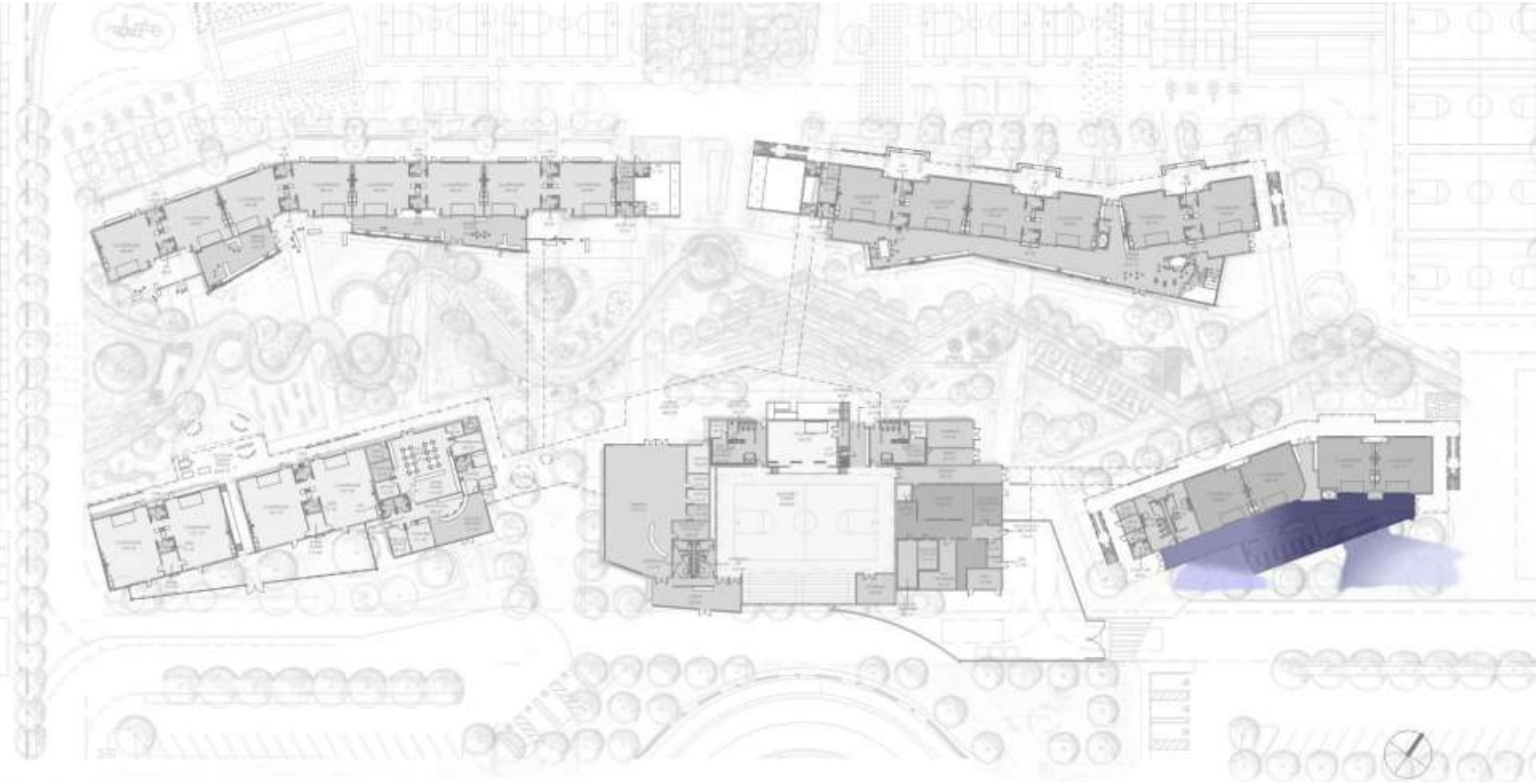
Reading

Ceramics + Sculpture

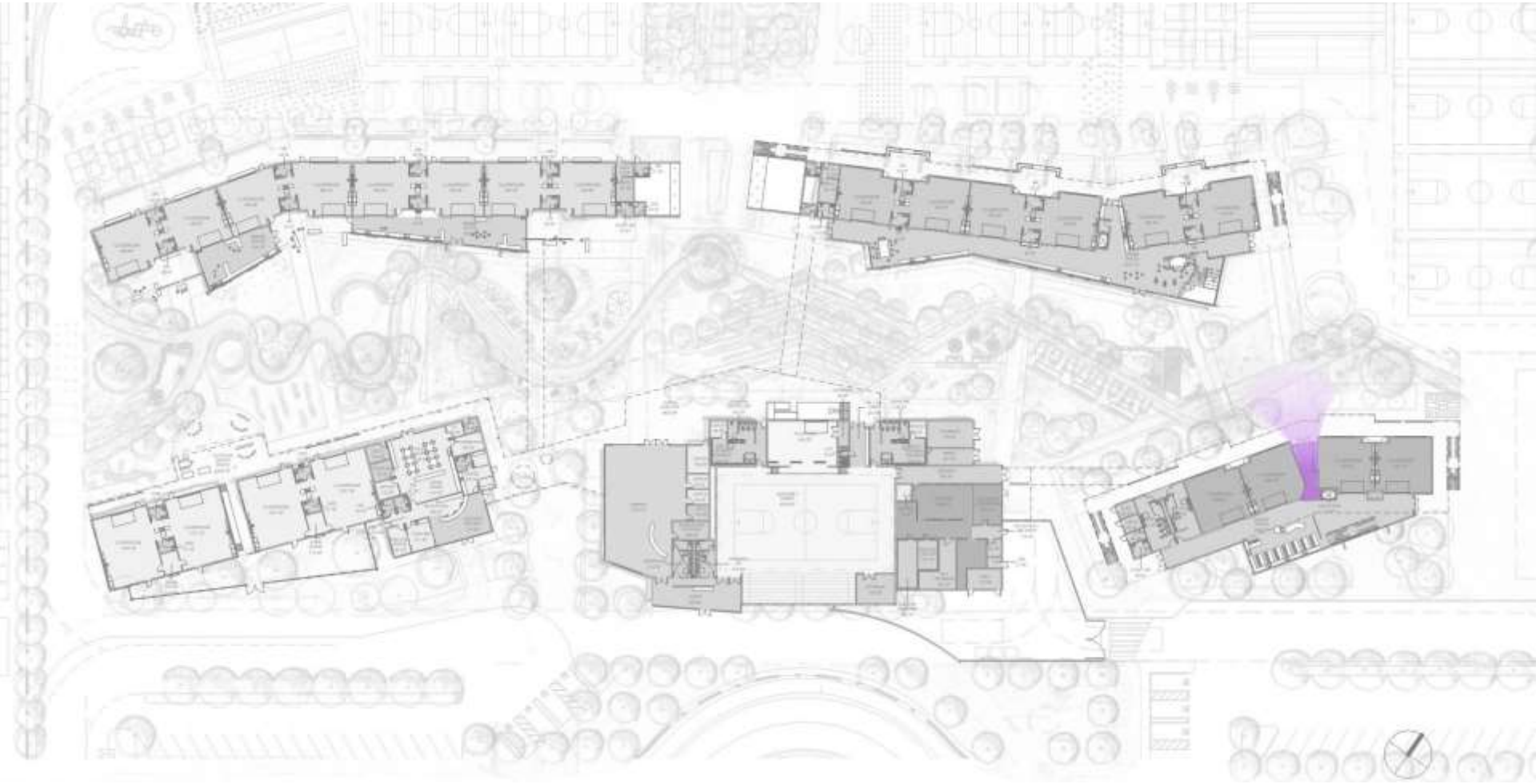
Performing + Fine Arts

Digital Arts

Science

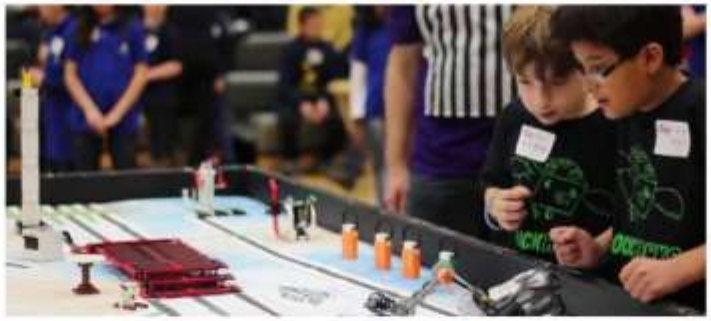


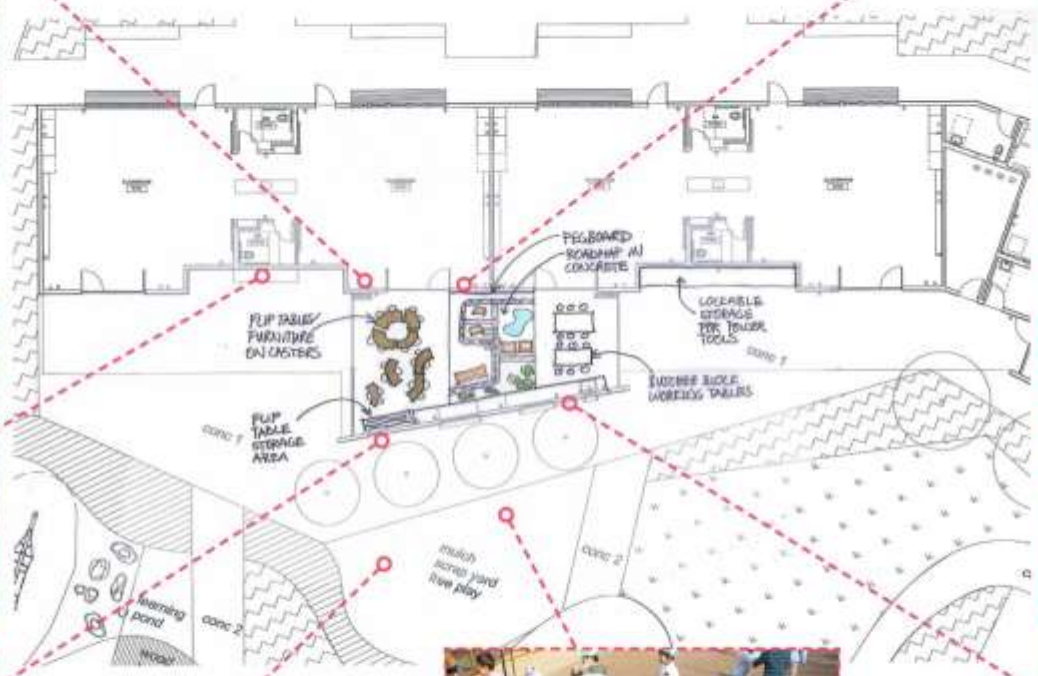
Student Lounge



Community Maker Spaces

STEAM for All!



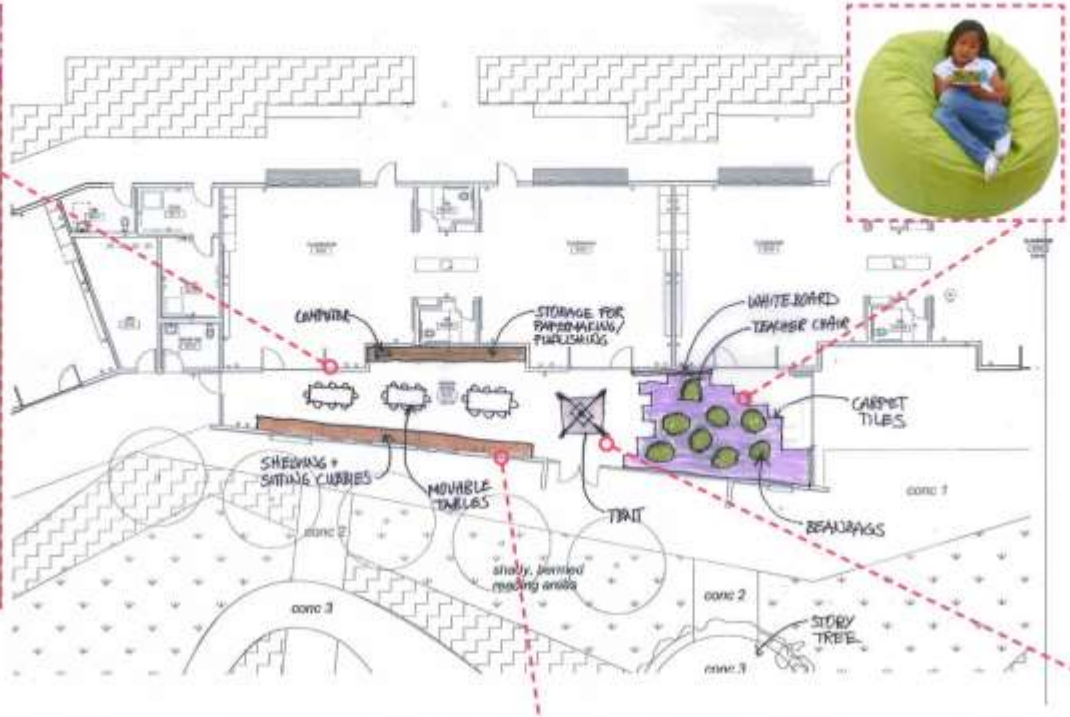

PEGBOARD
FLIP TABLES/ FURNITURE ON CASTERS
LOCKABLE STORAGE FOR POWER TOOLS
FLIP TABLE STORAGE AREA
conc 1
conc 2
learning pond
mulch screen yard free play

play
read

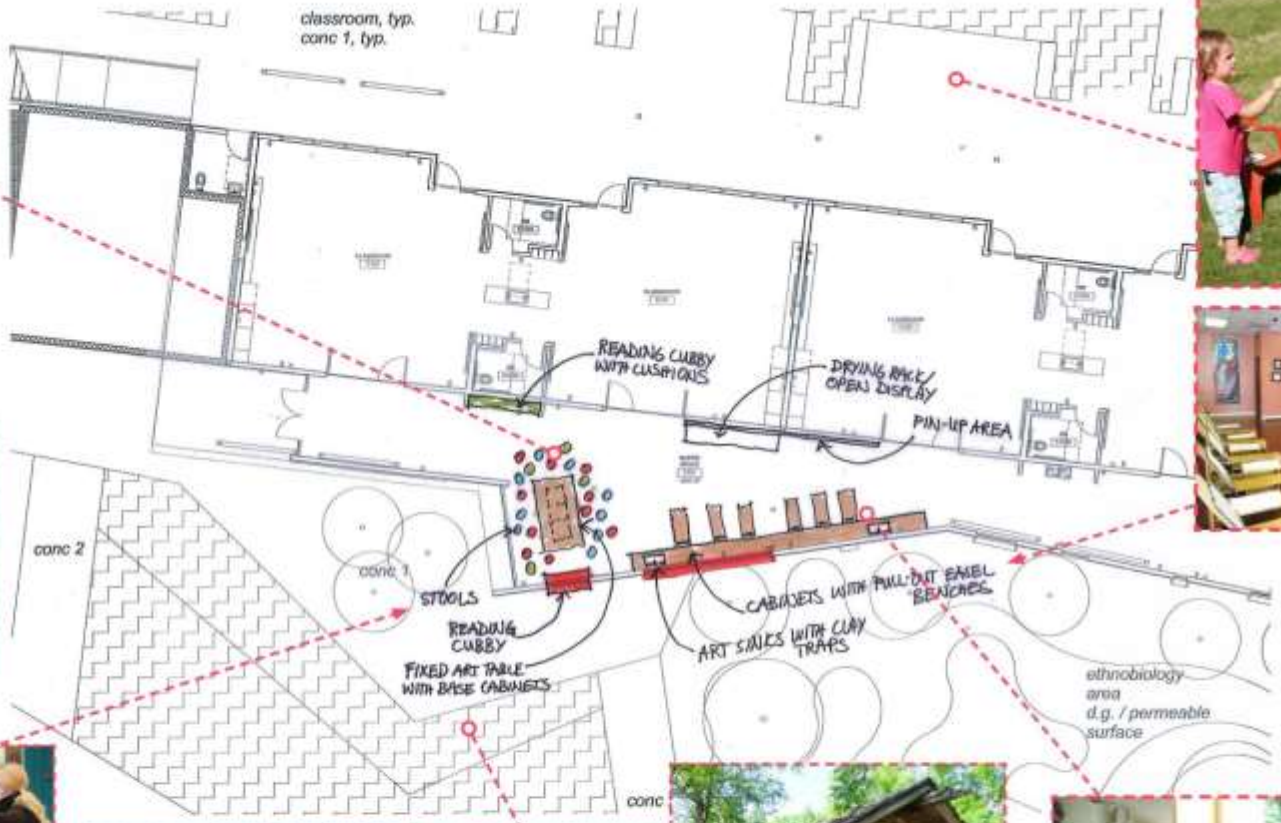
read

ENJOY

Where will I read today?
Students Rotate Weekly


COMPUTER
STORAGE FOR PAPERMAKING/ PUBLISHING
WHITE BOARD
TEACHER CHAIR
CARPET TILES
SHELVING + SITTING CUBBIES
MOVABLE TABLES
TENT
BEANBAGS
conc 1
conc 2
conc 3
shelf, painted reading areas
STORY TREE

make a
rock
caterpillar


classroom, typ.
conc 1, typ.
READING CUBBY WITH CUSHIONS
DRYING RACK/ OPEN DISPLAY
PIN-UP AREA
conc 2
conc 1
STOOLS
READING CUBBY
FIXED ART TABLE WITH BASE CABINETS
CABINETS WITH PULL-OUT EASEL BENCHES
ART SINKS WITH CLAY TRAPS
ethnobiology area d.g. / permeable surface
conc

CABIN HILL
ACADEMY
OF MUSIC

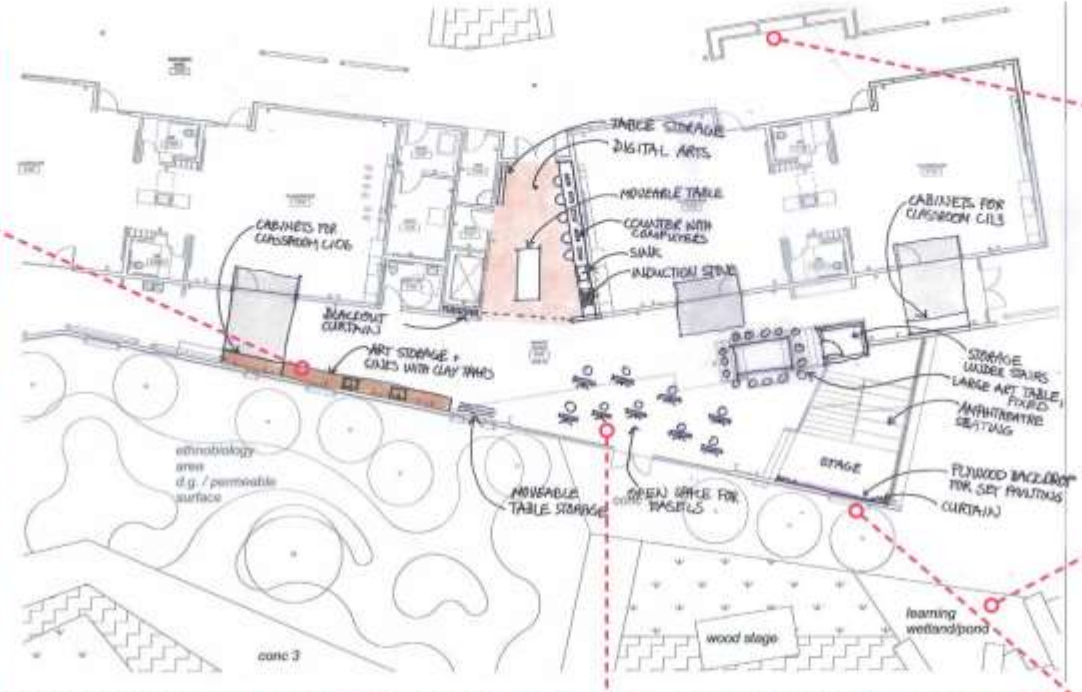
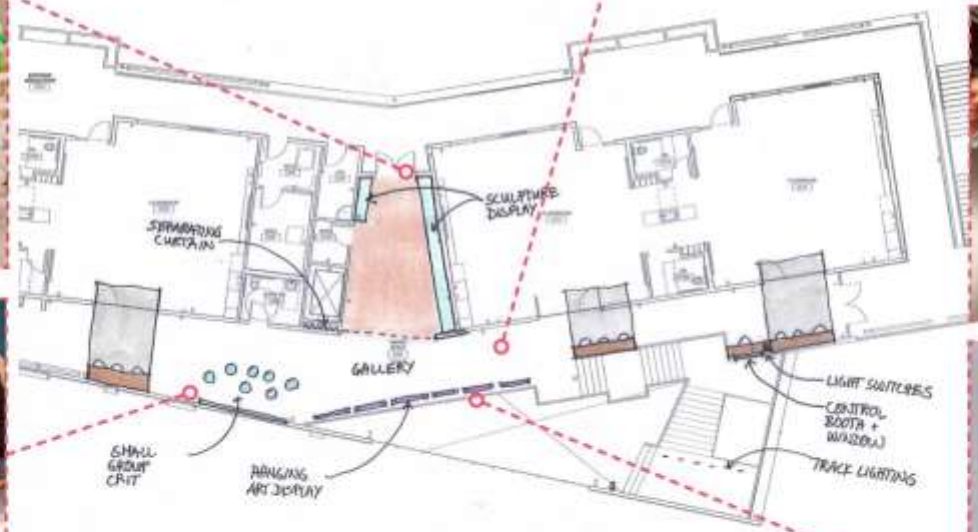
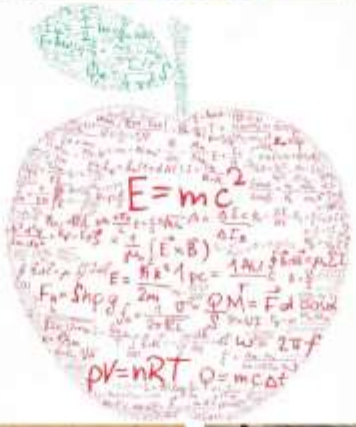


TABLE STORAGE
DIGITAL ARTS
MOVEABLE TABLE
COUNTER WITH COMPUTERS
SINK
INDUCTION STOVE
CABINETS FOR CLASSROOM CLOG
CABINETS FOR CLASSROOM CILS
BLACKOUT CURTAIN
ART STORAGE + CINES WITH CLAY TRAPS
STORAGE UNDER STAIRS
LARGE ART TABLE, FOLDS
AMPHITHEATRE SEATING
STAGE
PLYWOOD BACKDROP FOR SET PAINTING
CURTAIN
ethnobiology area d.g. / permeable surface
MOVEABLE TABLE STORAGE
OPEN SPACE FOR BASELS
conc 3
wood stage
learning wetland/pond

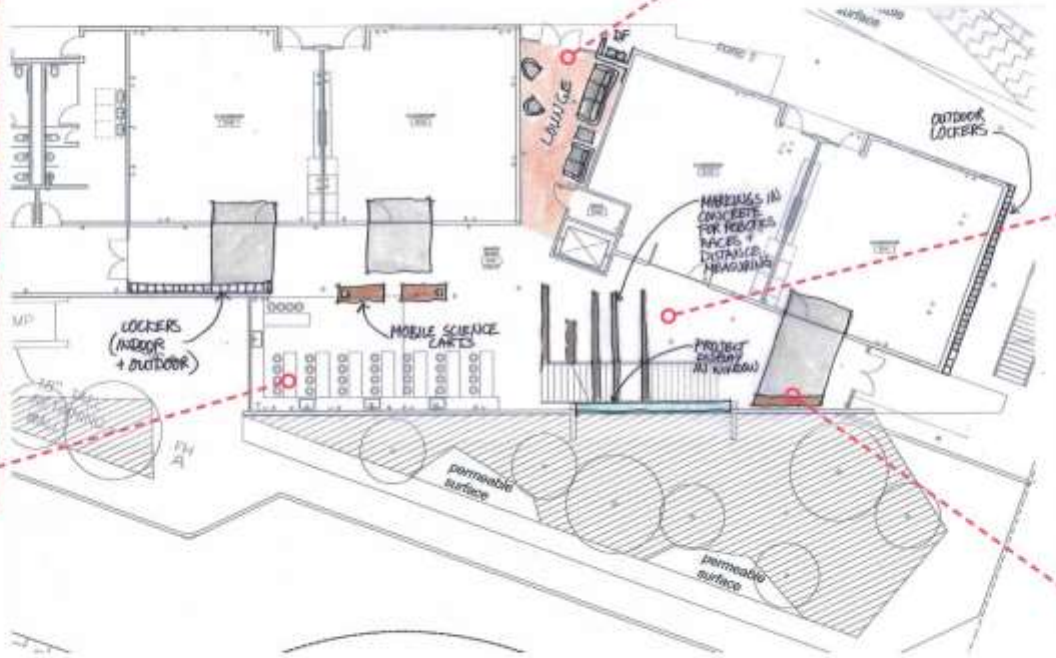
CABIN HILL
ACADEMY OF MUSIC


SEPARATING CURTAIN
SCULPTURE DISPLAY
GALLERY
SMALL GROUP CRIT
HANGING ART DISPLAY
LIGHT SWITCHES
(CONTROL BOOTH + WINDOW)
TRACK LIGHTING

WE BUILT THE NATURE
GARDENS HERE BY HAND
FOR WILDLIFE.


E=mc²

NATURE
LAB


LOCKERS (INDOOR + OUTDOOR)
MOBILE SCIENCE CARTS
OUTDOOR LOCKERS
permeable surface
permeable surface

Forces
FRICTION
Newton
GRAVITY
TORQUE
CENTEROFMASS
Inertia

Possibilities in your community

Cultural Themes

Community Engagement

Inspiration

The Building as a Teacher

RIO STEAAM SCHOOL

LANDSCAPE CONCEPT DESIGN

SCALE: 1" = 40'

Katherine Spitz Associates, Inc.
Landscape Architecture

May 21, 201

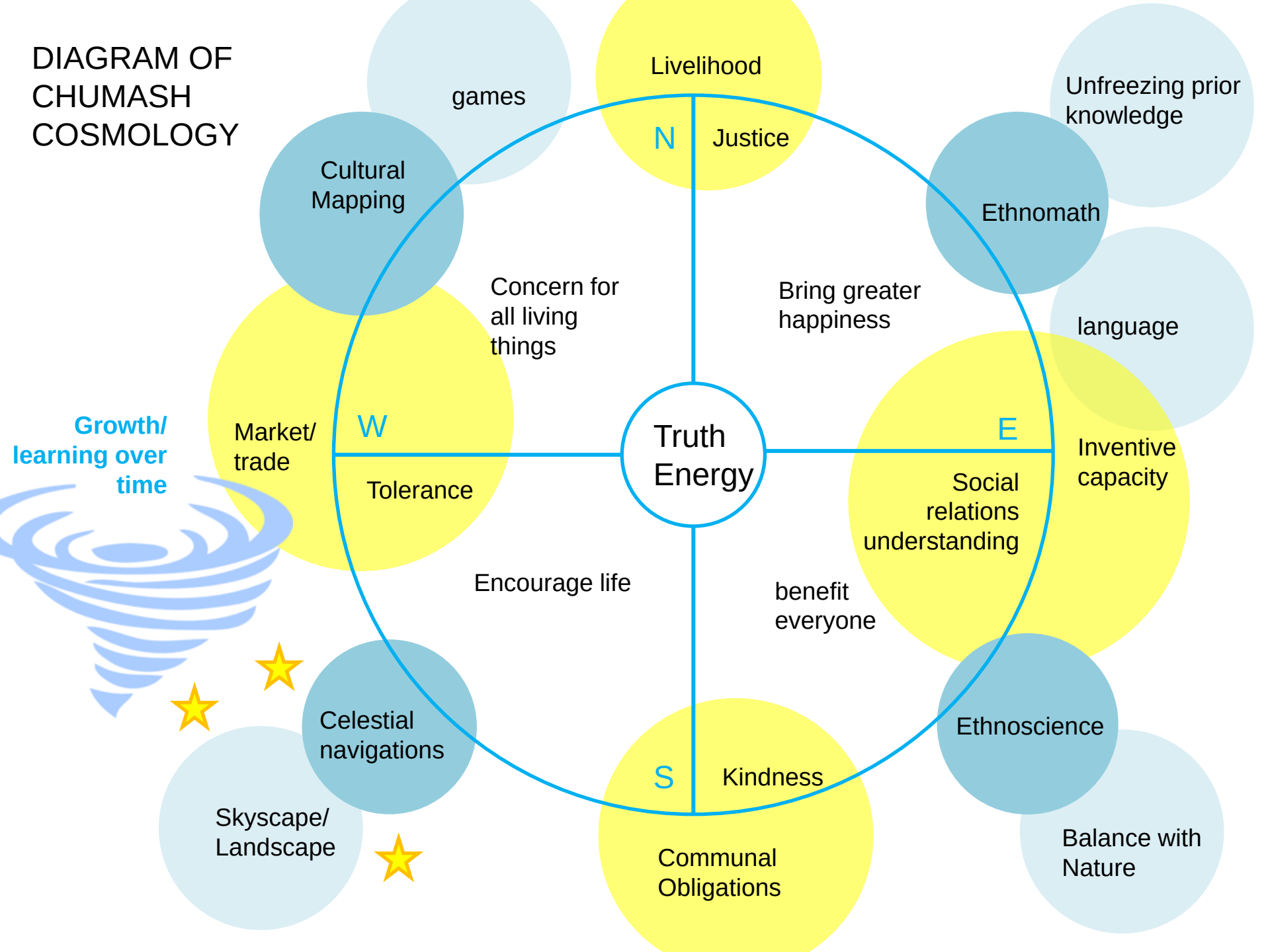


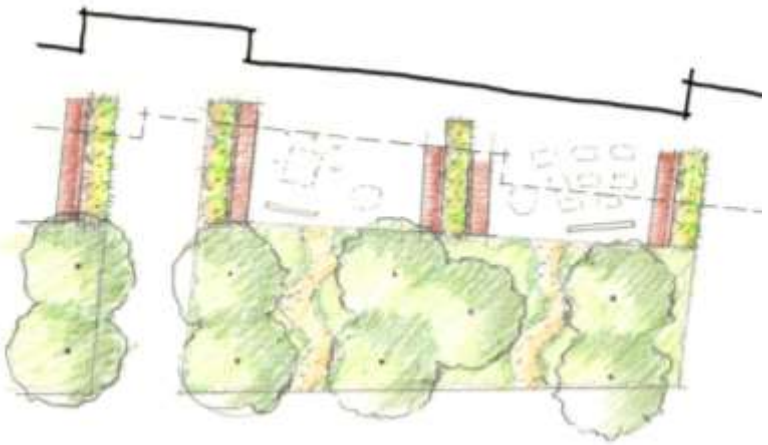
DIAGRAM OF CHUMASH COSMOLOGY
games
Livelihood
Unfreezing prior knowledge
N
Justice
Cultural Mapping
Ethnomath
Concern for all living things
Bring greater happiness
language
Growth/ learning over time
Market/ trade
W
Truth Energy
E
Inventive capacity
Tolerance
Social relations understanding
Encourage life
benefit everyone
Celestial navigations
Ethnoscience
S
Kindness
Skyscape/ Landscape
Communal Obligations
Balance with Nature

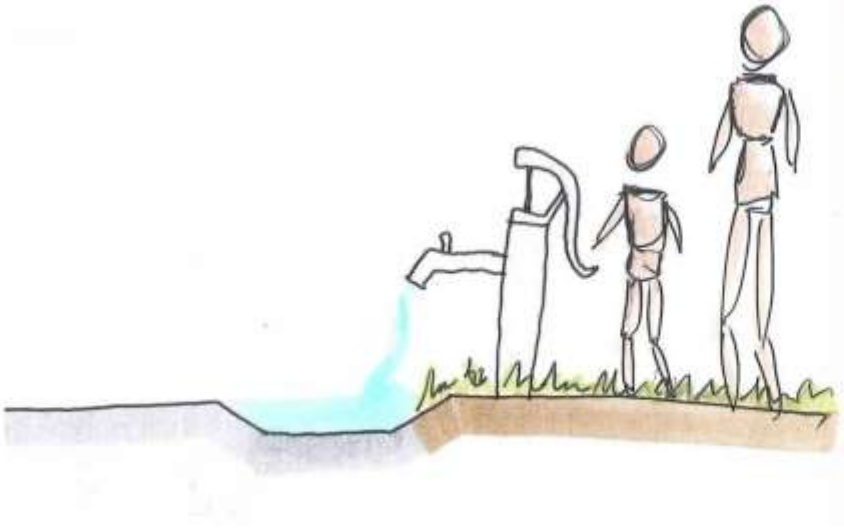
N
NW
NE
W
E
SW
SE
S
12
1
2
3
4
5
6
7
8
9
10
11

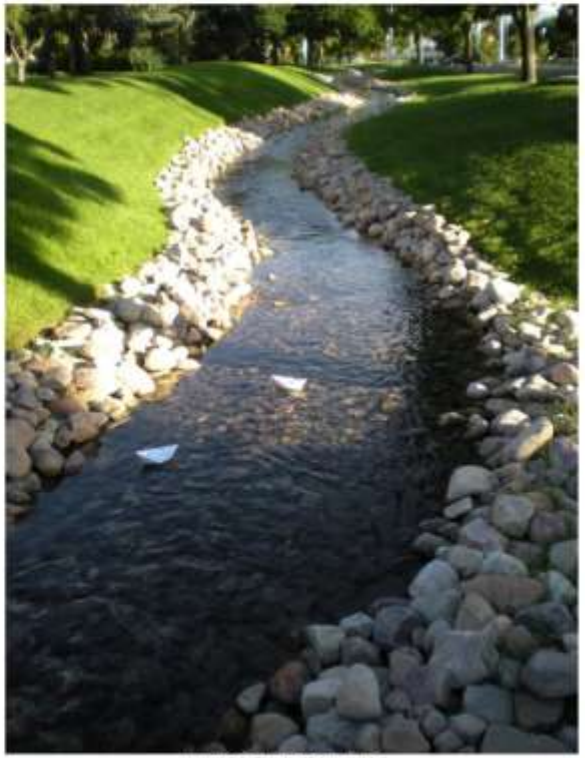
SIERRA
SIERRA
LOMERIA
Arenal
Arenal
Abrevadero
Abrevadero
Abrevadero

jihgfedcba
1 2 3 4 5 6 7 8 9 10

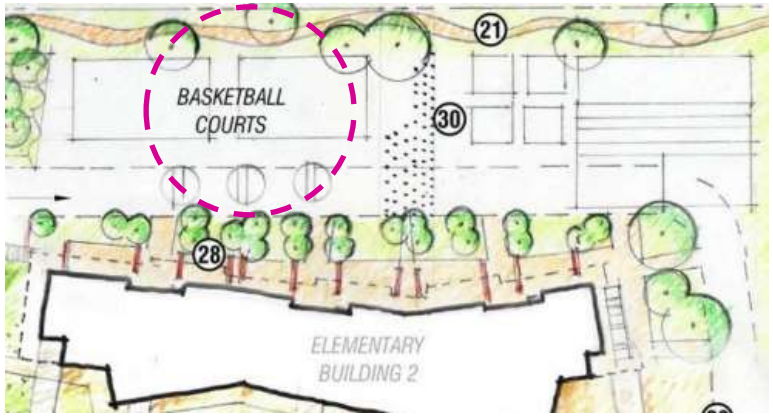
Ceres
Mars
Earth
Venus
Mercury
Sun

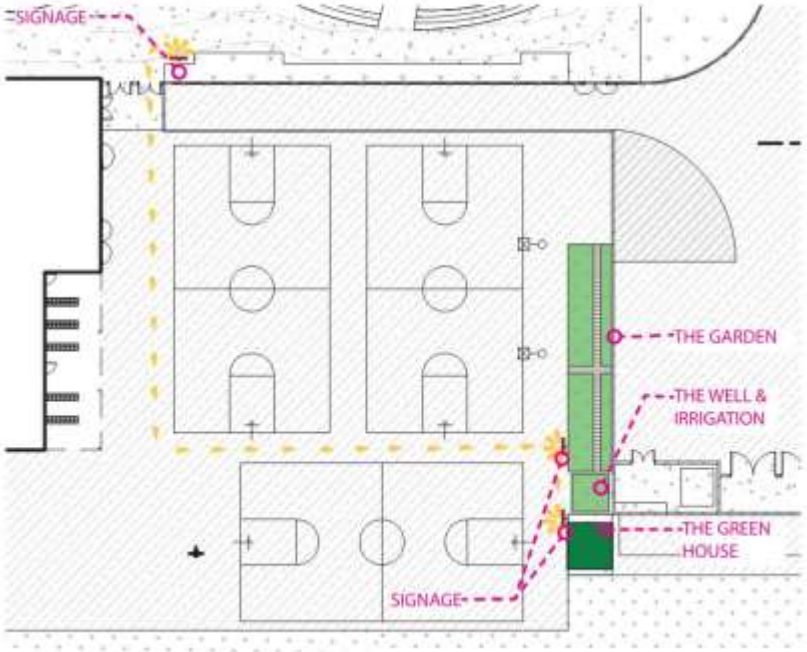




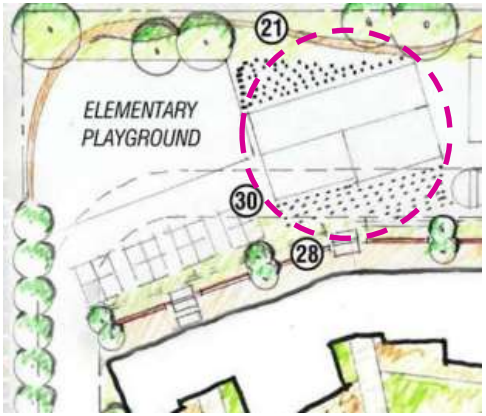


LANDSCAPE ELEMENTS:
HANDPUMP





LANDSCAPE ELEMENTS:
GREEN HOUSE & GARDEN



WORD HOPSCOTCH

METERS VS FEET SCALE

UTILITY MAPING

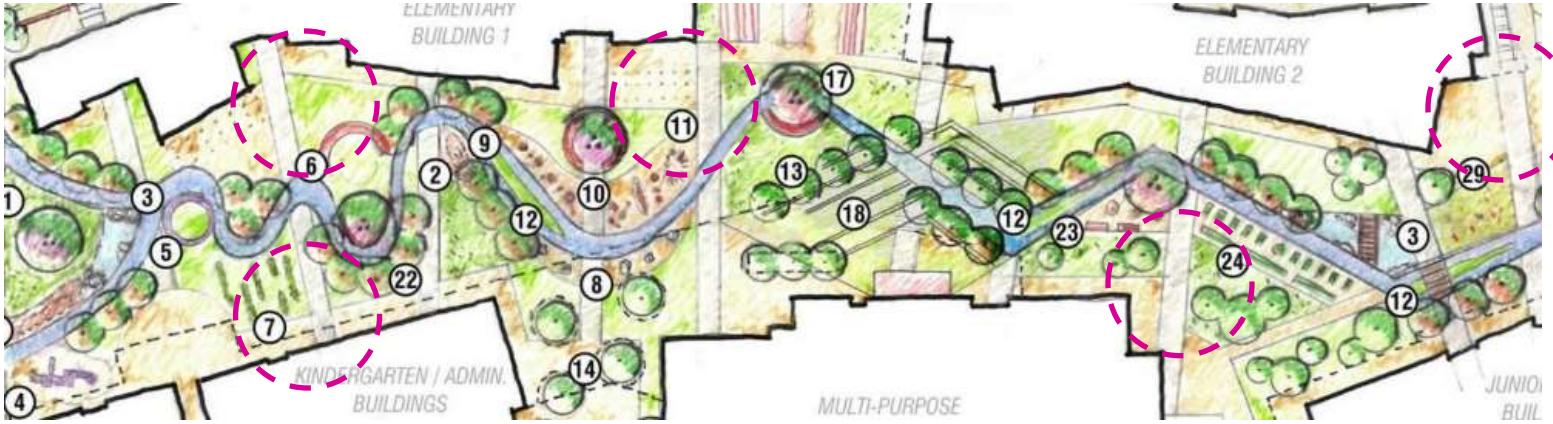
100 METER DASH

CONNECT THE DOTS HOPSCOTCH

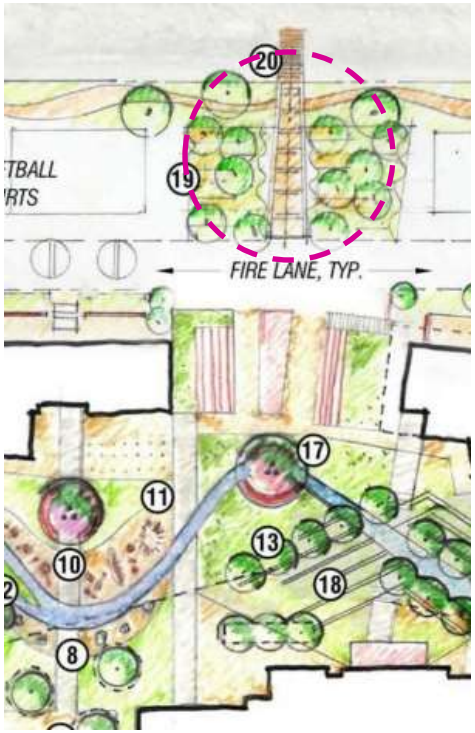
ASPHALT TOPOGRAPHY

WORD SEARCH

HARDSCAPE ELEMENTS:
EDUCATIONAL PLAYSCAPES



HARDSCAPE ELEMENTS:
FOSSIL SCAVENGER HUNT & MINERALS



LANDSCAPE ELEMENTS:
DETENTION BASIN

METERS
FEET

MERCURY

VENUS

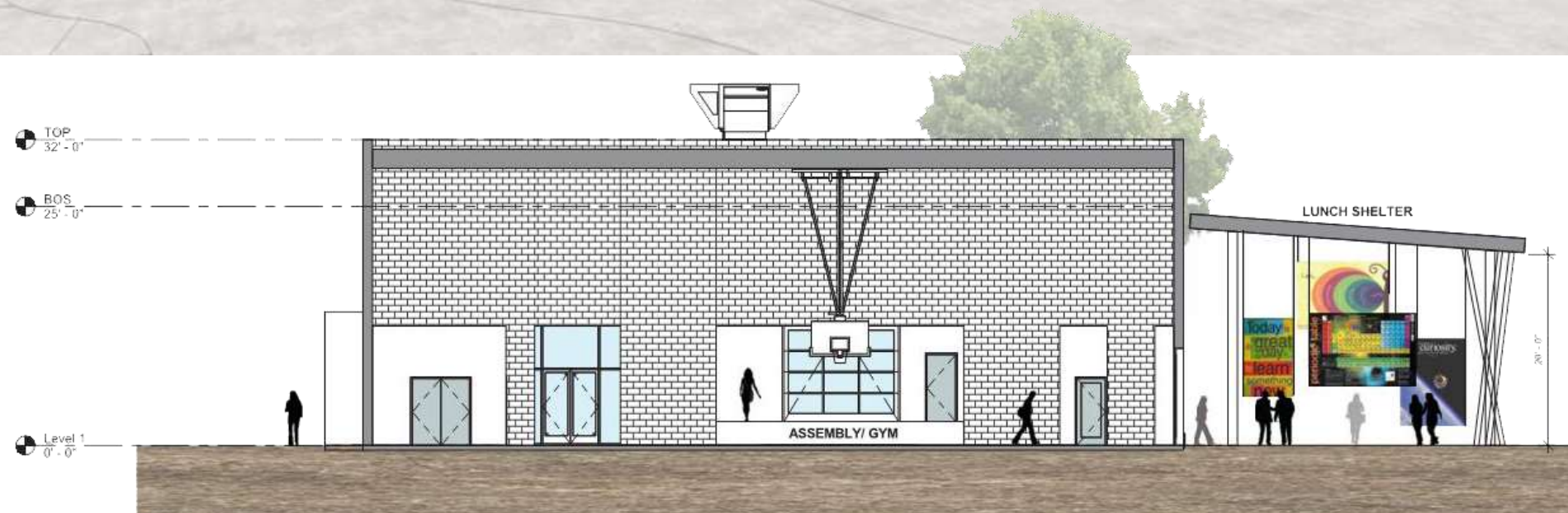
EARTH

MARS

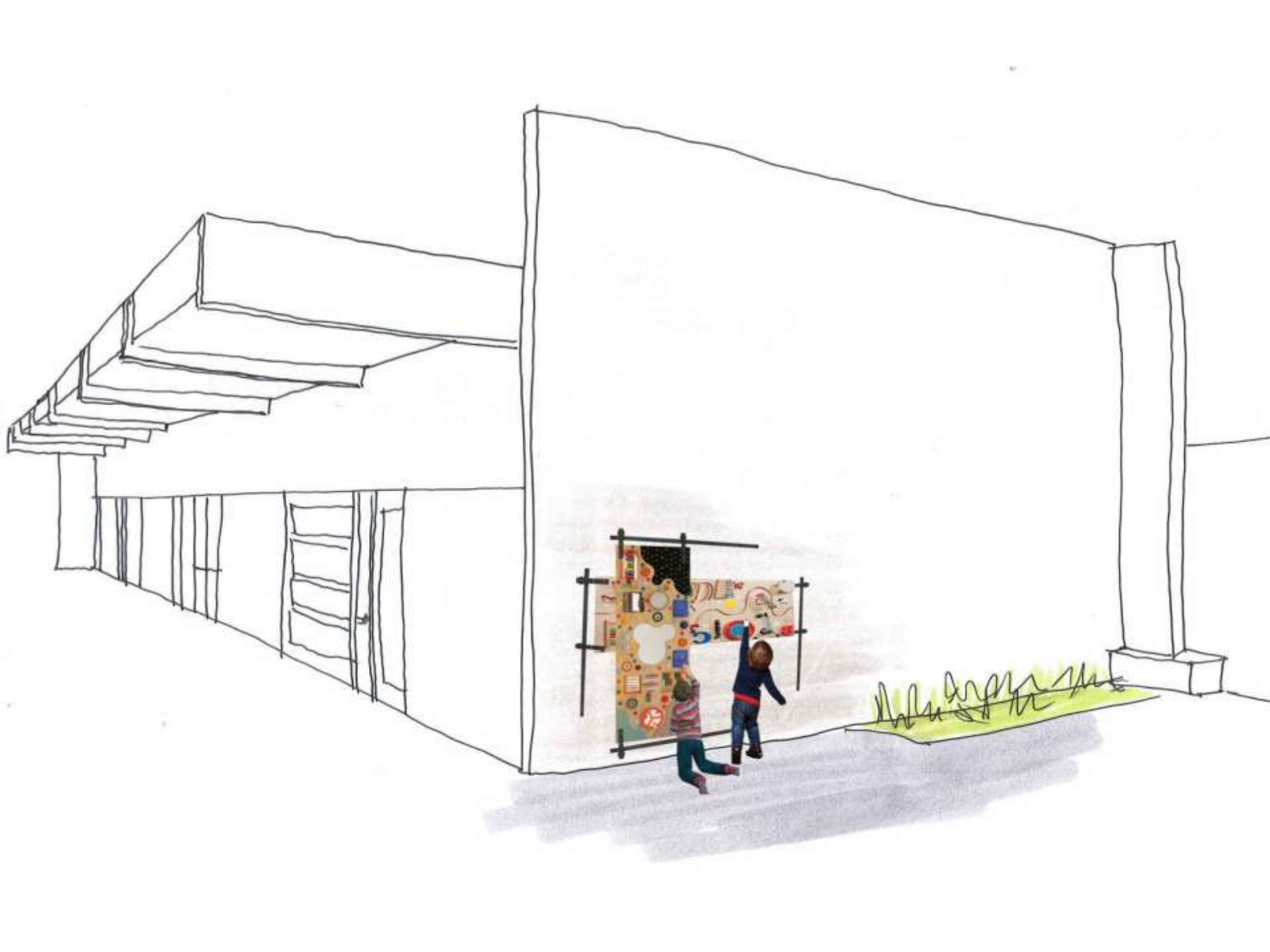
SUN

ARTIFACTS BURIED WITH SIN
HELP US KNOW HOW THEY LIVED

Today is a great day to learn something new


TOP
32' - 0"
ROS
25' - 0"
Level 1
0" - 0"
ASSEMBLY/ GYM
LUNCH SHELTER
20' - 0"

nitrogen



Funding

- Identify the facilities finance planning team
- Determine the budget for the new school
- Identify all potential sources of funding and special grant funding
- Identify and evaluate the site and any special conditions of the site
- Incorporate joint-use and community school concepts

Process

- Form a comprehensive program planning advisory committee
- Conduct site visits to other state of the art facilities
- Incorporate futures planning and futures technology
- Evaluate the process as it moves forward
- Select a top site administrator before the school is completed
- Deliver regularly scheduled board progress reports

Next Steps

Set Goals/Vision
Give Permission
Provide Resources
Support Professionals Developing
Network & Partnerships with the Broader Community

A4E
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