LEARNING SPACES

2016 EDUCATOR AND VOLUNTEER RESOURCE GUIDE

BUILD AWARENESS. BUILD KNOWLEDGE. BUILD COMMUNITY.

DESIGN LAB

LEARN AND BUILD

AFC ARCHITECTURAL FOUNDATION OF CINCINNATI

www.architecturecincy.org

AIA Cincinnati
A Chapter of The American Institute of Architects

WELCOME

DESIGN LAB MISSION

The Architectural Foundation of Cincinnati, in association with AIA Cincinnati, offers **DESIGN LAB** to community schools to broaden and deepen student awareness and understanding of our built environment.

We do this by:

- Creating thematic annual educational programs aligned with state learning standards implemented through an active partnership between educators and professionals in the built environment.
- Offering appropriate grade level content, lesson plans and learning goals.
- Providing educators with a useful and imaginative tool to help meet educational goals in a variety of academic and enrichment subject areas.

DEAR EDUCATORS AND VOLUNTEERS,

Welcome to **Design LAB: Learn And Build**! The Architectural Foundation of Cincinnati, in association with AIA Cincinnati, is pleased to offer this hands-on, project-based learning experience to our community's schools and students. With the generous gift of your time and talent, over 100 classrooms and 1,900 students will be able to participate in this creative and unique educational program for 2016.

For almost 20 years, **Design LAB: Learn And Build** (formerly ABC) has aimed to assist K-12 students in learning about how they can plan, communicate and thoughtfully build their environments. As students design and model their projects, they also build an awareness, knowledge and confidence about themselves, their ideas and how they might like to engage as citizens of the world.

As always, we welcome your input, insights and suggestions about how to improve and strengthen **Design LAB** in partnership with you, the educational and professional communities. With your support and a multidisciplinary curriculum, students will gain an appreciation of their built environment, and the interactive role they can have in shaping it. Please feel free to contact us anytime with your comments and questions. **Thank you for your participation!**

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IMPORTANT INFORMATION FOR EDUCATORS

THANK YOU FOR PARTICIPATING IN DESIGN LAB! As many of you know, the program is valuable to different students in various ways. For some, it is an opportunity to stretch their creativity in directions they may have never imagined. For others, it represents a chance to engage with the built environment in new ways. For many, it is a path to gain experience for operating within a team dynamic, and building consensus toward a common creative goal. The program is designed with the intent that each student will glean a measurable benefit from their participation. With this in mind, emphasizing student focus and engagement on their criteria for success is critical to their overall and individual achievement.

MAXIMIZE THE VALUE REALIZED FROM THE TIME YOU HAVE WITH YOUR CLASSROOM VOLUNTEER. They have a depth of knowledge and exposure with the built environment that can tremendously enhance the project experience in your classroom. However, most are not "classroom-regulars" – and for many this may represent their first foray into a classroom environment. B**e clear with the volunteers and students about your goals and expectations for your classroom's participation in Design LAB.** The project is yours to direct, with volunteer assistance as a knowledge resource.

MAINTAIN GREAT COMMUNICATION BETWEEN YOU AND YOUR VOLUNTEER. Collaborate on a plan for the program, and remain flexible as needed. Adjustments to schedule or expectations may be made if there are variations to the anticipated plan. Support your volunteer with any unfamiliar classroom circumstances and lead the process to implement the best ways of reaching the achievement goals for your students.

LESSON PLANS, ACTIVITIES & WORKSHEETS. This guide contains suggested activities pertaining to the Learning Spaces project theme, as well as design process and communication: concepts, drawing & modeling. **Note: you do not need to use every activity.** We would like for your class to get the most out of this experience, and understand that you know your students best. Therefore, select the activities that best fit your project approach, curriculum and student grade level(s). Some educators modify the enclosed activities and plan out or add their own activities as well.

Above all, **have FUN!** We hope you enjoy the project with your students and volunteer(s).

LEARNING OUTCOMES. We ask all educators to conduct a **pre and post assessment** with participating Design LAB students, to collect the surveys and return them to AFC. These assessments will be used to further refine and improve Design LAB, and support our program fundraising efforts.

The pre and post assessments will measure **K–2, 3–5, 6–8 and 9–12** grade level learning in the following key areas. *Please work with your volunteer to present information accordingly.*

English Language Arts: Key Ideas & Details, Integration of Knowledge & Ideas, Craft & Structure, Presentation of Knowledge & Ideas, Vocabulary

Mathematics: Geometry (2D and 3D), Measurement & Data, Number & Operations, Proportions, Quantities, Scale/Ratios

Science: Earth's Resources, Energy Resources, Study of Matter, Properties of Everyday Objects/Materials, Identify problems & Potential Technology/Engineering solutions

Social Studies: Spatial Thinking & Skills, Maps, Places & Regions, Human Systems

Visual Arts: Art Literacy, Authentic Application & Collaboration, Critical & Creative Thinking, Personal Choice and Vision

In addition to the student assessments, a **program evaluation** will be emailed to participating educators and volunteers in May. Your responses are extremely important to the continued success of Design LAB. We kindly request the surveys be completed and returned by **June 3, 2016**.

SAVE THE DATE!
The 2nd annual **Design LAB Educator & Volunteer Appreciation Party** will take place in **early June**. Details will be forthcoming. We want to celebrate you and your efforts with Design LAB!

QUESTIONS? Contact AFC at eddir@architecturecincy.org or (513) 421-4469.

IMPORTANT INFORMATION FOR VOLUNTEERS

THANK YOU FOR YOUR PARTICIPATION IN DESIGN LAB! The program is designed to increase awareness of the built environment and stretch the creative thinking skills of a vast range of students. Different students will necessarily have different levels of engagement with the core principles of the Design LAB project. **Every student benefits from your willingness to share your passion and creativity,** even if at times it appears some may not. Collaborate with your educator to ensure that your interaction with the students is tailored to the specific classroom's needs. Some students and classes benefit more from individual attention, others from dynamic group interactions. Don't be discouraged if it seems like some students aren't immediately engaging with the project, as these are often the students who will benefit most from this experience in the long run.

The culture of classrooms will differ based on the school type and location. Just as it is important to know your audience and tailor a presentation to a specific client, it is also important to understand the best way to communicate with the students in your specific classroom. A preliminary discussion with your educator to understand the dynamics of the classroom will help you deliver your message and comments in a manner that will be best received by the students. If you find the dynamics of the classroom to be challenging, please reengage with the teacher for additional advice and contact the volunteer coordinator or AFC for recommendations.

You are a valuable knowledge resource, with limited time in the classroom. Your expertise and creativity can be tremendously impactful; be mindful of effective ways to leverage the time you have available. Communication with your educator is critical for the success of the program, and for your personal satisfaction as a volunteer as well. Be sure that you clearly understand your educator's goals for their classroom's participation in Design LAB, and discuss best strategies to enhance the realization of those goals. The project may occasionally pose unique challenges. **Stay flexible when things don't go exactly per the plan, and be certain to discuss any differences in understanding of the classroom's goals or participation with your educator promptly.**

Above all, **have FUN!** Sharing your enthusiasm is contagious and will inspire students to express theirs as well. Design LAB is possibly their first in-depth exposure to built environment concepts, and it has the proven potential to elevate career aspirations. Chances are, this experience will give you the opportunity to learn as much from the students and teachers you work with, as they may from you. **Know that the lasting impact of your volunteer efforts will continue to be realized by many students long after the program's completion.**

LEARNING OUTCOMES
Design LAB educators will conduct a pre and post assessment with participating students, collect the surveys and return them to AFC. These assessments, included herein, will be used to further refine and improve Design LAB, and support our program fundraising efforts. *Please work with your teacher to present information accordingly.*

Share your expertise and the work you have done to help students design projects with **real world solutions.** At the end of the project period, student models and tri-fold panels will be entered in the **Design Fair** held at the Public Library, Main Branch. **We encourage you to attend to support your students and share in their recognition on May 7, 2016.**

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QUESTIONS? Contact AFC at eddir@architecturecincy.org or (513) 421-4469.

ACKNOWLEDGEMENTS

Design LAB is only possible thanks to the generous, energetic and thoughtful work of **all participating educators and classroom volunteers**. Your work in the classroom with students broadens their horizons and hones their skills in important ways no textbook ever could.

We also thank our sponsors and program volunteers, who contribute the treasure and time needed to implement Design LAB.

PROGRAM OVERVIEW

CALENDAR

DECEMBER 2015 | TEAMS ASSIGNED & FIRST CLASSROOM VISIT

Educators and classroom volunteers will receive an e-mail with their assignment information. You are responsible for coordinating the date and time for initial presentations and return visits. Plan a first classroom visit in the first two weeks of December, prior to holiday break.
See "FIRST CLASSROOM VISIT" and drawing activity for suggestions.

JANUARY 4, 2016 | PROJECT KICK-OFF

The classroom PowerPoint and all Program Materials will be posted on Dropbox and on the AFC website. All participating educators and classroom volunteers will receive an electronic invitation to access program materials. If you do not receive an invitation, email eddir@architecturecincy.org

JANUARY 4 - APRIL 29, 2016 | RESEARCH, DESIGN & CREATION PERIOD

See the Design Challenge and week-by-week timeline for a breakdown of suggested benchmarks and order of activities for the completion of projects.

SATURDAY, APRIL 30, 2016 | DESIGN FAIR SUBMISSION CHECK-IN/DROP-OFF

Time: 9:00am–12:00pm
Location: Public Library Of Cincinnati and Hamilton County, Main Branch
800 Vine Street, Cincinnati 45202
See DESIGN FAIR EXHIBITION & REQUIREMENTS for directions and drop-off details.

APRIL 30 – MAY 7, 2016 | DESIGN FAIR EXHIBIT WEEK

Time: During normal Library hours, www.cincinnatilibrary.org/info/hours.asp
Location: Public Library Of Cincinnati and Hamilton County, Main Branch
800 Vine Street, Cincinnati 45202

MAY 3, 2016 | DESIGN FAIR JURY REVIEW

See the DESIGN FAIR EXHIBITION & COMPETITION REQUIREMENTS for jury award categories.

MAY 7, 2016 | DESIGN FAIR RECEPTION & PROJECT CHECK-OUT

Location: Public Library Of Cincinnati and Hamilton County, Main Branch
800 Vine Street, Cincinnati 45202
Time: 9:00am–1:00pm
9:00am-12:00pm Students Present & Discuss Their Work / Last Chance to View Exhibit
12:00pm–1:00pm DESIGN LAB Fair Awards Presentation
1:00pm–2:00pm Project Pick-Up / Removal
9:00am–2:00pm **Project Check-out** & Certificates Pick-up
Educators or assigned classroom parent to pick up certificates for your class.

PLEASE NOTE: ALL PROJECTS MUST BE SIGNED OUT FROM MAIN LIBRARY EXHIBITION SPACE NO LATER THAN 2:00pm SATURDAY, MAY 7th. PROJECTS REMAINING AFTER 2:00pm WILL BE DISCARDED.

JUNE 2016 | EDUCATOR & VOLUNTEER APPRECIATION PARTY

Tentative dates - June 1 or 2, 2016. Details forthcoming.

PROJECT TIMELINE

SUGGESTED WEEK-BY-WEEK TIMELINE

The following schedule is based on a classroom working on the project for one 45-60 minute class period per week. You may choose for students to participate more frequently and distribute information, activities and worksheets for review/completion outside of class. Other than assessments, this outline schedule is not mandatory, and is intended to help guide your class through the design process. Adjust at your discretion and include holidays, Spring Break and possible snow days in your overall Work Plan. Remind students to keep a folder with information and images to prepare their tri-fold project display. *Thank you!*

MONTH/WEEK	PROJECT PHASE	SUGGESTED ACTIVITIES
DECEMBER	Intro Visit | Getting Acquainted	Drawing Activity, Site Selection & Analysis, Materials reminder, Pre-Assessments due
JANUARY		
Week 1 DISCOVER	Project Introduction	PowerPoint, Design Thinking & Process, Q&A
Week 2 DISCOVER	Client & Site Phase	The Challenge, Site Selection & Analysis
Week 3 INTERPRET	Design Inspiration Phase	Thinking About Learning, Building Survey, Structures
Week 4 INTERPRET	Design Concepts, Green Design	Learning Environments, Intro to Green Design, Spatial Awareness, Tri-fold: Phase 1
FEBRUARY		
Week 5 IDEATE	Design Ideas & Drawing	Design Ideas Form; Plan, Section & Elevation
Week 6 IDEATE	Understanding Scale	Drawing to Scale, Freehand Drawing Activity
Week 7 EXPERIMENT	Design Week, Drawing	Sketches, Plans & Elevations
Week 8 EXPERIMENT	Design Week, Drawing	Develop Plans & Elevations, Tri-fold: Phase 2
MARCH		
Week 9 EVALUATE	Presentations, Intro to Modeling	Student presentations or Modeling Exercise
Week 10 EVOLVE	Work Week	Modeling Exercise, Model bases / layout
Week 11 EVOLVE	Work Week	Models
Week 12 EVOLVE	Work Week	Models / Tri-fold: Phase 3
SPRING BREAK – Enjoy!		
APRIL		
Week 13 EVOLVE	Work Week	Models / Midpoint evaluation
Week 14 EVOLVE	Work Week	Models / Project Description, Tri-fold layout
Week 15 EVOLVE	Work Week	Models / Project Description, Tri-fold layout
Week 16 SELECT	School/public Display, Select Entries	Finishing touches, Complete Design Fair Entry Forms

CONCEPTS

DRAWINGS

MODELS & TRI-FOLDS

ADMINISTER THE POST-ASSESSMENT TO STUDENTS IN LATE APRIL OR EARLY MAY.

CONSIDER THE FOLLOWING OPTIONS FOR THE WEEK BEFORE THE DESIGN FAIR SUBMISSION:

1. Have your students present their work to each other for review, discussion and comment with their peers.
2. Display student work in a prominent location at your school / education site.
3. Talk with your local branch library or other organizations about the possibility of displaying student projects publicly in your neighborhood.

DESIGN THINKING & THE DESIGN PROCESS

WHAT IS DESIGN THINKING? Design Thinking is a mindset. It's the confidence that everyone can be part of creating a more desirable future, and a process to take action when faced with a difficult challenge. That kind of optimism is well needed in education.

THE DESIGN PROCESS The design process is what puts Design Thinking into action. It's a structured approach to generating and developing ideas.

THE FIVE PHASES OF THE DESIGN PROCESS:

1. **DISCOVERY** **Discovery means opening up to new opportunities, and getting inspired to create new ideas.** Discovery builds a solid foundation for your ideas. Creating meaningful solutions for students, parents, teachers, colleagues and administrators begins with a deep understanding for their needs. With good preparation, this can be eye-opening and will give you a better understanding of your design challenge.
   - **Understand the Challenge** – Design a learning space where you, your friends, or your entire community can learn in new, exciting, and active ways.
   - **Prepare Research** – Interview students, teachers, administrators, parents and/or community members to explore the wants and needs for a new learning space. Explore possible sites for the space - should it be a renovation of an existing space, an addition, or a new structure?
   - **Gather Inspiration** - Think about places outside of school that are learning spaces such as museums, camps, libraries, playgrounds, sports, arcades and even theme parks. Collect images for inspiration.
2. **INTERPRETATION** **Interpretation transforms your stories into meaningful insights.** Observations, field visits, or just a simple conversation can be great inspiration—finding meaning and turning these into actionable opportunities for design can be a challenge. It involves storytelling, as well as sorting and condensing thoughts until you've found a compelling point of view and clear direction for ideation.
   - **Tell Stories** – Synthesize your discovery by creating inspirational stories that captures your learnings.
   - **Search for Meaning** - Look for themes that appear, explore the meaning of your findings, and define insights.
   - **Frame Opportunities** – Experiment with various visualization methods such as charts and diagrams to present your learnings. Turn your ideas into brainstorming "how might we" questions that will be used in the next phase, Ideation.

THE 5 PHASES OF THE DESIGN PROCESS

(CONTINUED)

3. **IDEATION** **Ideation means generating lots of ideas.** Brainstorming encourages you to think expansively and without constraints. It's often the wild ideas that spark visionary thoughts. With preparation and a clear set of rules, a brainstorm session can yield a multitude of fresh ideas.

   - **Generate Ideas** - Establish and follow rules for brainstorming in your group, engage in brainstorming sessions, and then select ideas that have the greatest potential. Be sure to keep your notes and even take pictures of the process as they will be valuable later on for your presentation. Freely conceptualize with words, diagrams, sketches, drawings...choose methods that best help you describe your ideas.
   - **Refine Details** – Start with a reality check to determine which ideas support your goals for the challenge, which ideas have potential barriers, and which ideas can be evolved. As you narrow your ideas, capture them in a more structured format such as a mini-poster that would include the following:
     - Title of your idea
     - Summary of your idea in a single sentence
     - Description of how your idea would work
     - Explain the features and benefits
     - List challenges and questions

4. **EXPERIMENTATION** **Experimentation brings your ideas to life.** Drawing and building prototypes means making ideas tangible. Spontaneous learning occurs while drawing and building, and sharing ideas with other people. Even with early and rough prototypes, you can receive a direct response an idea.

   - **Make Prototypes** – Prototypes enable you to share your ideas with other people and discuss how to further define it. You can prototype just about anything through drawing, modeling, role-playing, storyboards, diagrams, advertisements, etc.
   - **Get Feedback** - Present your prototype to an audience to get valuable feedback which you can use to modify and improve your idea.

5. **EVOLUTION** **Evolution is the development of your concept over time.** It involves planning next steps, communicating the idea to people who can help you realize it, and documenting the process. Change often happens over time, and reminders of even subtle signs of progress are important.

   - **Track Learnings** – As your concept evolves, you can begin to measure its impact. Define a set of criteria for success to help guide and evaluate the development and progress of your idea. Be sure to document your progress, discuss the impact of your ideas and celebrate the progress you have made.
   - **Move Forward** – When your idea has evolved into a solid concept, it's time to plan for the next steps. Create an overview of the project and determine a final timeline. Identify the tasks that need to be completed and decide who will be responsible for completing them. Invite input from people outside of your design team to help, and build collaborative working relationships with each other and other teams.

Adapted from 'Design Thinking for Educators', www.designthinkingforeducators.com, IDEO

FIRST CLASSROOM VISIT

GETTING ACQUAINTED

It is recommended that educators and volunteers schedule an introductory classroom visit prior to the students' winter holiday. Volunteers, spend time during your first visit introducing yourself and getting to know the students you'll be working with.

Consider questions, discussions, and activities to get students thinking critically about the built environment. Some students have never really stopped to consider what goes into creating the environments and spaces that they occupy every day. Spend a few minutes helping them to think critically about ideas such as:

- The factors that are important in the design of a building/learning space.
- Which systems make up a building and what they are designed to do (this is a great place to make a comparison to the body – the building envelope is the shell, the structure is the skeleton, HVAC is the respiratory system, etc.)
- Spaces they like or don't like in buildings (e.g. their school), and why.

See next page, 'DESIGN THINKING DRAWING ACTIVITY' for a suggested, fun warm-up to get students thinking about the built environment, drawing and design.

Time permitting, this may be an opportunity for volunteers to present the Design LAB 2016 classroom PowerPoint, introducing concepts about the built environment and the project that the students will be working on. Coordinate the most appropriate time for this presentation with your educator. To help maximize student retention, we suggest presenting the Learning Spaces classroom PowerPoint the first week of the project kick-off -- January 4-8, 2016 and no later than January 15, 2016.

IMPORTANT: MODEL MATERIALS REMINDER!

Encourage students to begin collecting modeling materials while they are home for the holiday break. Boxes and other unique packaging materials are plentiful during this time, and can easily be rescued from the garbage or recycling bins. Remind students that objects such as LEGO's, action figures, Matchbox cars, or other toys that they would not want to lose are not recommended for this project – but challenge them to think creatively about what kinds of other interesting materials can be reclaimed for future use in their models.

DESIGN THINKING

DRAWING ACTIVITY

The following Design Thinking activity is recommended for the first classroom visit as a way to initially stimulate broad ideas about design and creative thinking.

This activity is designed to help students start thinking creatively about the built environment. It requires that they make design decisions quickly, and commit them to paper.

DURATION: 20 minutes

OBJECTIVES – Students will:

- Practice communicating their design ideas quickly by sketching and drawing
- Demonstrate creative thinking about the built environment through an iterative design process

RECOMMENDED MATERIALS:
one sheet of 11 x 17 paper for each student,
pencils to draw with

DRAWING ACTIVITY:
Divide students into four groups.
This activity works smoothly when students are arranged in four rows to facilitate rapid passing of papers from one row to the next.

Preselect four common building typologies for the students to work with. These should be buildings that each student would be reasonably familiar with. Each student will interact with each building typology once during this activity. Some common buildings include:

- School
- Grocery Store
- Museum
- Restaurant
- Fire Station
- Recreation Center
- Stadium
- Skyscraper

Assign one building typology to each row to begin the exercise. Students have 4-5 minutes to begin to design a building of this type on their page. Encourage students to spend the entire 4-5 minutes drawing.

At the end of the first cycle, have students pass their designs to the left (group 1 to group 2, group 2 to group 3, etc.). No communication of ideas is allowed during the handoff – students must work only with the ideas on the page. Each designer now has a design-in-progress in front of them, in a different building typology. Begin another cycle of design, and encourage students to use the full 4-5 minutes drawing and designing – adding their own ideas and clarifying what is on the page.

Continue through two more iterations of this process, until each student has had an opportunity to work on all four of the building typologies. This exercise becomes difficult in the third and fourth rounds, as students may feel that there is little left to contribute to the design-in-progress. Encourage them to continue drawing and adding to the design, as there is always something creative that can be added.

Pass the papers back to their original owners to finish the activity.

DISCUSSION: This is a great opportunity to reinforce ideas about the creative and spontaneous nature of design and working collaboratively. Consider questions such as:

- Did the final design of your building end up looking like you thought it would when you started?
- What elements were added that you would never have considered?
- How easy / difficult was it to work on someone else's design without any communication about what was already on the page?

PRE-ASSESSMENTS

GRADES K-2

GRADES 3-5

GRADES 6-8

GRADES 9-12

NOTE: The post-assessment will be emailed / provided by April 2016. All questions will be the same except for question #7.

2015-16 LEARNING SPACES: SHOW US WHAT YOU KNOW!

GRADES K-2 PRE-ASSESSMENT

Name _____ Grade _____

Teacher _____

1. **Match** the **number** of sides with the picture of its **shape**:

3

8

4

---

2. **Match** the **word** with the picture of its **shape**:

triangle

cube

half-circle

---

3. **Circle** the **word** or **picture** that is a **waterproof** material:

wood

paper

glass

---

4. **Circle** the **image** that is a **section**:

---

5. **Use** the shapes below to **draw** a building:

---

6. **Circle** the picture that shows a **built environment**:

---

7. What are you excited to **learn** in Design LAB: Learn And Build this year?

_____

_____

_____

2015-16 LEARNING SPACES: SHOW US WHAT YOU KNOW!

GRADES 3-5 PRE-ASSESSMENT

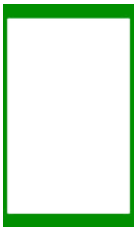
Name _____ Grade _____

Teacher _____

1. **Circle** the **scale** on this architectural drawing:

NORTH EAST ELEVATION
1/8" = 1'-0"

2. This rectangle represents a **four-story** building. Using the measurements provided, how high is each **story**?



The rectangle building is **36** feet tall

The rectangle building is **24** feet wide

3. **Circle** the building materials below that are **sustainable**:

Bamboo	Old-forest timber
Plastic	Recycled glass

4. **Match** the **image** to the **word** that describes it.

Plan

Elevation

Section

5. **Draw** a **square** in 2 dimensions (2-D) **and** in 3 dimensions (3-D). What is the name of the 3-D **square form**? – **Label it.**

6. **Circle** the picture that shows a **built environment** and **explain why** you think it is a built environment?

_____
_____
_____
_____

7. What are you excited to **learn** in Design LAB: Learn And Build this year?

_____
_____
_____
_____
_____
_____
_____
_____

2015-16 LEARNING SPACES: SHOW US WHAT YOU KNOW!

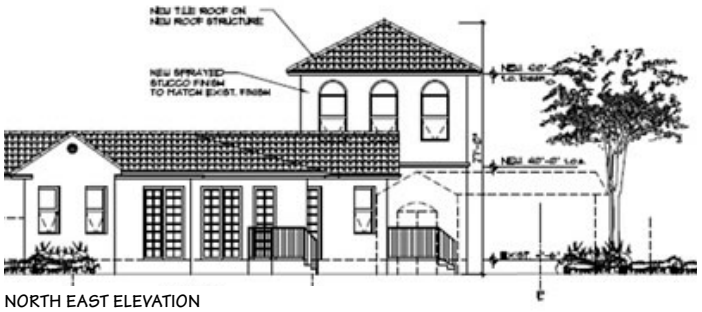
GRADES 6-8 PRE-ASSESSMENT

Name _____ Grade _____

Teacher _____

1. What is the **scale** of this architectural drawing?
   Why (or how) do architects, designers, engineers use **scale** in their design process?

_____
_____
_____
_____
_____
_____
_____



NORTH EAST ELEVATION

1/8" = 1'-0"

2. The **ratio** of a model to its actual building is **1": 50'**.
   If the model is 5", **how tall is the actual building?**

_____

3. **List three** sustainable building materials.

_____
_____
_____

4. Pretend the images below of a green pepper are a building. **Label** the **type of drawing** each image represents.



_____ _____ _____

5. **Draw** a triangle in 2 dimensions (2-D) **and** a **triangular form** in 3 dimensions (3-D). What is another name for the 3-D triangular form? – **Label it.**

6. What is the **built environment**?

_____
_____
_____
_____
_____
_____

7. What are you excited to **learn** in Design LAB: Learn And Build this year?

_____
_____
_____
_____
_____

Name _____ Grade _____

Teacher _____

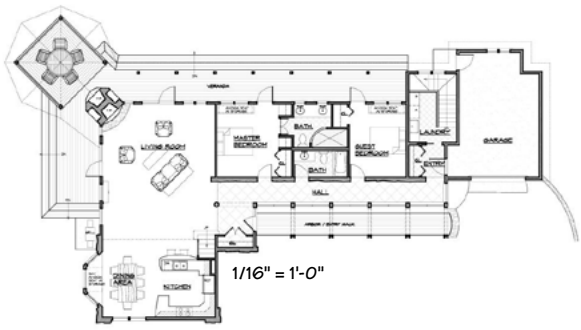
1. Look at the drawing of this building and **name as many of the building features** as you can:

2. The five phases of the **Design Process** are (**Fill in** the missing steps below):
   1. _____
   2. Interpretation
   3. _____
   4. _____
   5. Evolution

3. **Name** a sustainable building material and a building material that is NOT sustainable.

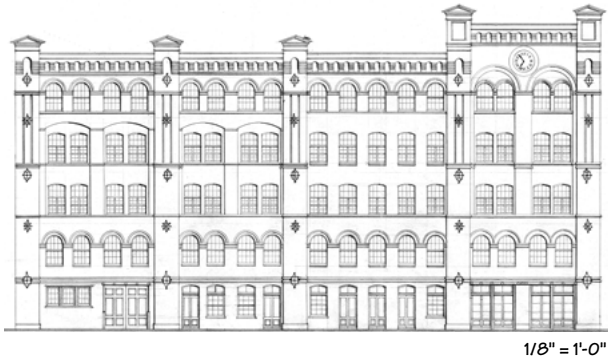
   sustainable _____ not sustainable _____

4. **Label** the **type of drawing** each image below represents, **and** identify the **scale** of the drawings.



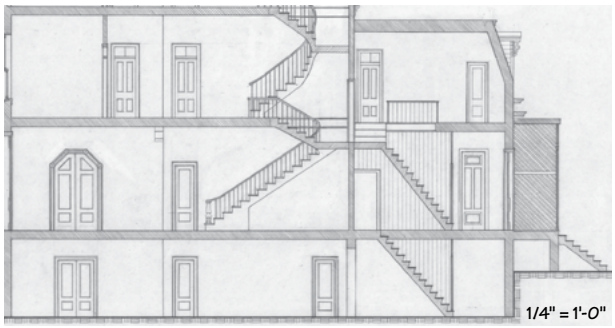
Type of drawing:_____

Scale: _____



Type of drawing:_____

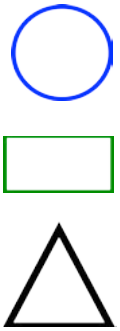
Scale: _____



Type of drawing:_____

Scale: _____

5. **Match** the three dimensional (3-D) object with its two dimensional (2-D) **cross section**.



6. What is the **built environment**?

_____

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7. What are you excited to **learn** in Design LAB: Learn And Build this year?

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THE DESIGN CHALLENGE:

LEARNING SPACES

THE CHALLENGE

OVERVIEW & PROJECT REQUIREMENTS

THE CHALLENGE IS TO UNDERSTAND THE CLIENT'S NEEDS AND DESIGN ACCORDINGLY. This means understanding how you and others LEARN, what are the needs to do so, and how design can shape and fulfill those needs. Think about all the uses of your classroom or other **learning spaces** that inspire you in considering your designs.

PROJECT REQUIREMENTS:

1. Projects may be developed in teams or individually. Based on previous experience, we recommend teams of up to four students, and leave this to the discretion of the educators and volunteers. The goal is for each student to have ample opportunity to contribute to the design process, drawing and model-building.

2. Models should offer real world solutions to the design challenge. Use your creativity to build a model that could become a real Learning Space and be constructed for your client. Grades 6-12 projects are strongly encouraged to use scale.

3. Each project must incorporate at least one sustainable design solution.

4. Each classroom may submit no more than (3) three Design Fair entries, including a 3D model and tri-fold display. See **Design Fair Exhibition & Competition Requirements** for more info. All work must be designed and completed by students, with assistance from educators and volunteers.

Have each team keep a folder containing the Design Ideas Form(s) and all additional research, sketches, concept images, photographs, etc. for the project, and use to prepare the tri-fold panel.

CONCEPTS: DISCOVERY & INTERPRETATION

Use the first 4 weeks to understand and research the project, and gather inspiration. Introduce the project (classroom PowerPoint presentation), share stories or observations that frame opportunities and identify meaningful insights. Identify your client(s) and site selection as quickly as possible to facilitate development. See the 'Client Phase', 'Site Phase' and 'Design Inspiration Phase' to start your planning. Select supplemental information, activities and handouts to do in-class or for homework to support goals for the project.

DRAWINGS: IDEATION & EXPERIMENTATION

Utilize the next 4 weeks for generating ideas and narrow them down by experimenting with sketches, drawings and scale. Continue to refer to the Week-By-Week Project Timeline for suggested activities and progress points.

- Use the drawing activities in this packet to begin to explore and form the details for each of the learning space uses. Decide how the different uses could share space, and which activities need to be separate but near each other. Which spaces do not need to be near each other?

- Have students decide how much area (feet x feet) is needed for each of the activities in the learning space. Use the Design Ideas Form to record the requirements for each programmatic use / activity.

- Discuss the desired qualities of the spaces appropriate for each project: **size, height, shape, sound, lighting, color, comfort (heat, cooling, airflow), should it be interior or exterior, what should the materials do?**

Continue to utilize the Design Ideas Forms throughout the process to remind students of their design decisions.

MODELS & TRI-FOLDS: EVOLUTION

Time to BUILD! On average, classrooms spend approximately 50% of the project period for building (7-8 weeks). By this point, students typically have a foundation on which to build while they further develop ideas. This is often the most exciting time for students as they synthesize information engage in building their designs!

- Make a quick massing model or create scaled plan cutouts of the spaces that you can maneuver around on the site plan or model base, to get your location / arrangement just right.

- SCALE – create a few pipe cleaner scale figures to the same scale as the model, or draw and create flat cutout figures using stiff paper or cardboard that can stand up. With these, you can check to make sure they 'fit'. What is height or the range of heights for your clients?

- If you're thinking of going vertical, use blocks to elevate areas.

- After you've identified interior and exterior activities, check in with your Green Design Solutions list on the Design Ideas Form. Confirm which sustainable strategies you will incorporate into your project. Select one or two that will help define an architectural feature, and make it a part of your model.

- Refer to the MODELING section for tips about building your base, trees, glue and tape tricks and other ideas. Discuss additional suggestions with your classroom volunteer.

DON'T FORGET PHOTOS! Take pictures of students' work as records.

THE CHALLENGE

learn·ing
/ˈlərniNG/
noun
1. the acquisition of knowledge or skills through experience, study, or by being taught.

synonyms: scholarship, knowledge, study, education, teaching, research, intellect, enlightenment, illumination, understanding, wisdom

space
/spās/
noun
1. a continuous area or expanse that is free, available, or used for a particular purpose

2. the dimensions of height, depth, and width within which all things exist and move.

synonyms: room, capacity, area, volume, expanse, extent, scope, venue, play

verb
3. position (two or more items) at a distance from one another.

synonyms: position, arrange, array, lay out, locate, situate, set

DESIGN A LEARNING SPACE as a renovation, addition, or new building on your school grounds. This should be a place where you, your friends, or your entire community can learn in new, exciting, and active ways.

GETTING STARTED
We will explore our design challenge in THREE PHASES:
- **CLIENT PHASE**
- **SITE PHASE**
- **DESIGN INSPIRATION PHASE**

NOTE TO EDUCATORS: The activities and questions below are suggestions to inspire and guide your students as they address the design challenge by choosing a client, a site, and finding design inspiration. Specific examples are provided to help visualize possibilities, rather than limit ideas. Please feel free to customize your lessons to best accommodate your students and classroom goals. Activities and questions can be addressed individually or within project groups.

LEARNING SPACE: CLIENT PHASE

Identify the needs and wants of your Client. Choose your Client from your school community. This may include you, your friends, teachers, coaches, and parents or considerations for the entire student body.

POSSIBLE STARTER QUESTIONS
- How does your client learn? (This includes you!)
  Does your client learn by doing, traveling, reading, watching, another way?
- How do spaces affect your client's learning? What spaces are best for learning, what spaces are the worst for learning? Does your whole community agree or do some prefer to learn in different ways and spaces? Consider museums, camps, schools, sports, libraries, inside and outside spaces... anywhere you have ever been or dreamed of going.

POSSIBLE ACTIVITIES *(for individuals or groups)*
- Brainstorm lists of your favorite and least favorite places you have learned in the past
- Brainstorm a list of places you want to go to learn
- Use your brainstorms to create and conduct a survey of your client's learning styles and preferred learning spaces. Compare the survey results to your own list. What differences and similarities are there? Consider the needs and wants of students with different learning abilities.

CONCLUSION / CLIENT PROFILE
Identify the wants and needs of your client for the learning space you will design.

THE CHALLENGE

LEARNING SPACE: SITE PHASE

Choose a space in or around your school grounds to renovate, build an addition on, or create a whole new building. Spaces can be indoor, outdoor, or a combination of the two.

POSSIBLE STARTER QUESTIONS

Choosing what TYPE of building project you will do:

RENOVATION

- Identify a space in your school that could be used better than it is today.
- Is there a current space you like to learn in, what could make it even better? Examples: study hall, classroom, library, hallway, storage, offices, gym, cafeteria, anywhere in your school.

ADDITION

- Is there something missing from your school you have always wanted?
- Is there something you love learning that you could add a space for to your school? Examples: a swimming pool, laboratory, observation deck, skate park, kitchen, recording studio, anywhere you can learn.

NEW BUILDING

- Is there a place close to your school building that has great qualities for learning such as light, trees, views, sounds, etc.?
- Is there an area on your school grounds that isn't being used well today, but has the potential to be a great learning place? Examples: Parking lot, lawn, sports fields, woods, creeks, playground, anywhere on your school grounds.

POSSIBLE ACTIVITIES

To guide you in choosing which project type you want:

WALKING / TOUR EXERCISES

- Take a walk in and around your school, record what you see in writing, drawing, or by taking pictures.
  What is working well? What is not working as well?
  What things help you learn?
  What things hinder learning?
- Give someone who doesn't know as much about your school as you do, maybe your classroom design volunteer, a tour of the school building. At the end of the tour, think about what spaces you pointed out. Why did you chose those spaces?

STUDENT OBSERVATION EXERCISE

- As you go through your school day, think about how your learning is affected by the spaces you are in.
  Do any spaces help you learn?
  Do any of them make it hard for you to learn?

MAPPING EXERCISE

- Draw a map of good and bad learning spaces in your school.
  How are different spaces arranged?
  What spaces are close together or far away?
  Where can you go or see outside?
  What spaces are loud or quiet, public or private?
  How do these locations affect learning?

CONCLUSION/PROJECT TYPE SELECTION

- Compare your results with your classmates.
  Do you think your learning would be best improved by a space that is a renovation, addition, or new building? Why?

Also see Site Selection & Analysis for more information and activities.

THE CHALLENGE

LEARNING SPACE: DESIGN INSPIRATION PHASE

Collect ideas and examples of amazing learning spaces in your community and the world. Explore all possibilities, think without limits! Decide what type of space you will design and how it will be used.

POSSIBLE STARTER QUESTIONS

- How will your client use your learning space? What activities will take place there?
  - Examples: a place for reading books, studying history, exploring aquatic life, solving scientific problems, etc.
- Will your space be used for one activity, or a combination of two or three activities?
- What learning styles/abilities will you address in your space?
- What materials, textures, colors will enhance learning in your space?
- Will there be space for group work? Individual work? How big or small will those spaces be?
- What is one amazing feature you would like in your space? Examples: slide, fish tank, telescope... *Think without limits!*
- How can this space be built sustainably? Consider materials, solar orientation, water collection, etc.

POSSIBLE ACTIVITIES

GATHER INFORMATION

- Collect photos, from the internet, magazines, or from home, that show memorable learning spaces.
- Bring in 'things' that are from a memorable learning experience--such as photos from when you learned how to play soccer, a summer camp, a trip, etc.

ANALYZE INFORMATION

- Make a collage of your gathered photos to start imagining what your space might look like.
- Make a venn diagram of different uses for your space. Use your diagrams to decide how many uses you will include in your space.
  Examples: [science lab, fish tank, observatory] [library, reading room, garden]
- Write or illustrate a story about how different people will use your future space--think about teachers, students, people with different learning styles and abilities

CONCLUSION / INSPIRATION BOARD

- Choose 1-4 uses for your learning space (4 max. suggesed)
- Select specific Ideas or pictures you will use to inspire your design

SITE SELECTION & ANALYSIS

site

noun

an area of ground or space on which a town, building, or monument is constructed.

This class activity can be led by the teacher or the volunteer. The intent is to find a site that is good for the project and is able to be studied. The site study will help the students to look at the world around them in a different way with new tools. Note that teams who choose to renovate an existing, interior space will not need to do all the activities.

RECOMMENDED MATERIALS:

- Building plans for the school building, IF available
- Maps showing the area around the school
- Drawing paper and/or grid paper
- Camera (for documenting the site and images for the tri-fold display board)
- Compass (students may need instructions)
- Access to computer for teacher, volunteer, and/or students.
  Leader can show images or print maps for students to use.
  Google Earth:
  www.google.com/earth/
  CAGIS (Cincinnati Area Geographic Information System) CAGIS Online:
  http://cagisonline.hamilton-co.org/cagisonline/index.html
  LINK-GIS (Northern KY Geographic Information System):
  www.linkgis.org/lghome
  Your local County Auditor's Office or Website e.g.:
  www.hamiltoncountyauditor.org
- Measuring tools: Measuring tape (100 foot or 25 foot), meter/yard sticks, trundle wheels. Arm spans and feet lenghts also come in handy! (especially for younger students)

DURATION - 40 minutes for each activity (Activity 1: Selecting the site, Activity 2: Analyzing and documenting the site)

OBJECTIVES

- Understand how the building design can/should respond to the natural environment.
- Understand how the natural environment is shaped by the built environment.
- Be able to use measurement, notes, and drawings to document the conditions of a site.

SITE SELECTION & ANALYSIS

SELECTING THE SITE
(CONTINUED)

ACTIVITY 1: SELECTING THE SITE

CONSIDER POSSIBLE SITES:

a) Renovation, b) Addition/Annex, or c) Independent building/space (indoor and/or outdoor)

There are several ways for a team to go about finding a site:

- Walk around the outside of the school building or education facility.
- Walk through the school building/facility and look for natural connections to outside.
- Find and identify existing spaces to transform into a new Learning Space.
- Use the aerial view with CAGIS or Google Earth/Maps.

WEIGH THE OPTIONS

Have a group discussion about what makes one location better than another, using some of these questions:

- What are the functions of the new space?
- How do people get to the new space?
- What is near the new space now?
- What will the setting add to the new space?

ACTIVITY 2: ANALYZE & DOCUMENT THE SITE

ANALYZE THE SITE

What is the site like? Discuss the impact of building on a particular site. Students should think about features they want to add as well as existing conditions.

Natural Conditions

- Topography - Is the site flat? gently sloping? steep?
- Vegetation – Are there existing plants (trees, grass, bushes, gardens)?
- Climate – Is the site sunny or shady? Where does the sun rise and set?
- Geology/Hydrology – What is the ground like? Wet, dry, rocky, sandy?
- Wildlife – Are there animals that live where the site is? Deer? Birds?
- Natural features – Waterfall, stream, hill, valley, etc.

Built Environment

- Land use – study the adjacent built structures, including the school building.
- Traffic/transit –autos, people. Are there sidewalks, roads or paved areas? Is there a bus stop nearby?
- Utilities – Do you see telephone poles, electrical wires, manholes, gas meters?
- Historic – Is the neighborhood made up of buildings that are old?

DOCUMENT THE SITE

- Take photos of the site if possible.
- Print or draw a map so you can indicate features of the site while you walk around
  PRINT: Visit CAGIS Online http://cagisonline.hamilton-co.org Look at all the available views: topographical, street view, etc. The Hamilton County Auditor's Office (look for the link on CAGIS) has images of the existing buildings with dimensions and lot size. Choose a Print option.
  DRAW: show the shape of the existing building on drawing paper, leaving plenty of space to draw surrounding lot and make notes and record measurements when visiting the site.
  - Use the compass to mark North on your drawing. Note the time of day and the position of the sun.
  - Measure and mark where the main features of the site are located, including natural features and the built environment.
  - To measure: Students can determine the length of their paces and use that to approximate dimensions and distances, or use tape measures, yardsticks, or trundle wheels.

NOTE: If classes are choosing the Addition/Annex option, students will need to discuss the height of the building and the addition. This will be done in a separate session.

SELECTING THE SITE
(CONTINUED)

- Older students will be able to use the mathematical concept of similarity, using a yardstick and its shadow, a ruler held at arm's length, or a mirror on the ground. Here are a couple of YouTube videos about finding the heights of things:
  www.youtube.com/watch?v=8-Vv-fAsuaY
  www.youtube.com/watch?v=F6fltSqImFM

- Younger students could count bricks and multiply by the height of a single brick or create other strategies. Let students brainstorm ideas.

COLLECT EVERYTHING
Each team should keep a folder containing all items gathered about the site including: sketches, photos, images, nearby building types, maps, internet searches, etc. to use to prepare the tri-fold panel.

NEXT STEPS: DECIDING ON A SCALE

What scale shall we use for the model?

- How big is the building? Determine the area required for the Learning Space.
- How much space do we need around the Learning Space? Add to the building area the area around the learning space to determine the total site area.
- Calculate the scale of the site for the model.
- The maximum model display space is 24" x 24". Listed below are the sizes of site that will fit in that space based on which drawing scale the team uses:

- Drawing scale is 1/4"=1'-0". Largest site is 96' x 96'.
- Drawing scale is 1/8"=1'-0". Largest site is 192' x 192'.
- Drawing scale is 1/16"=1'-0". Largest site is 384' x 384'.
- Drawing scale is 1/32"=1'-0". Largest site is 768' x 786'.

NOTE: Scale is not required, but is highly recommended as part of the learning and design process, especially for grades 6 – 12.

INTRODUCTION TO GREEN DESIGN

FOR STUDENTS, TEACHERS & PARENTS

A "Green Building" does not mean the building is colored green. A "green" way of creating buildings means that you respect and try to understand nature in every way that you can. It means that you work with nature and not against it. Nature is older, wiser and stronger than any person or building. To keep nature happy, healthy and friendly, choose to be considerate in the following ways:

1. RESPECT THE EARTH. Place buildings onto the land and among the plants, trees, and streams so that natural beauty stays in place. Protect parks, farms, fields and natural landscapes whenever you can. Don't put things into the ground that could be destructive, such as chemicals and other man-made objects that will harm the soil, plants and animals.

2. RESPECT THE WATER. Save as much clean water as you can for important things like drinking, washing and irrigating. Collect rainwater from the roofs of buildings so it can be used for other needs in the building or garden instead of letting it wash away the topsoil or be put into underground pipes that take it far away. Where needed for pathways or parking areas, cover the ground with materials that still let the rainwater soak in and feed the plants and trees.

3. RESPECT THE AIR. Create buildings that don't need a lot of energy to make them comfortable and warm. Most of the electricity that comes from power plants is made from burning coal which pollutes the air. Buildings that are better insulated against the cold in winter and better ventilated with natural breezes in the summer will need less energy for heating and air conditioning. This helps the air inside and outside of the building.

4. RESPECT THE SUN

Let the sun help light the inside of your buildings instead of using lots of electric lights. To collect heat and light for winter face the building to the south. You can use this side to have the most windows. For summer, you can use an overhang to block the sun when you don't want additional heat. If the summer sun heats up the side of the building too much, plant big leafy shade trees to block the sun's rays. The sun and trees work well together. In the fall, these trees will drop their leaves to let the sun warm up the building in the winter time. Make roofs, sidewalks and driveways with light colors so the summer sun will not make them too hot.

5. RESPECT THE WIND. Put buildings on the land in places that protect them from cold wind in the winter. Plant evergreen trees on the side of the building where they can block the winter winds. Try to let the breezes get into or around the building in the warmer months of the year to help cool things off. **TIP**: Do an online search for prevailing winds in the Cincinnati area.

6. RESPECT MATERIALS & RESOURCES. When we buy materials that are made or sourced close to a project, we invest in our local economy and reduce transportation costs and expended energy. Less miles to travel also reduces the amount of carbon emissions from trucks and semis. Whenever possible, reduce, reuse and recycle materials and resources.

7. RESPECT TREES & OTHER LIVING THINGS.

Try to make buildings fit into the landscape without removing many trees, plants and other living things. All of nature's creatures need to have places to live and people can't live well without them. Trees help create the air that people and animals need to breathe.

8. AND OF COURSE, RESPECT PEOPLE.

Buildings are made for people to use and live in. Make buildings bright, comfortable and safe. Make them out of things that help people stay healthy. Make them strong and long lasting because people spend lots of money and use lots of resources to build them. And, probably one of the most important things is to make them beautiful for people and for Mother Nature.

– Joel Elliott Stout, AIA, Committee On The Environment, November17, 2000 (adapted)

SUSTAINABLE SOLUTIONS

THE 5 BIG IDEAS OF GREEN BUILDING

Adapted from the 2006 National Building Museum exhibition principles, *"The Green House: New Directions in Sustainable Design."*

NOTE: Some of these ideas, especially in #2 through #5 are advanced and intended for real world implementation. Suggested "Big Ideas" that students may want to consider for their design are highlighted in ***BOLD.***

1. USE NATURAL ENERGY (SUN, WIND, WATER) TO POWER YOUR BUILDING.

Most of us currently rely on oil, coal, natural gas, and other fossil fuels to heat and cool our buildings. These resources pollute the environment and are in limited supply. A good alternative is to maximize the use of the **renewable resources** like sun, wind, and heat from the earth through either active or passive strategies.

PASSIVE STRATEGIES MIGHT INCLUDE:

- Design and **orient** the building to minimize summer afternoon solar heat gain and optimize winter solar heat gain. In the northern hemisphere, this means orienting the long sides of the building to face south and north, and creating roof overhangs and landscaping that shade the east, south, and west sides of the building. Minimize windows on the north to prevent heat loss, and maximize them on the south to increase solar heat gain in the winter
- Choose **colors and materials** to reflect sun where you want to prevent heat gain, or absorb sun where you want warmth. Darker colors attract and absorb heat. Lighter colors reflect heat.
- Strategically **plant** shade trees and shrubs around your building. In summer, well-placed plants and **deciduous** trees help keep the building cool by blocking the sun (south and west), while bare branches in winter let the sunlight through to warm the building and spaces inside.

ACTIVE STRATEGIES MIGHT INCLUDE USING:

- **Solar hot water** heaters on your roof use the sun's energy directly to heat water for your building. You can also use a solar batch water heater for pre-heating water.
- **Photovoltaic panels** (solar panels) also known as 'PV Panels' transform the sun's heat into electrical energy.
- Small scale **wind turbines**, which can be mounted on your roof or near your building to generate electricity.

THE 5 BIG IDEAS OF GREEN BUILDING

(CONTINUED)

2. MAKE SURE THE AIR INSIDE YOUR BUILDING IS HEALTHY AND CLEAN.

Americans spend up to 90% of their time indoors where air quality can contain more pollution than the air outdoors. Pollutants range from toxins, such as asbestos and formaldehyde found in building materials, to allergens such as mold, mildew, fungus, bacteria, and dust mites. The negative effects of these pollutants may cause health problems upon initial exposure or even many years later.

These are some measures that can be taken to improve indoor air quality:

- Choose ventilation systems that remove dirt, dust, moisture, humidity, and pollutants.
- Seal off garages and maintenance areas from the building to eliminate fumes from cars and other equipment.
- Choose fabric and paints identified as "low VOC." Low Volatile Organic Compound materials have reduced toxic properties, limit off-gassing and keep chemical smells to a minimum.
- Test your building for toxins that influence air quality with a do-it-yourself kit or hire a specialist.
- **Create plenty of circulation of fresh air throughout your building by using fans and opening windows. Proper air movement in a building helps to exhaust harmful gases like carbon dioxide and carbon monoxide. It also removes water vapors that can cause harmful mold to grow in a building.**
- **Keep plants in your building to help remove carbon dioxide and harmful toxins from the air.**

3. CONSIDER THE GEOGRAPHY AND CLIMATE OF THE LAND AND SITE WHERE YOU BUILD.

You can create a sustainable building by using the land your building sits on wisely, and by considering the impact of the building on the surrounding environment.

Some ways you can affect how wisely land is used on your building site include:

- **Design a smaller, more compact building. Rather than building a wide, low building, consider one which is taller, has a smaller footprint, and takes up less land.**
- Choose a site that is located near public transportation, community services, jobs, shopping, and recreation to save fuel and money.
- Choose a neighborhood where buildings are clustered closer together, leaving more open space for residents to enjoy, and helping to preserve the natural landscape.
- **Adopt smart gardening and landscaping practices, like using organic pesticides and composts, as well as native plants that do not require extensive irrigation systems.**
- **Use "pervious" materials rather than paving for patios and walks. Paved surfaces can cause storm water runoff, not allowing water to be absorbed into the earth. This can result in the contamination of local water sources. Pervious materials allow water to seep slowly into the ground.**

THE 5 BIG IDEAS OF GREEN BUILDING

(CONTINUED)

4. CREATE A BUILDING THAT CONSERVES RESOURCES AND IS ENERGY-EFFICIENT.

The roof, walls, windows, and doors of a building create a building "envelope" that protects occupants from weather and intruders, including pests, noise, and dirt. It also controls the entry of sunlight and, most importantly, helps maintain indoor thermal comfort.

Maintaining a constant level of comfort can waste energy and be expensive, but can be done efficiently and economically by the following means:

- **Create a building envelope with more durable and energy-efficient materials that reduce drafts, balance room temperatures, control moisture, and save on heating and cooling costs.**
- Seal any gaps or cracks where moisture can get in, and heat or cooling can leak out.
- Install insulation. Insulation materials vary, but the purpose is the same: slow the transfer of heat between your building and the outside world.
- Use high-efficiency appliances such as those that have earned the United States' Department of Energy's Energy Star rating.
- **Design a smaller, more compact building, which uses less energy.**
- **Design and orient the building to minimize solar heat gain in the summer, and optimize / capture solar heat gain in the winter. See 'PASSIVE STRATEGIES' in Big Idea #1.**

5. CAREFULLY CHOOSE CONSTRUCTION MATERIALS AND USE ONES THAT ARE RENEWABLE, REUSABLE, AND DURABLE.

When selecting products and materials to use in a building, look for ones that:

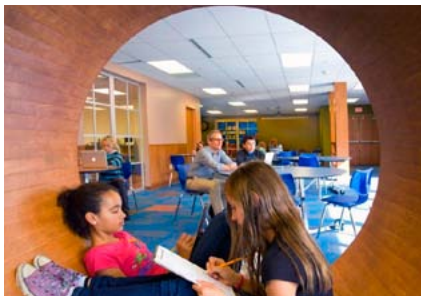
- **Are quickly renewable, that are easily replaced by new growth or cannot be used up.**
- **Are reusable, that are reused from a previous construction project or that can be reused for future projects. (For example, brick from an old school can be reused to create a façade for a new project.)**
- **Are durable, that are not easily damaged and can withstand the weather and climate of the site.**
- **Require low levels of energy to extract, process, and be transported. Choose local materials if possible.**
- **Have low levels of environmental impact; for example those that do not off-gas toxic materials.**

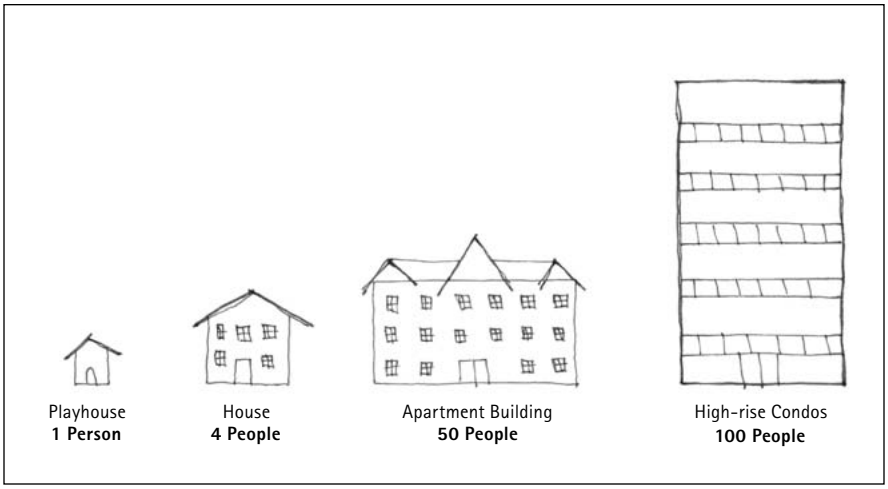
DESIGN CONCEPTS

SIZE

Buildings and spaces come in all sizes, varying from small structures meant for one person to large buildings made for hundreds of people.

How big does your space need to be? Many people like being in small, cozy spaces, while others prefer large, expansive spaces. When you are at home tonight, measure your room. How big is your room? Is it just for you or do you have to share it with someone else? Is it big enough or would you like it to be bigger? Figure out what size room would be just right for you. What sizes of rooms will be just right for your client(s)?





SHAPE

Some buildings/spaces are square, some are rectangular, others may be L-shaped or H-shaped and some are even round.

Would one shape of space be better for certain uses than other shapes? Take a look at your classroom or learning environment--what is determining its shape? Can you think of a building or space that would need to be a certain shape because of its use?

Some spaces are a specific shape because that shape is symbolic to the people using the space. Many cathedrals are shaped like crosses, which has a symbolic meaning to the Christians who use those churches. For other cultures, circles represent unity and eternity, so their buildings may be built in circular forms. Other buildings are shaped a certain way to gain attention or to be unique.

Ask your client(s) if they would prefer a certain shape for their learning space. Or, based on the information you have collected, choose a shape for your design that you think best suits their needs.



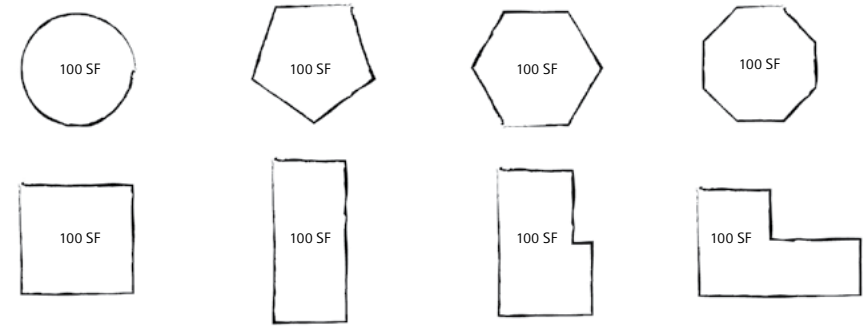








The diagram below shows 8 different shapes (in plan view) that a building may be, but each is the exact same size--100 square feet. Does one shape look bigger than the others?



PLAN VIEW

LOCATION & ORIENTATION

LOCATION

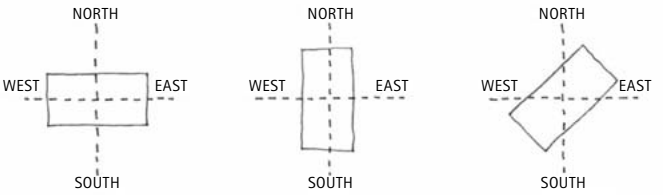
Buildings and spaces are to be built on a specific site. A "site" is simply a piece of land on which a building can be built. This site can be literally anywhere in the World. The location of the building or space is very important when it comes to designing an appropriate building for a specific site. For example, would you build an igloo in the desert? Look at all of the images shown and notice how each building is uniquely designed to fit into its site. The buildings are different shapes and sizes and they are made out of different types of materials based on their location.

The precise positioning of the building on a site is also important. Let's say you are building a learning space on a piece of land with a pond on it. How close do you want the structure to be to the pond? If you put it too close to the pond what will happen if it rains a lot and the pond gets bigger? Will it flood your space?

ORIENTATION / DIRECTION

Orientation is a concept that is closely related to location. When a built environment professional is looking at a site, it is very important that she/he knows which direction is North. When you look at drawing or construction plans, you should always see an arrow that shows which way North is. The way a building sits on a site in relationship to which direction North is called the building's orientation. The building's orientation is very important as it relates to site features such as topography, natural vegetation, beautiful views or access roads. Building orientation is also important to take advantage of heat from the sun and natural ventilation from prevailing winds.

The diagram below shows just a few possible orientations of a building.

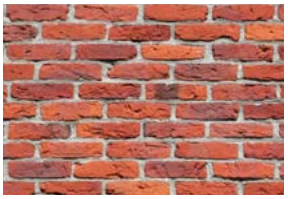


PLAN VIEW

TREATMENT (MATERIALS)

Buildings and spaces are made out of a collection of many different building materials. Some of the materials are easy to see when you look at a building such as brick or glass on the outside of the building while other materials are hidden on the inside of the building like the wood, steel or concrete used to hold the building up. The color, size and texture of the materials that you can see when you look at a building or occupy a space play a very important role in the overall look or "character" of a space or structure. Color, size and texture are the basic elements of the concept of "treatment".

What "treatments" are being used for the buildings in your neighborhood? You might see buildings with bricks, or wood siding, or maybe even stucco. Are all the brick houses the same color? Brick and other building materials often come in many different colors to help personalize and customize a building. Often various treatments have certain adjectives associated with them as well. Brick is often thought to be "heavy" and "solid" (opaque) whereas glass is seen to be "light" and "airy" (transparent or translucent). All exterior building surfaces can be said to have a "treatment."



BRICK

CONCRETE

SIDING: ALUMINIUM, VINYL, OTHER

WOOD

STUCCO

GLASS

EXTERIOR TREATMENTS: WALLS, ROOFS, PATHS

Question: What other exterior building treatments can you think of? What treatments are used for your house? How about your school? Don't forget that roofs have treatments too.

CARPET

HARDWOOD

BAMBOO

TILE

CONCRETE

WALL COVERING

INTERIOR TREATMENTS: FLOORS, WALLS & CEILINGS

The concept of "treatment" does not just apply to the exterior of the building. Interior surfaces have treatments as well. Floors have a variety of treatments such as wood, tile, carpet, bamboo or cork. Wall treatment can also vary using materials such as paint, wallcovering or wood paneling. The possibilities are endless!

Look at the interior treatments above. What adjectives can you use to describe each one. For example, some people might say that carpet is warm, soft, and fuzzy.

DESIGN CONCEPTS

LEARNING ENVIRONMENTS

There are many types of buildings in the world where you can learn or gain knowledge. You can find them in your local neighborhood, including city libraries, schools, colleges, laboratories, book stores, museums, etc. These buildings include spaces to learn: classrooms, study areas, break rooms, computer labs, and many other interior environments. All of these rooms are filled with textures, colors, furniture, lighting, equipment, and various access points (laptops, books, tablets, etc.) to give guests the accessibility and comfort to discover and learn about any subject they wish to research.

ACTIVITY

Pick a learning building, either local, national, or international, and research how the building was designed. What kinds of rooms does it have? How are materials used? What is the exterior (outside) and interior (inside) treatment? Is it a traditional shape (box) or does it look like a symbol for something?

Present to class what you have learned, either verbally or through a visual presentation. In small groups, compare/ contrast with other students the similarities and differences between your buildings? **How** does their **size** differ? **What activities** go on in each building? **Who** would be using these buildings? **Why** did you choose that building or space in particular?

EXTERIORS: SHAPES CREATING STRUCTURE

Question: What learning buildings have you been to before, with your family, friends, or school on field trips? Do you remember what the outside of the building looked like when you arrived? What did it make you think of? How did it make you feel?

INTERIORS: SPACES WELCOMING LEARNERS

Question: What do you look at first when entering a space? Do you like open light spaces or dark small alcoves? Where do you like to do homework/ classwork? Where does your class meet for large group activities? Is there space for you to work alone or in small groups? Can you be active somewhere in the space? Which colors and textures do you and your client(s) like?

THINKING ABOUT LEARNING

OVERVIEW

Many times we do not realize the differences in all the classrooms at school -- they are set up differently depending on what subject is being taught there. Science classes are not be taught in english classrooms because certain equipment is needed specifically for that subject. **Learning spaces** are designed in the best way for students to learn and teachers to teach. During this activity students will work together to create a definition for a space of learning. Students then use this to analyze their own classrooms and see how it fits their original definition.

OBJECTIVES

Students will:

- Define "learning space"
- Identify the various aspects of a "learning space"
- Analyze and explain how their classroom functions to address these needs

MATERIALS

- _____worksheets (one for each student)
- Pencils

TEACHER PREP

- Copy _____worksheets (one for each student)

NATIONAL STANDARDS OF LEARNING:

Social Studies – 1, 3, 7; Technological Literacy – 18, 19, 20; Visual Arts – 3

DURATION: ±45 minutes, plus worksheet homework

LESSON PLAN

1. DEFINE LEARNING SPACE

In small groups or as a class, ask students to **brainstorm** the function of a learning space. What do we need in classrooms or other learning environments? Have students write down their responses on the following worksheet in the blank spaces in the first column. Use leading questions to guide students to the following answers: a place to experiment; a place to design and think creatively; a place to encourage conversation about learning material (being in small groups or large circle discussion); a place to play games at recess or gym, a place to reflect, etc.

2. ANALYZE CLASSROOMS AT SCHOOL

In class or as homework, have students use the following worksheet to analyze whether the building they are taught in functions well as a learning space.

3. CONCLUSION

Ask students to discuss their findings. Would classrooms here still work in another part of the world? How is it different for various grade levels (for older students)? What needs to be changed for different students and teachers using the space? Do they need to change their definition of what a learning space is?

This activity was adapted from a publication by the National Building Museum.

THINKING ABOUT LEARNING

STUDENT WORKSHEET

Name(s): _____ Grade: _____

_____ Teacher _____

"LEARNING IS A TREASURE THAT WILL FOLLOW ITS OWNER EVERYWHERE." *~chinese proverb*

We will learn in many spaces throughout our lives, in classrooms, laboratories, libraries, museums, parks and many other environments in and out of school. Using this sheet, investigate a classroom at school and discover how it functions toward your learning experiences.

ASPECTS OF A LEARNING SPACE *(example: desk(s) and chairs for every student)*	**YOUR CLASSROOM** HOW DOES THIS SPACE HELP YOU LEARN? *(example: desks/chairs provide a place to easily see and hear teacher's presentation, and to write/draw)*

BUILDING SURVEY

STUDENT WORKSHEET

Name(s): _____ Grade: _____

Building Type _____ Teacher _____

By looking closely at a building you can learn a lot. Choose a building - your school, for example - and investigate what's around it and what's on it! When you've completed the survey, draw a picture, write a poem, or create a story about your building.

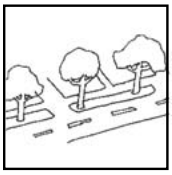
LANDUSE CATEGORY

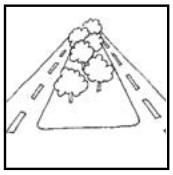
What landuse category does your building primarily belong to? (circle one):

Residential | Commercial | Institutional | Industrial | Open/Public Space and Parks | Mixed Use

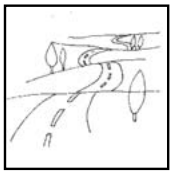
LOCATION

My building is located on a:


Tree-lined Street


Boulevard


Busy Highway


Curvy Road

Other? Draw it.

PROXIMITY

What types of buildings are near your building? (circle all that apply):

Places of Worship | Businesses | Factories | Schools | Other _____

Office Buildings | Hospitals | Homes | Stores | None

TRANSPORTATION

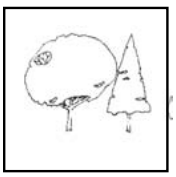
What types of transportation areas can be used to access your building? (circle all that apply):

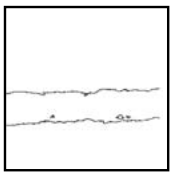
Parking Lot | Yellow Bus Stop | Metro Stop | Walking Trails

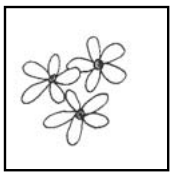
Bike Path | Sidewalk | Other _____

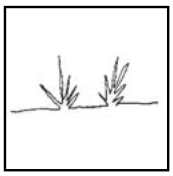
LANDSCAPING

The plants that are found near my building include (circle all that apply):


Trees


Bushes


Flowers


Grass

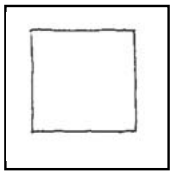
Other? Draw it.

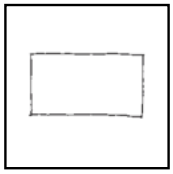
BUILDING SURVEY

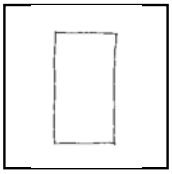
STUDENT WORKSHEET

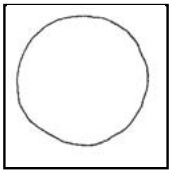
ARCHITECTURE / CONSTRUCTION

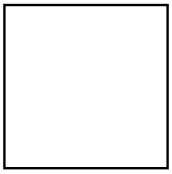
*Look at the **front** of your building. My building is shaped like a:*


Square


Long Rectangle


Tall Rectangle


Circle

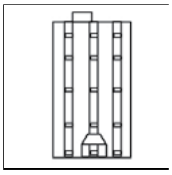

Other? Draw it.

My building is __?__ stories tall:


One Story

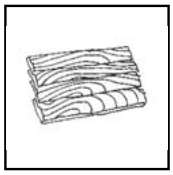

Two Stories

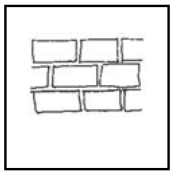

Three Stories

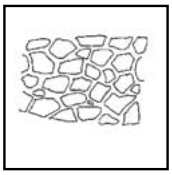

Four Stories

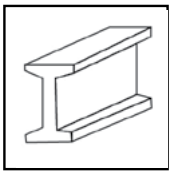

More? How many? _____

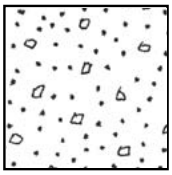
My building is made out of (circle all that apply):

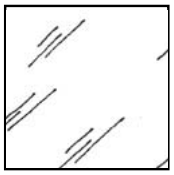

Wood


Brick

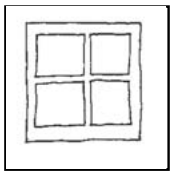

Stone

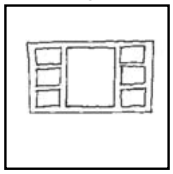

Metal

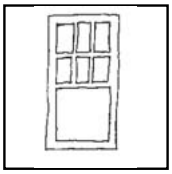

Concrete

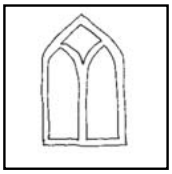

Glass

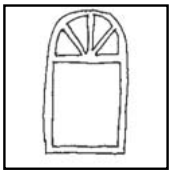
The shape of my building's windows are:

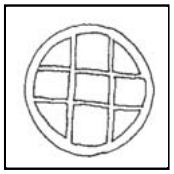

Square


Long

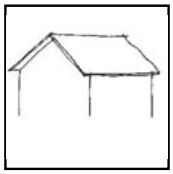

Tall

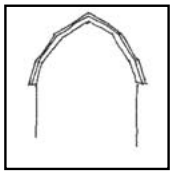

Pointed

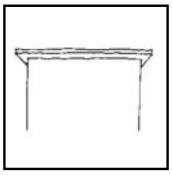

Arched

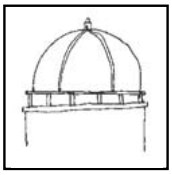

Round

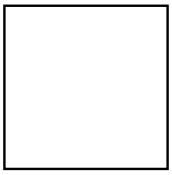
The shape of my building's roof is:


Pitched


Vaulted


Flat


Dome


Other? Draw it.

*Is there a **sign** on your building? What does it say?* _____

2016 LEARNING SPACES DESIGN IDEAS FORM

STUDENT HANDOUT: PART 1

Name(s): _____ Grade: _____

_____ Teacher _____

WHERE IS YOUR LEARNING SPACE?

_____

WHAT SUBJECTS, IDEAS AND SKILLS WILL BE TAUGHT AND LEARNED IN YOUR SPACE? (4 max)
Next to each, list ideas about the kind of place and needs for teaching and learning. Some suggestions are below.

1. _____ _____
2. _____ _____
3. _____ _____
4. _____ _____

large / small | loud / quiet | interactive | windows | groups | solo work | computers | desks | views
chairs tables | storage | shelves | experiments | big-screen | tools | equipment | lighting | shade
cover/roof | natural ventilation | wind protection | trees, plants, garden | other?_____

GREEN DESIGN SOLUTIONS *(This is a 'possibilities' list. You may decide to focus on one or a few. See 'Intro to Green Design' & lesson plan activities)*

Earth *(geography and climate)* _____

_____

Water *(use and protect wisely)* _____

_____

Energy: Air, Sun, Wind *(minimize fossil fuels & use less)* _____

_____

Materials & Resources *(safe, efficient, recycled, recyclable)* _____

_____

_____

Indoor Environmental Quality *(light, sound, materials, hot/cold)* _____

_____

Other Design Ideas: *(2D and 3D forms & shapes, textures, colors, materials, furnishings, equipment, lighting, heating/cooling, shade, floors, walls, ceilings...)*

_____ _____

_____ _____

_____ _____

GIVE YOUR LEARNING SPACE A NAME:

_____

Collect other ideas, sketches, images, research, reports, interviews, etc. in a binder or folder along with this form to keep all your design team's ideas together so you can refer to them during the design process and use for the tri-fold panel.

2016 LEARNING SPACES DESIGN IDEAS FORM

STUDENT HANDOUT: PART 2

Name(s): _____ Grade: _____

_____ Teacher _____

PROGRAM MAP: After studying existing learning spaces, and completing your list above, draw a 'map' (diagram) of your learning space. For example: entry, locations for certain activities, furniture, windows, walls, equipment, etc.

ORGANIZING AND DESIGNING:
Describe your learning space in each of the following areas: (if needed, use a separate piece of paper for each)

- SIZE: how big does the space need to be?
- SHAPE: what shapes and forms could your space look like?
- LOCATION: where is the space if inside or attached to a larger building? Where is the building if stand-alone?
- ORIENTATION: how does your space relate to other places and the outside world?
- TREATMENT: what is it made of? how do the materials help with light, sound, beauty or comfort?

PRESENTING YOUR IDEAS:
List the ideas you will show in your model:

_____

List the ideas you will illustrate on your tri-fold board:

_____

PEER PRESENTATIONS: Using the following outline, develop a 5 to 10 minute verbal presentation.

- Project title and location.
- Describe your "big ideas" that shape the design.
- Walk through your project in the order someone would experience it, starting from the street, or entry, participating in activities, relationship to the outdoors, etc.
- Describe your green design solutions along the way.
- Describe how your learning space fits into the building or environment ('context').
- Talk about things in your project that you're still figuring out (your audience may have ideas!)

Record comments from your classmates, teacher, and other invited guests.

_____

_____

_____

After your presentation, go back through your notes and highlight the comments you will incorporate into the design. Did you make changes based on comments? What were they?

PROJECT DESCRIPTION (for your Tri-fold Exhibit Label)
On a separate page (or on the computer), use the information you have collected as a starting point for writing your project description. It should be approximately 300–500 words, and highlight your subject(s)/skill(s), major space program needs/activities, resulting design decisions, and green/sustainable solutions.

ARCHITECTURAL

DRAWING, MODELING AND ACTIVITIES

- VOCABULARY
- STRUCTURES
- PLAN, SECTION & ELEVATION
- DRAWING TO SCALE
- SCALE FIGURE ACTIVITY
- SPATIAL AWARENESS
- FREEHAND DRAWING / DIAGRAMMING
- MODELING INFO TIPS & RESOURCES
- MODELING EXERCISE

ARCHITECTURE AND DESIGN VOCABULARY

BUILT ENVIRONMENT: Human-made surroundings, such as buildings, structures, parks, streets, and bridges

CARDINAL DIRECTION, CARDINAL POINT: One of the four principal compass points: North, East, South and West also designated by N, E, S and W

CLIENT: A person or group that uses professional advice or services, for example from an accountant, architect, engineer, etc.

CROSS SECTION: A view into the inside of something made by a plane cutting through it

CONSERVE: To preserve and/or use the earth and resources in such a way as to avoid waste

DESIGN PROCESS: To create for a particular purpose or effect, usually in an arrangement of parts / details.

DURABLE: Products that are long-lasting and require little maintenance

ECOLOGY: The study of the relationships of organisms to one another and to their physical surroundings.

ECOSYSTEM: A community of organisms (plants, animals, microbes) in conjunction with the nonliving components of their environment

ENERGY SMART: Meeting your energy needs cost effectively and with the least impact on the environment

ENVELOPE: The skin of a building— including the windows, doors, walls, foundation, basement slab, ceilings, roof and insulation— that separates the interior of a building from the outdoor environment

ENVIRONMENTAL IMPACT: The effect of materials on the environmental quality inside your home and to the outdoor environment and atmosphere

FOOTPRINT: Land area taken up by a building

FOSSIL FUELS: Carbon-rich deposits in the earth, such as petroleum (oil), coal, or natural gas, derived from the remains of ancient plants and animals and used for fuel; non-renewable energy

"GREEN": Making environmentally friendly choices that use our natural resources for present needs without depleting those resources for future generations

INSULATION: A material that prevents or reduces the passage, transfer or leakage of heat, electricity or sound

LEARNING SPACE: the product of a design process created from the relationships between forms of space and style of learning.

LOCAL (MATERIALS): Materials extracted/manufactured/ produced within 500 miles of building site

MODEL: A three-dimensional representation of a person, thing or proposed structure of a smaller scale than the original

NATURAL RESOURCE: A material or supply such as timber, fresh water, or a mineral deposit, occurring in nature and with the potential for human use

PROGRAM: A list of types of spaces needed for a project and their associated areas, usually in square feet (area)

RECYCLE: To use again, especially to reprocess

REGION: An area with similar characteristics that separates it from other areas. Regions might be defined by criteria like common culture or language; climate; economic activity; or political connections. Regions have extremely fluid definitions that might be as small as a neighborhood or as large as a continent

RENEWABLE: Natural materials that can be rapidly replaced in the environment, such as fast-growing trees and agricultural products

RENEWABLE ENERGY: Energy derived from sources that do not deplete natural resources; examples include solar, wind, and geothermal energy from the Earth's core

REUSABLE: Products that can be used again or recycled once they are no longer needed or operable for their original purpose

RURAL AREA: An area of very little development, often characterized by agricultural uses or undeveloped land

SCALE: 1. The ratio of a distance on a map to the corresponding actual distance. 2. The ratio of a linear dimension of a model to the same dimension of a full-scale original

SHAPE: The form of an object or its external boundary / outline

SITE, BUILDING SITE: A place or area where something is, was or will be built

SKETCH: A rough drawing that can express an idea

STORY, STORIES: A floor or level(s) of a building

STRUCTURES: Elements of a built object that are combined and organized to hold the object together and keep its shape.

SUBURBAN AREA: A developed area located outside the denser urban center characterized by a separation of uses and within commuting distance

SUSTAINABILITY: Meeting the needs of the present without depleting resources or harming natural cycles for future generations; another way to say "green"

TWO-DIMENSIONAL (2-D): A shape that only has two dimensions and no thickness (x, y)

THREE-DIMENSIONAL (3-D): An object that has height, width and depth (x, y, z)

URBAN AREA: An area of dense or closely placed development, often associated with a street plan made up of blocks, and mixed uses; a city

WATERPROOF: Designed to prevent water from entering or passing through; impervious to water

STRUCTURES

STRUCTURE refers to parts or elements of a built object and how they are combined and organized to hold the object together and keep its shape. Structures need to be built to stand up and resist the natural forces that are working against them. Those forces are referred to as loads.

LOADS include things that go on inside the structure (gravity, the weight of building itself, movement, and vibrations) and things that go on outside of the structure (intensity of rain and wind, weight of ice and snow, and movement of the earth). In order to resist these loads, structures are constantly in a state of stress called tension or compression.

TENSION:

A pulling, stretching, and expanding action

COMPRESSION:

A pressing, pushing, squeezing, and compacting action

Basic structural elements are used in various combinations to make up the built environment. Look around your school, community or neighborhood and see which elements you can find and identify how the loads placed upon them are transferred to the **ground**.

The structural elements to the right visually describe each element and how it reacts to **gravity** loads placed upon it. Looking at these diagrams, try to act out the structural elements with your classmates and see what it feels like when different loads are placed upon you.

STRUCTURE	DEFINITION	EXAMPLE	LOAD	ACT IT OUT
COLUMN	A vertical linear element used to support a beam, floor, or roof			
BEAM	A horizontal linear element spanning across an opening, supported at both ends			
WALL	A vertical planar element that separates two spaces			
SLAB	A horizontal planar element that separates two spaces			
CANTILEVER	A horizontal structural element supported only at one end			
FRAME	A rectangular arrangement of linear structural elements			
TRUSS	A 2-dimensional triangular arrangement of linear structural elements			
SPACEFRAME	A 3-dimensional triangular arrangement of linear structural elements			
ARCH	A curving or pointed element that spans across an opening			
VAULT	A series of parallel curved or pointed arches			
DOME	A series of curved or pointed arches on a round or many-sides base			
FOUNDATION	Anchors a building by transferring the loads acting upon the building into the ground			

Source Credit: Architecture In Education, The Foundation for Architecture, Philadelphia.

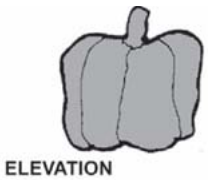
PLAN, SECTION & ELEVATION

DRAWING ACTIVITY

NOTE: The activities in this section are designed for you to conduct with your class. Directions to you, the teacher, are in italics. These would also be appropriate for your volunteer's return visits. Ask your volunteer to bring in any examples of drawings or models from their work or classes.

Architects, Contractors and Designers use three main kinds of drawings to show what designs look like and how they are built. These are the PLAN, the ELEVATION, and the SECTION.

Introduce this to students and write the words, "plan" "section" and "elevation" across the board, leaving room for you to sketch the pepper beneath each word along with them.



ELEVATION

PLAN

SECTION

MATERIALS:

EACH TEAM OR TABLE OF STUDENTS: *3 green peppers, a cutting board, a knife (you can also pre-cut the peppers and hand them out one at a time as you go through the activity)*

EACH STUDENT: a pencil, a blank sheet of paper oriented horizontally and creased in thirds

When their papers are named & folded, walk through the following instructions:

INSTRUCTIONS:

1. Set the first **uncut** pepper on the desk or table in front of you. Crouch down and look at it with your eyes level with the **side** of it. What you see is the ELEVATION of the pepper. Draw what you see in the **first** section of the paper. An **elevation** is a drawing of the **side** of a building, and is a direct, **perpendicular** view to what you are seeing and drawing.

2. Slice the second green pepper in half **horizontally**. What you see when you look **down** into the bottom is the PLAN of the pepper. Draw what you see in the **top half of the middle section** of the paper. When you draw the plan of a building, you are showing a horizontal "slice" at approximately four feet above the floor. When you look directly **down** at the top of the **un-cut** pepper, what you see is the "ROOF PLAN". Draw the roof plan of the pepper **below the floor plan**. Try to orient the shape of the pepper the same way for both drawings. On the **Floor Plan**, shade in the thickness of the "walls". This shading is called "poche".

3. Slice the third green pepper in half **vertically**. When you look at the cut side of either half, you see a SECTION view of the pepper. Sections show **vertical** relationships between spaces in a building, and the walls beyond the "cut line" can be drawn in elevation within the section. Just like the plan, it's a "slice" through the object—shade in the thickness of the walls, roof and floor like you did for the walls on the plan.

VOCABULARY:

- Plan
- Section
- Elevation
- Horizontal
- Vertical
- Perpendicular

DRAWING TO SCALE

USING ARCHITECTURAL AND ENGINEERING SCALES

An architect's or engineer's scale is a specialized ruler designed to facilitate the drafting and measuring of drawings such as floor plans and orthographic projections (three-dimensional objects represented in two dimensions). Because the scale of such drawings are smaller than life-size, an architect's or engineer's scale features multiple units of length and proportional length increments. Scales may be flat, with 4 scales, or have a symmetric 3-lobed cross-section, with 6 scales.

In the United States, architectural scales are marked as a ratio of 'x' inches per foot, typically written as x" = 1'-0". For example, one-quarter inch measured from a drawing with a scale of "one-quarter inch per foot" or 1/4" = 1'-0" is equivalent to one foot in the real world (a scale of 1:48). Another example, one inch measured from a drawing with a scale of "one inch per foot" is equivalent to one foot in the real world or 1" = 1'-0" (a scale of 1:12).

If you do not have architectural scales, the students can create their own by placing masking tape over a flat ruler, and marking off the increments to create a scale to use for measuring. Following are instructions on how to make a 1/4" = 1'-0" architectural scale *(you can adjust for other scales, 1'8"=1'-0", etc.)*:

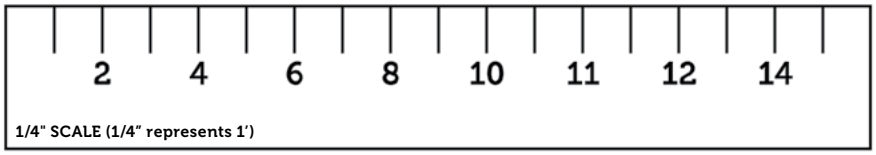
MATERIALS NEEDED:

- Flat ruler (plastic, metal, etc.)
- Masking tape
- Sharp pencil or fine-point pen for marking

1. Place masking tape over the length of a flat ruler that has 16 markings per inch.
2. Starting at zero "0", for every 4 markings (or 1/4"), create a new mark that will represent 1'-0".
3. Going back to zero "0" and from left to right, number each new mark that you made sequentially so that each one represents one foot. You should have 4 'feet' per inch. If you mark all the way to 12", you will have 48 'feet'.
4. It should look something like this (not shown to scale):

5. Now you're ready to use the architectural scale you just created for your project!

You can also create a paper scale and photocopy for student use:



In SCALE, this straight edge is 16 feet long. Each mark represents 1 foot.

For more printable scales, go to www.printablerulers.net
Select 'Architect Scale 12-inch Ruler'. Requires legal-sized, 8.5" x 14", paper.

DRAWING TO SCALE

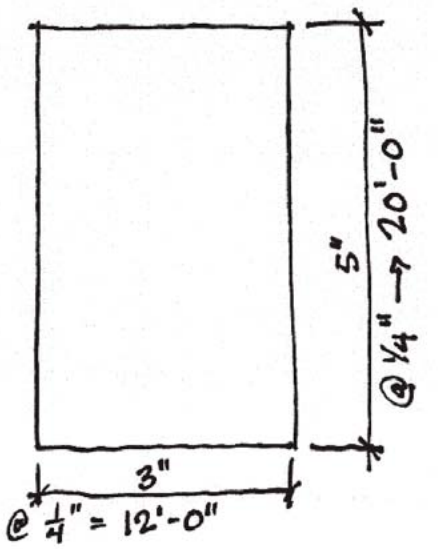
DRAWING ACTIVITY

Scale can be a tricky concept to get across, but this multi-part activity will help you and your students to understand and be able to create scaled drawings & models.

MATERIALS

- Architectural Scales / Rulers
- Each Student: standard 12" ruler, blank piece of paper - Lined or Graph paper work well too.

Copy the sketch below onto the board, large enough for students to read:



PART 1: INTRODUCING DIMENSIONS

Verbal Introduction: Architectural and engineering drawings show how big things need to be, so they're labeled with the dimensions of all the parts so the builder can build it. *(an example from your volunteer would be helpful to have on hand)*
This is how dimensions are written on a drawing.

Walk through the parts of the dimension notation in the drawing you copied onto the board.

PART 2: INTRODUCING THE CONCEPT OF SCALE

Verbal Introduction: What does it mean when we say that drawing is "to scale"? Since we can't draw a building as big as it really is (your school building won't fit on even a large piece of paper!), we 'shrink' it down so it fits into a manageable picture, but we still need to be able to measure it as we work on the design. So, we shrink it down by using a ruler in a new way: an inch or a fraction of an inch represents one foot of length. This can be done with a regular ruler (with a bit of mental math); architects usually use something called an ARCHITECTURAL SCALE. *== pass around your scales ==* It's a special kind of ruler that is marked so that when you read 1, 2, 3, etc., instead of inches, they are actually 'feet', just shrunken down like a dollhouse or matchbox car. The smaller the fraction of an inch that is used to equal a foot, the smaller the "scale" of the drawing.

Another example of something 'scaled down' are model train sets. They're labeled differently, (O, H, HO, G, N, etc.), but each of those 'scale' designations represents a fractional scale, so that if you get parts from different places, getting the same scale makes sure they will all fit together.

1. Ask students to use the ruler to draw a rectangle in the middle of the page that is 3 inches wide and 5 inches tall.
2. Have students measure the box they drew using the 1/4" edge of the Architectural Scale, and have them write down the dimensions in feet and inches. (for younger students, do this larger on the board with them, so they can see and copy). The box will measure 12'-0" wide, and 20'-0" tall at 1/4"=1'-0" scale. Ask students to check out how big the box is at other scales. How big is it at 1/8"=1'-0" or 3"=1'-0"?

DRAWING TO SCALE

DRAWING ACTIVITY

PART 3: DRAWING YOURSELF TO SCALE

MATERIALS:

K-6

- Roll-paper (or large sheets) for making full-size outline tracings of kids

K-12

- Architectural Scales
- Standard 12" Ruler
- Tape Measure
- Each Student: DRAWING TO SCALE STUDENT HANDOUT (next page), and Pencil

K-6

1. Create full-size outlines of each student on roll paper. Arms should be down to the sides. Feet should be flexed, with the soles of the shoes at the bottom edge. Before they get up, draw horizontal lines at the ankle, knee, wrist, elbow, shoulder, chin, eyes, and top of head, similar to the Student Handout. Have them write their names on their outline's 'shirt'.

2. Hang the tracings on the wall with the "feet" on the floor. (point out now they now have "elevations" of themselves at "full-scale" meaning the drawing is the same size they are. It's a really BIG drawing! Ask, "Can you draw the school building or your house at "full scale"?

K-12 *(6th grade and up could start here)*

3. Have students pair off and measure themselves (or their full-size elevations) to fill out the DRAWING TO SCALE STUDENT HANDOUT. As they work, check to see that they are writing the dimensions with proper notation (from "Part 1: Introducing Dimensions" activity).

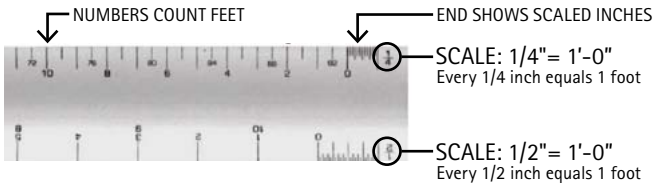
4. Once the dimensions are filled out, have them draw themselves in the graph paper section of the handout, using the 1/4" side of the architectural scale. You may need to walk through the scale translation of a few dimensions of yourself or students on the board to show the process.

DRAW YOUR CLIENT TO SCALE

When students research their client, have them find or estimate their client's height(s) and draw their client to scale next to them on the DRAWING TO SCALE STUDENT HANDOUT. A scaled, cutout figure of their client will be helpful when they start building their models. You can also have them create a Pipe Cleaner Scale Figure (see 'Scale Figure Activity').

PART 4: HOW BIG IS BIG ENOUGH?

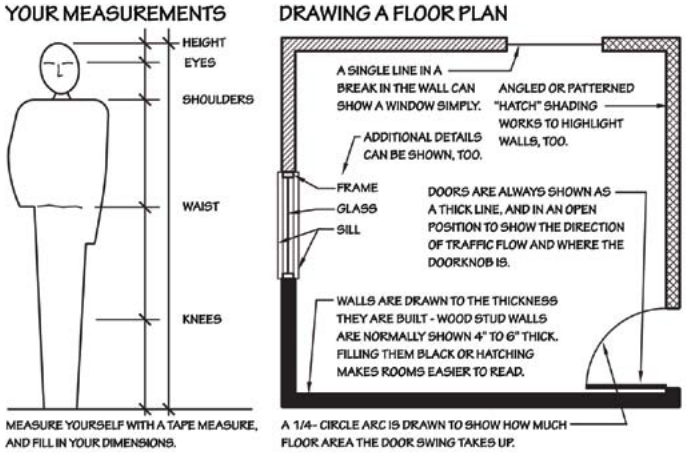
Have students measure and evaluate a few spaces that they use for studying different subjects. How much space do you really need for these activities? Green design utilizes the concept of efficiency, not just in regards to energy, but also in materials. Smaller structures use less material. How small of a space could someone learn in? Can some rooms be used for more than one purpose? Why or why not? TIP: Send students on a web quest for examples of small, efficient learning spaces.

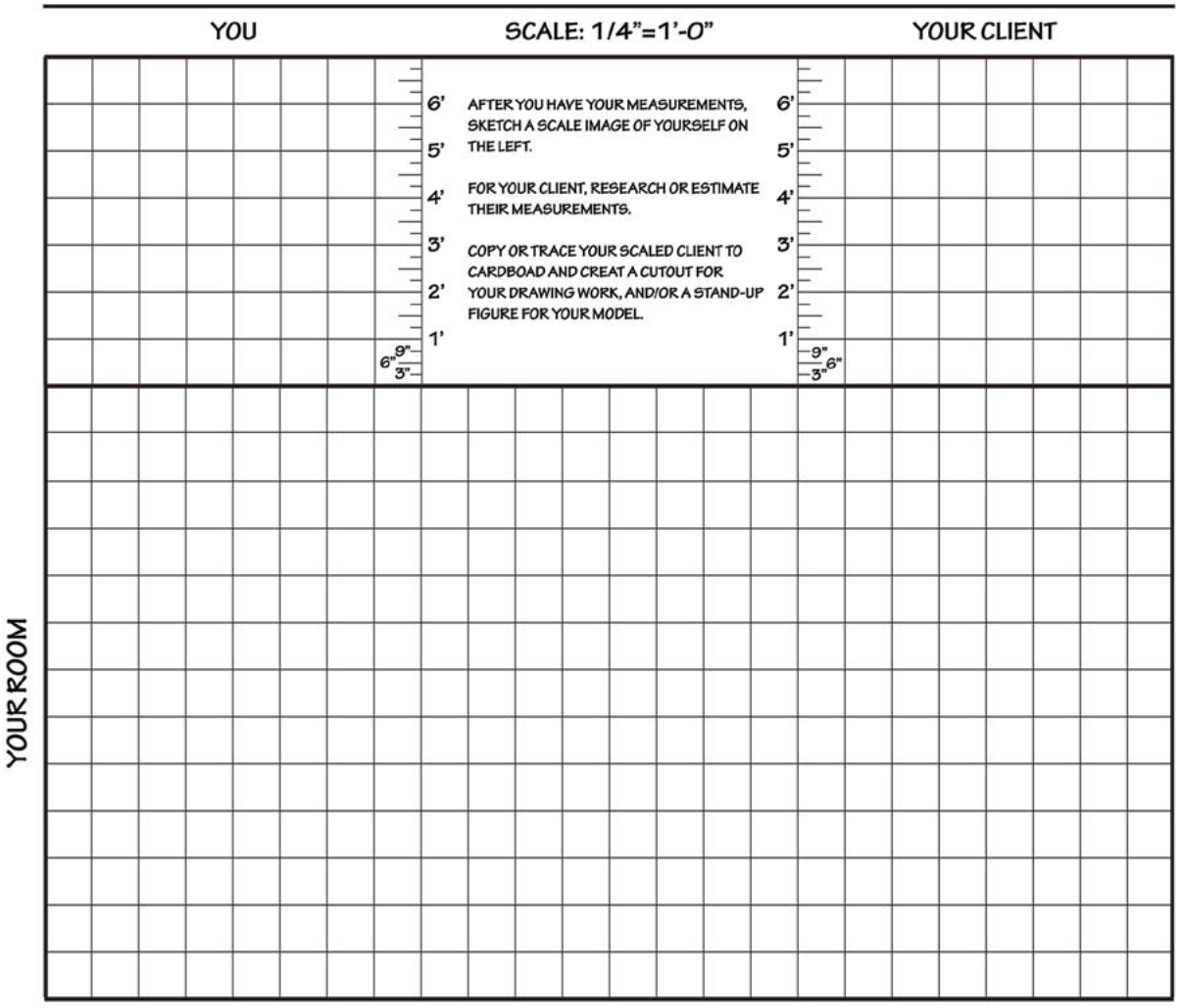


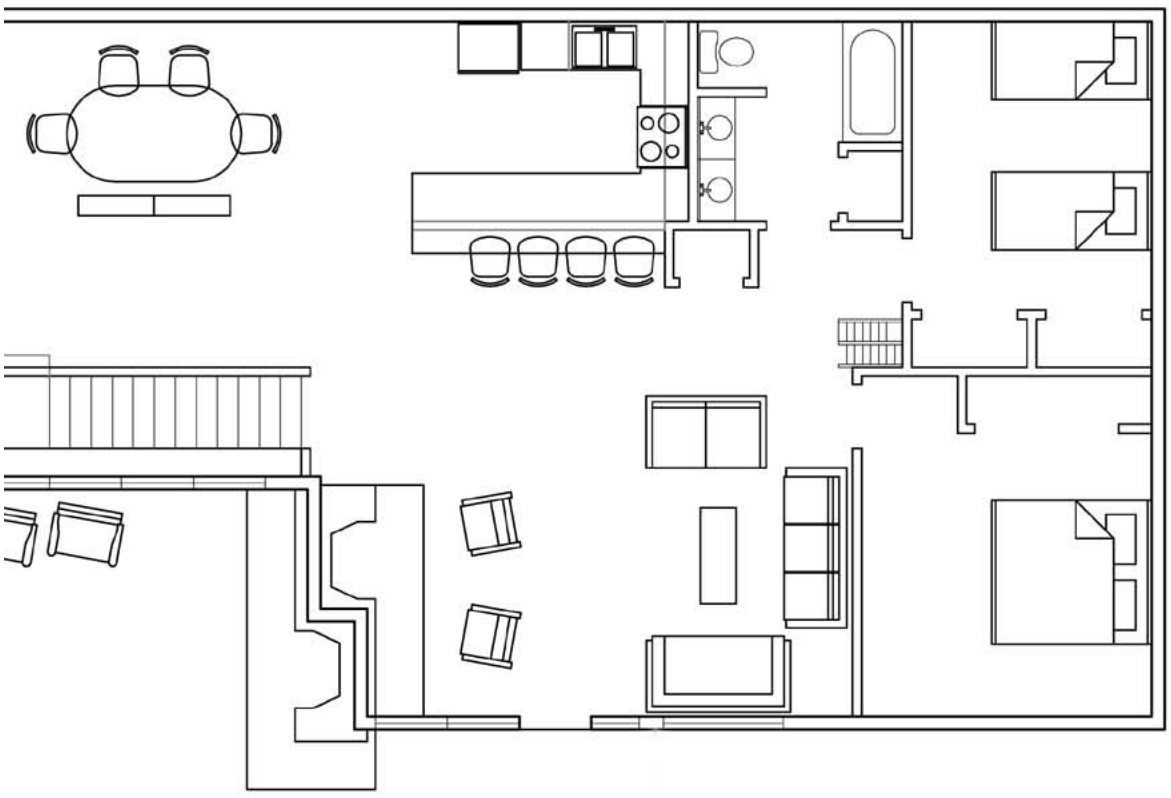
DRAWING TO SCALE

STUDENT HANDOUT

1. Have students measure their classroom, or bedroom at home, and draw a floor plan and the elevation of a wall with a window in it.
2. Evaluation — Have students write about their space. Is your room comfortable for the activities you do in it? Would it be too big or too small for other activities? Why?

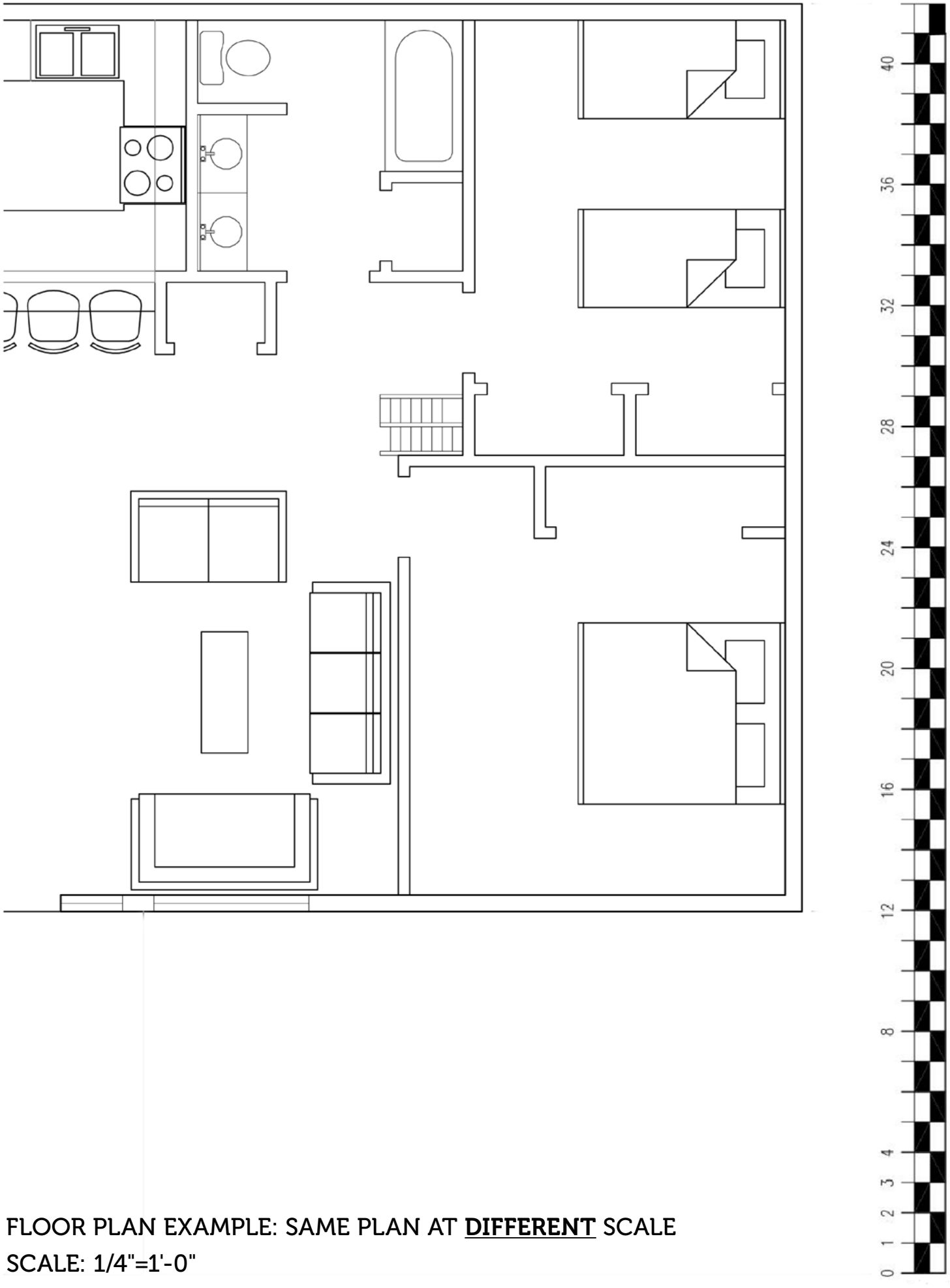






FLOOR PLAN EXAMPLE

SCALE: 1/8"=1'-0"

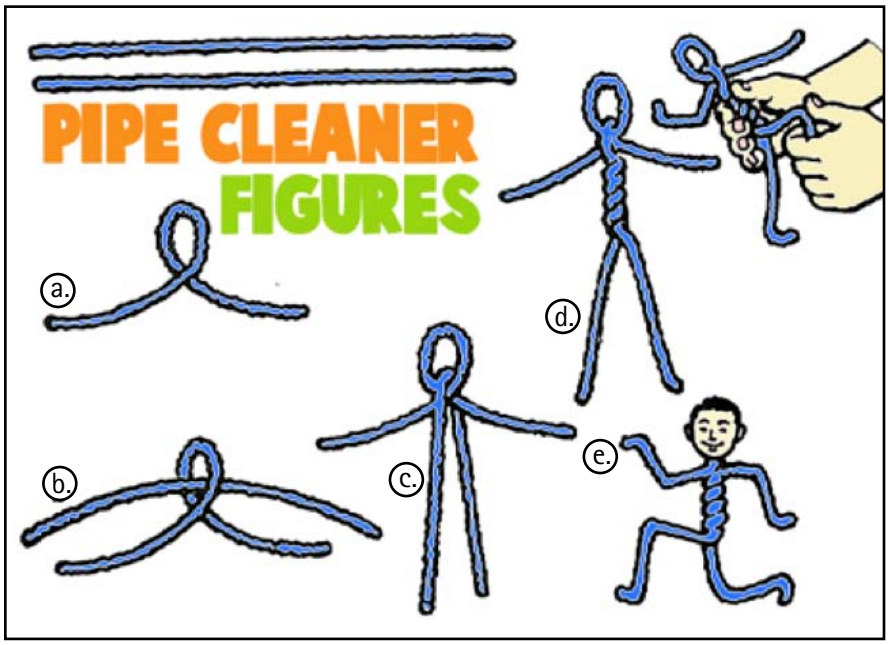


FLOOR PLAN EXAMPLE: SAME PLAN AT **DIFFERENT** SCALE

SCALE: 1/4"=1'-0"

SCALE FIGURE ACTIVITY

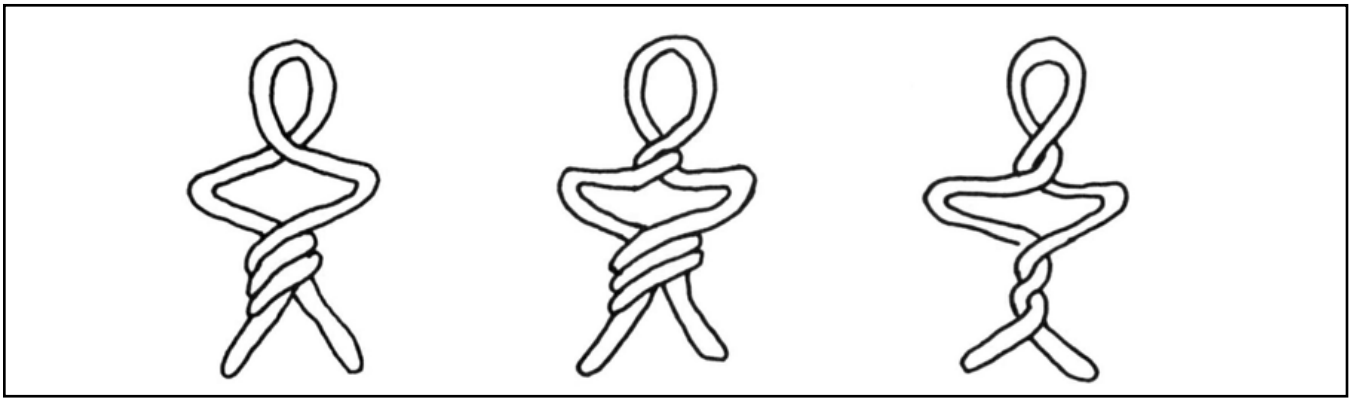
In this activity, students create a figure than can be kept and used as a scaled object for drawings and models. If you do not have pipe cleaners, you can also create a "flat" scale figure from paper, cardstock or other material.



OPTION 1: To make these figures, you will need 2 pipe cleaners, face cut-outs (optional), and glue (optional). Carefully follow the illustrations shown at the right to make the pipe-cleaner figures. Go from illustration a. to e. Glue faces to heads of figures (optional). Have each student twist two pipe cleaners as shown above to resemble a human figure. Students should measure and cut their figures, estimating how tall a house would need to be to fit the figure's scale. When making a drawing or model, use the figure to make adjustments as necessary to be sure that the figure fits.

OPTION 2: Give each student one pipe cleaner to be cut and twisted to resemble a human figure. Students should measure their figures and estimate how tall a space would be to fit the figure's scale; they can make a drawing of their learning space, adjusting it as necessary to be sure that the figure "fits" (doorway, steps, windows, ceilings, walls, etc.) This figure can be kept and used as a scale determinant for further drawings and constructions.
From 'Architecture in Education: A Resource of Imaginative Ideas and Tested Activities' by the Center for Architecture, Philadelphia, PA.

NOTE: A 6'-0" tall person at 1/4"=1'-0" scale would be 1 1/2" tall. A 4'-0" tall person at 1/4"=1'-0" scale would be 1" tall.



SPATIAL AWARENESS

NOTE: This is a good activity to lead with volunteer(s).

The intent of this activity is to help students begin to understand how their bodies relate to spaces of different sizes and types, and the functionality and feelings associated with each different spatial experience. This exploration will assist students in understanding how the specificity of space relates to the functions and activities associated with learning.

MATERIALS NEEDED:
- Ability to explore the school grounds – inside and possibly outside. Access to various spaces around the school.
- (Optional) 100 foot measuring tape or 25 foot measuring tape, grid paper, and clipboard. For this optional portion of the activity, students will measure the spaces and record responses to the questions below.

DURATION: 30-45 minutes

OBJECTIVES– Students will:
- Relate purpose and activity to space size and type – recognizing which spaces are more appropriate for specific purposes and how rooms and spaces are designed with specific intent.
- Understand their own bodies as they relate to the size and nature of different spaces.

ACTIVITY:
Select two to three of the spaces listed below (or others appropriate to your school) to visit with your students. Try to provide a range of spaces from small to large, and a variety of uses.
- Classroom
- Closet or small office (less than 8' x 8' in size)
- Gymnasium or cafeteria
- School office
- Athletic field
- Under a tree – or at the edge of a wooded area
- Outside, against a tall, blank wall (preferably no windows)
- Corridor or hallway
- Playground

(Optional) Measure the first space – students should draw and record the space size on their grid paper. Calculate the area in square feet.

Begin in the first space by having the students stand shoulder-to-shoulder in one corner of the room.

(Optional) Measure the space that this tight cluster of students occupies and record the square footage as the minimum required to pack everyone in.

- While in this configuration, ask the students what they see, what they hear, and how they feel.
- Ask the students to carry on conversations with their neighbor – and also with the teacher and volunteer from this tight configuration. What do they notice about the ease / difficulty of communicating this way?

Ask the students to spread out – at arm's length apart so that they can just turn in circles without touching. Repeat the exploration questions above.

In the larger spaces, work through one or two more cycles of spreading farther apart, and then checking how the students perceive the space they are in. Pay particular attention to how easy or difficult it may be to learn and communicate in this space. What is the appropriate people-density for the space that you are exploring? Would this type of space be appropriate as a learning environment? For what types of learning? (Be creative here – push students to think beyond the traditional uses of each of these spaces.)

Try to repeat these steps in each room or space you've selected. Help the students note the similarities and differences in their responses to each space.

DISCUSSION: We use different spaces in different ways. Typically, the places you'll visit during this activity have been designed with a very specific use in mind. Consider additional questions such as:
- How many people usually use a space this size? Would you call this a public or private space?
- What is this space used for? Is the space too big, too small, or just right for its use? Could it be used for more than one purpose?
- How many people could be in this space before it no longer works for the users? (Test this, if you can.)
- What is the light like in this space? Do the activities here need lots of light or just a little? Is there daylight? What would the room be like with / without sunshine or views to the outside?
- Can people outside the building see into this space? What do you see during the daytime? During the nighttime? What does this transparency (or lack of transparency) do to the privacy of the space?
- How easy or difficult would it be to learn in this space? What types of learning might be most appropriate to be carried out here?

FREEHAND DRAWING

DRAWING ACTIVITIES

A. ARCHITECTURAL BLIND CONTOUR DRAWING

MATERIALS: pencils or pens and paper

It sounds simple, but is a challenge, even for those who "draw for a living". Can be done on-site (field trip), or with photographs in the classroom or at home.

1. Identify a local or internationally recognized building to draw. Each student should have easy access to an image (in-person, projected, or a print sitting on their desk) of the exterior of a building.
2. Ask students to draw the building without looking at their paper. Some find it easier when they do not lift their pen.

B. MASSING STUDY

MATERIALS: pencils, pens, crayons, pastels, or watercolors and paper

PART 1: FIELDS OF COLOR - NO LINES

1. Identify a local or internationally recognized building to draw. Each student should have easy access to an image (in-person, projected, or a print sitting on their desk) of the exterior of a building.
2. Select two or three colors or shades of gray to work with.
3. Ask students to "draw" the building using only fields of color. No linework allowed. They will need to pay attention to the effects of light and shadow on a surface.

PART 2: MASSING BLOCKS

1. (same as above) - new paper.
2. Directive: only draw the essential components.
3. Trace the building (or draw it while looking at the paper) and break down the form into masses - the largest shapes that make up the building. Disregard the ornamentation (the small details) and only focus on the essential elements. FOR EXAMPLE: Union Terminal would be a horizontal line for the ground, a half circle for the rotunda, and two rectangles for the wings.

C. DIAGRAMMING

Diagramming communicates design features or spaces in the building in an abstract image. Buildings do many different things all at once. Focusing on one specific function throughout a structure helps you to see and discover relationships between the parts of a building that you don't necessarily notice immediately.

This exercise is performed on an existing building, but the concept can be used for design as well, by diagramming the DESIRED way a building functions for a particular project

1. Identify a familiar building. Can be the students' homes, the school, etc.
2. Select four functional categories: light, wind / airflow, entry, circulation, water, energy, sequence, etc. Your volunteer might be able to come up with more.
3. Each student draws four corresponding boxes on a page, and draw a diagram for each category within the boxes.

Diagrams can be bubble-diagrams, paths, arrows, different shapes, etc. They can be plans (horizontal) or elevations/sections (vertical). **Hint: do a web-quest for graphic diagram images.**

FOR THE PROJECT

Have students create diagrams representing essential ideas, rooms, functions of their learning space design.
Do their diagrams tell them anything about what the building could look like?

MODELING

INFORMATION, TIPS, & RESOURCES

REMINDER: Your model base is 2'-0" x 2'-0" (24" x 24").

If selected SCALE is:		
	1/32" = 1'-0", largest site is **768' x 768'**	**1/16" = 1'-0",** largest site is **384' x 384'**
	1/8" = 1'-0", largest site is **192' x 192'**	**1/4" = 1'-0"**, largest site is **96' x 96'**

GENERAL TIPS:

Valuable items such as dolls, building system toys (Legos, Tinker Toys, etc.), matchbox cars, dollhouse furniture, etc. are **STRONGLY DISCOURAGED** for projects that will be submitted for exhibition. While every effort will be made to keep projects safe, it is a highly trafficked public space and we cannot guarantee safety.

Hot glue is a favorite for the speed it allows when putting together projects. Please be aware that some plastics such as polystyrene give off fumes when in contact with hot glue. Always work in a well-ventilated area and use caution with 'found' materials and hot glue.

White Glues such as Tacky-glue and Sobo (there are other 'craft' glues too) dry a little faster and are more viscous than Elmer's, so they stick better to what you're working on. With all typical white school and craft glues, tight connections and a "less is more" ethic work best for both speed of construction and the overall strength of the model.

Play-Doh Or Clay allows students to show multiple designs in a short span of time and they can make edits to their first drafts without scrapping their initial model completely. To get a quick grasp of what shape they want their building to look like, give the students an equal amount of clay or Play-Doh to shape ideas they have for a building.

MODELING ACTIVITY: COLLECTING MODELING MATERIALS

As soon as possible, begin to collect the following: cardboard, construction paper, card-stock, thin-cardboard boxes of all shapes, cereal boxes, plastic cups, emptied (cleaned & dried) soda bottles, straws, sticks, rocks, formed plastic pieces from packaging, and any kind of clean packaging discards that do not have food or toxic residue.

OPTIONS

- Designate a team of students to develop a flier to print and send home in backpacks asking for materials.
- Have all students create a designated collection box at home, and ask their parents to bring materials home from the office.
- Place COLLECTION BINS around the school - Library, Office, Teacher's Lounge, Parent Center, Cafeteria, etc.
- Have students prepare a presentation to the teaching staff about the project and the materials they are looking for as the start of having the collection bins around the school.

MODEL REFERENCES

There are many websites that you can search for references of other models that were designed and mocked-up by professionals; this will give you an idea where to start when making your own 3D models. These websites also show examples of well designed buildings and spaces if you wish to research other structures of learning. These include but are not limited to:

Arch Daily - http://www.archdaily.com
Architectural Digest - http://architecturaldigest.com
Design Boom - http://www.designboom.com
Dezeen - htpp://www.dezeen.com
Pinterest - http://www.pinterest.com
You Tube - http://www.youtube.com

3D MODELING

SketchUp 3D Digital Modeling:
http://www.sketchup.com/3Dfor/k12-education SketchUp® is a user-friendly 3D modeling program made available online for FREE (limited edition). In previous years, several classes have utilized this visualization tool successfully. A little time on the tutorials provided on SketchUp web pages can get students ready to build their models in cyber-space, and even upload them to the 3D Warehouse site for all to see! If you are uploading models, please use "DLAB2016" in the front of the file names so they stay together.

NOTE: Ask your volunteer for suggested tips for model making. Younger students will require assistance with the cutting and hot-gluing materials option. Invite older students, siblings and/or parents to help assemble, if possible. If additional time is needed outside of class to finish, lunchtime, recess and "Pizza Night" or "Super Saturday" events can be great community gatherings to complete projects.

MODELING EXERCISE

(modified from the Michigan Architectural Foundation "Architecture: It's Elementary")

LENGTH OF LESSON: ≈ 45 minutes
Suggestion: Ask your architect / volunteer to assist with this activity.

OBJECTIVES: Be able to understand two and three dimensions and recognize differences in size, proportion and scale.

- MATHEMATICS: Geometry and measurement
- VISUAL ARTS: Perform and Arts in context

RECOMMENDED MATERIALS

1. Building cutout sheets with tabs for gluing or taping (included); photocopy onto paper or card stock for student use.
2. Colored pencils
3. Scissors
4. Tape and glue
5. Paint & brushes to create roads, lakes, etc. *(optional)*

VOCABULARY (See glossary for definitions)

- Two-dimensional
- Three-dimensional
- Model
- Roof

ACTIVITY

A. In this lesson, students will design and construct buildings which reflect a particular land use, which can then be placed to create a city or neighborhood (optional).

B. Using the building cutout sheets, the students should first design & color the building shapes, then cut out the building shapes along the outside perimeter lines.

C. Have the students fold at the tabs and interior lines, then assemble their buildings.

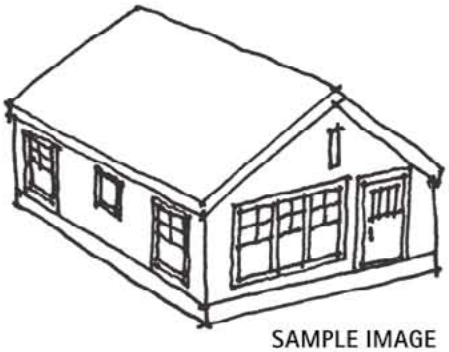
D. Have the students place their buildings on their city block(s), but do not attach them to the poster boards (optional).

TEACHER'S EVALUATION

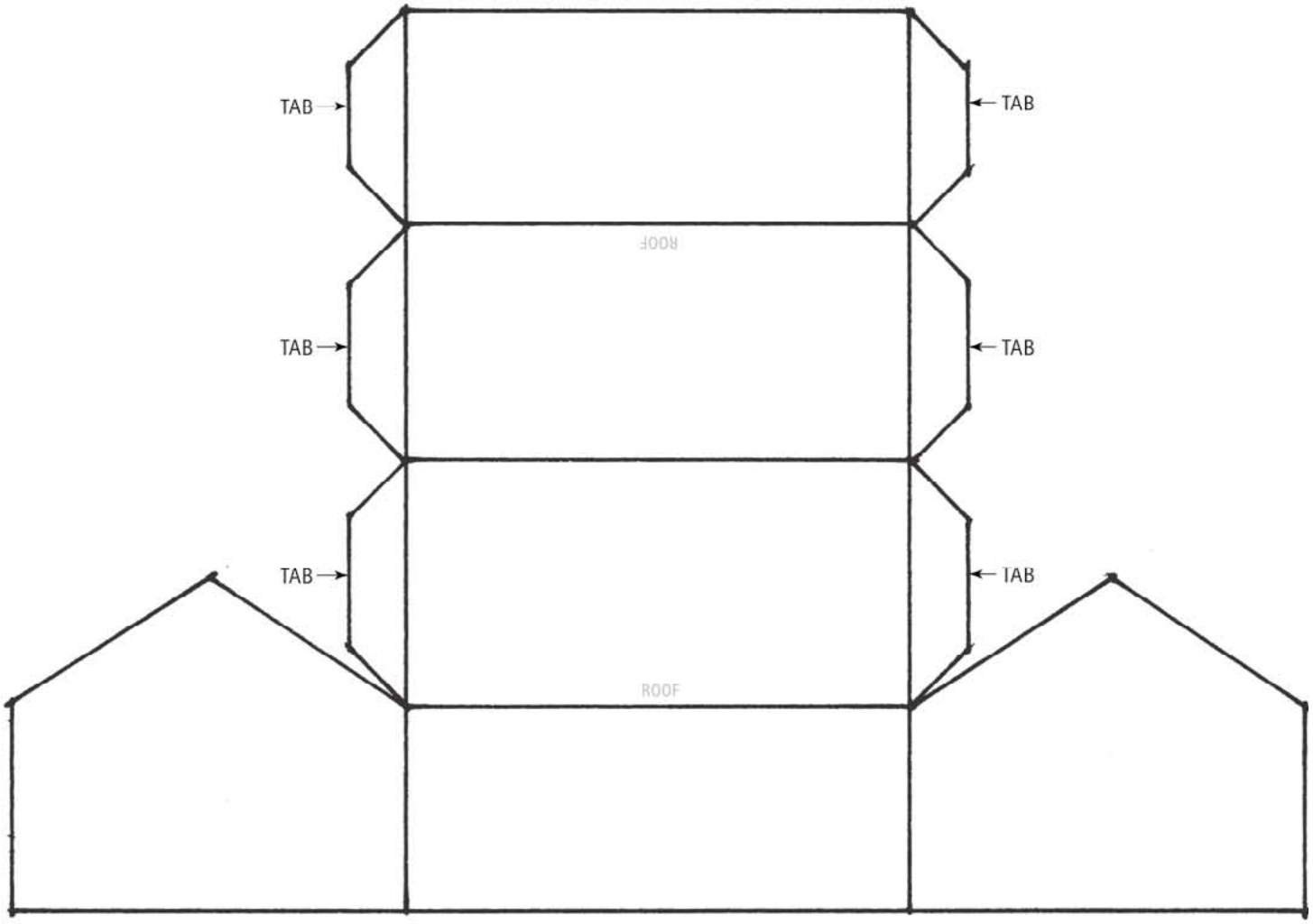
Monitor the development and progress of the student planning and construction of the models.

DESIGN PRINCIPLES FOR CONSIDERATION:

- Design is accomplished by composing the physical characteristics of size, shape, texture, proportion, scale, mass and color.
- Order is the arrangement and organization of elements to help solve visual and functional problems.
- Visual relationships are determined by light, shadow, edges and contrast. Balance is the creation of visual harmony through the use of color and the articulation of form.
- Nature is a model for architectural forms and shapes.
- Form follows function is a design approach where the form of the building is determined by the function of its spaces and its parts.
- Mass creates form, which occupies space and brings into being a spatial articulation.
- Symbolism is an important means of visual communication for architecture. Visual thinking is a key to awareness of the built environment.
- Sustainable design of the built environment protects the natural environment.
- Social structure, culture and the built environment have a direct influence on one another.
- Design is experienced through human sensory perception. The creative process is basic to design.
- Aesthetics is the artistic component of architecture.
- Climate and the natural environment influence design decisions.
- Architecture satisfies emotional and spiritual needs in addition to physical needs.
- Past, current and future technologies influence design decisions.



SAMPLE IMAGE



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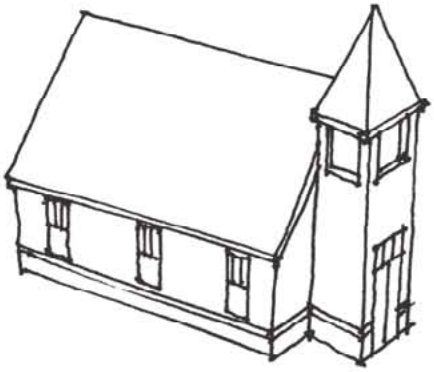

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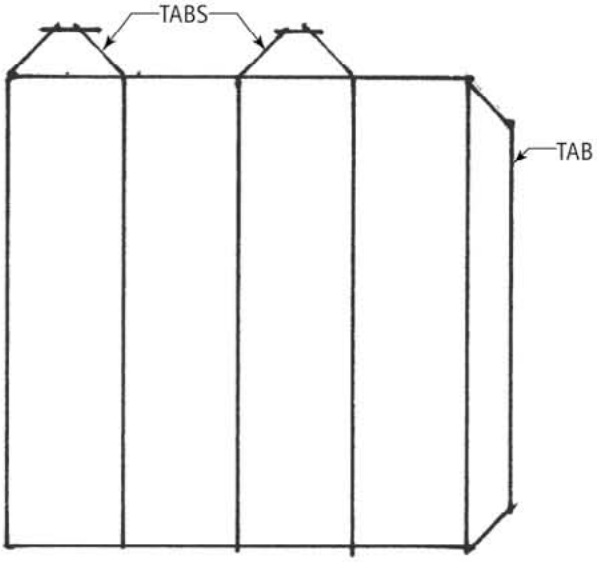
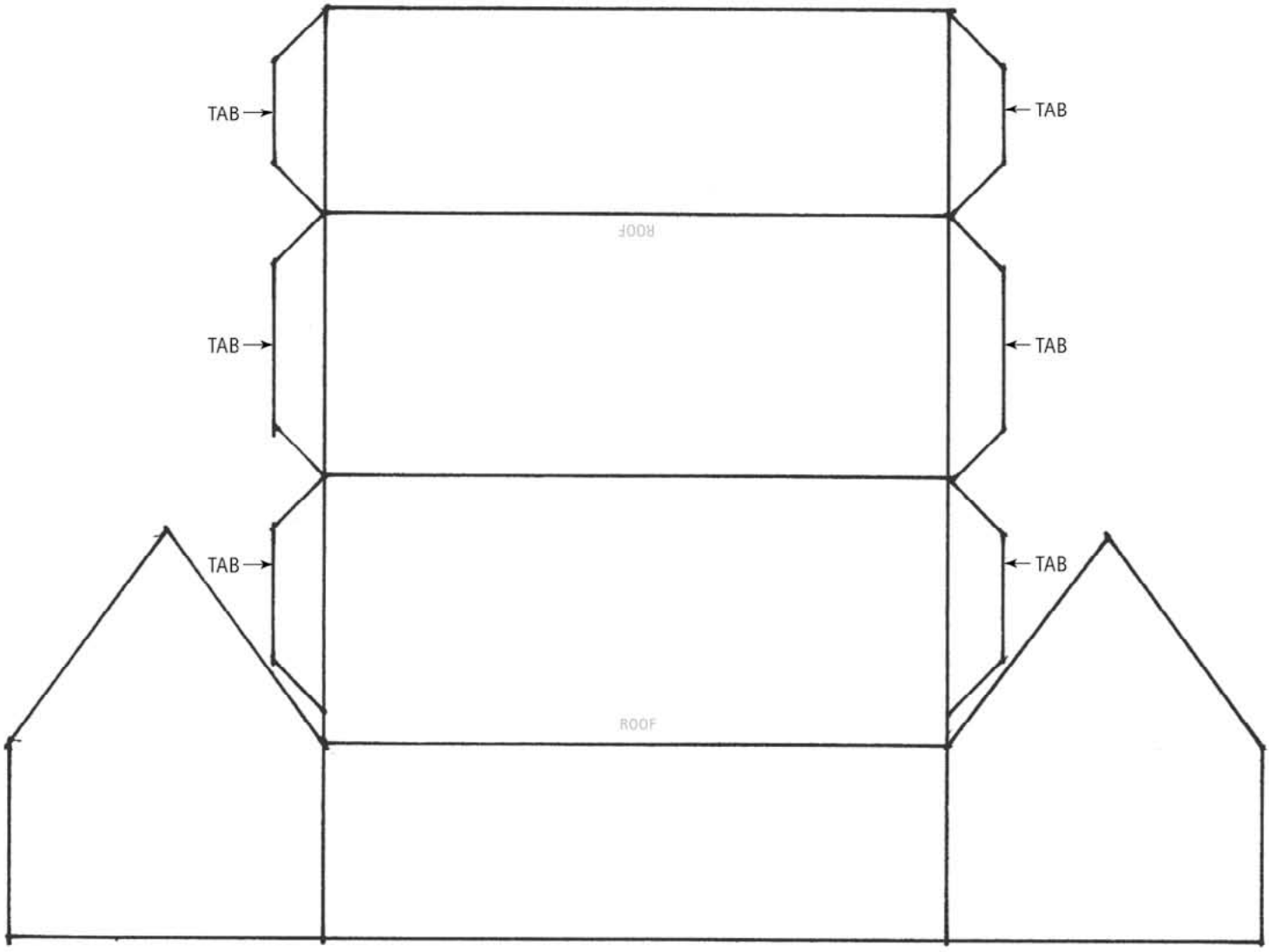
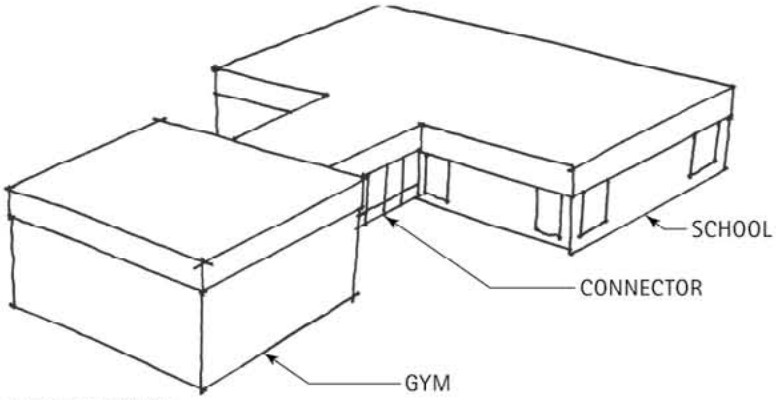


ROOF



SCALE: 1/8" ≈ 1'-0"

PATTERN #3: A GYM, TO BE ADDED TO AN ELEMENTARY SCHOOL TO MAKE A HIGH SHCOOL



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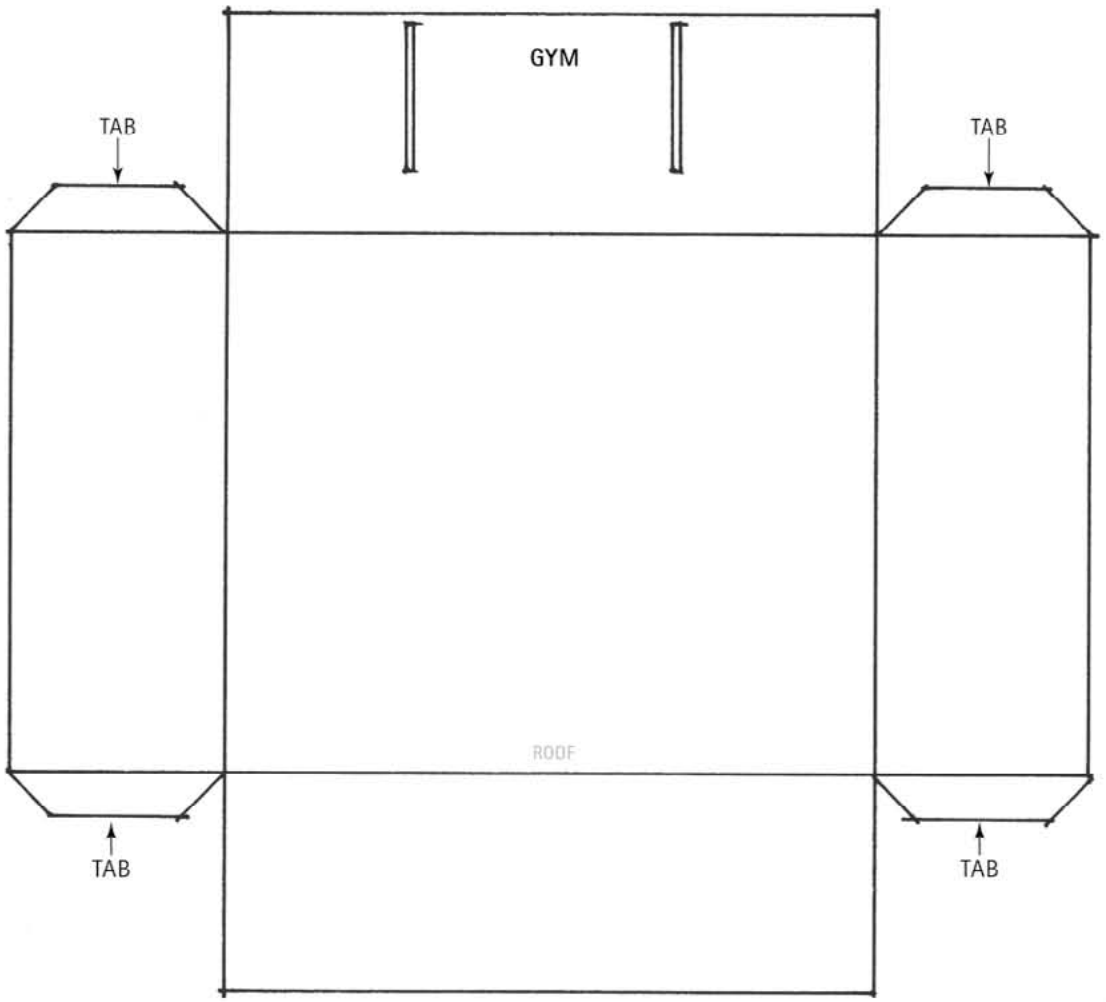
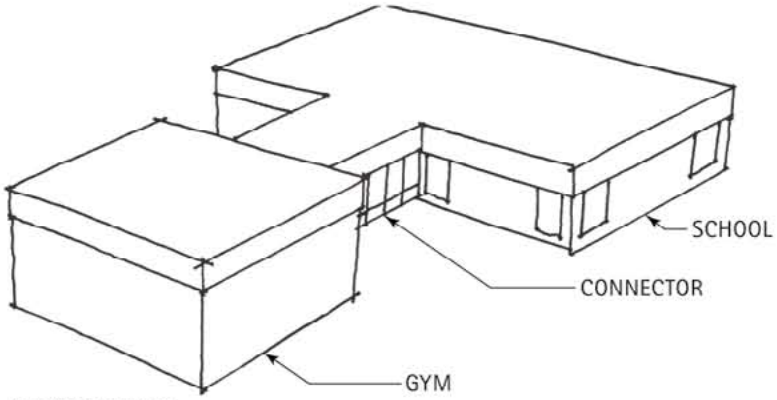


SCALE: 1/8" ≈ 1'-0"

PATTERN #4: AN ELEMENTARY SCHOOL OR PORTION OF A HIGH SCHOOL



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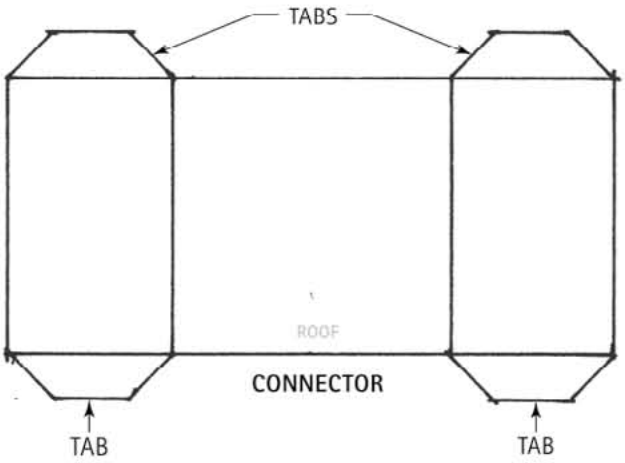
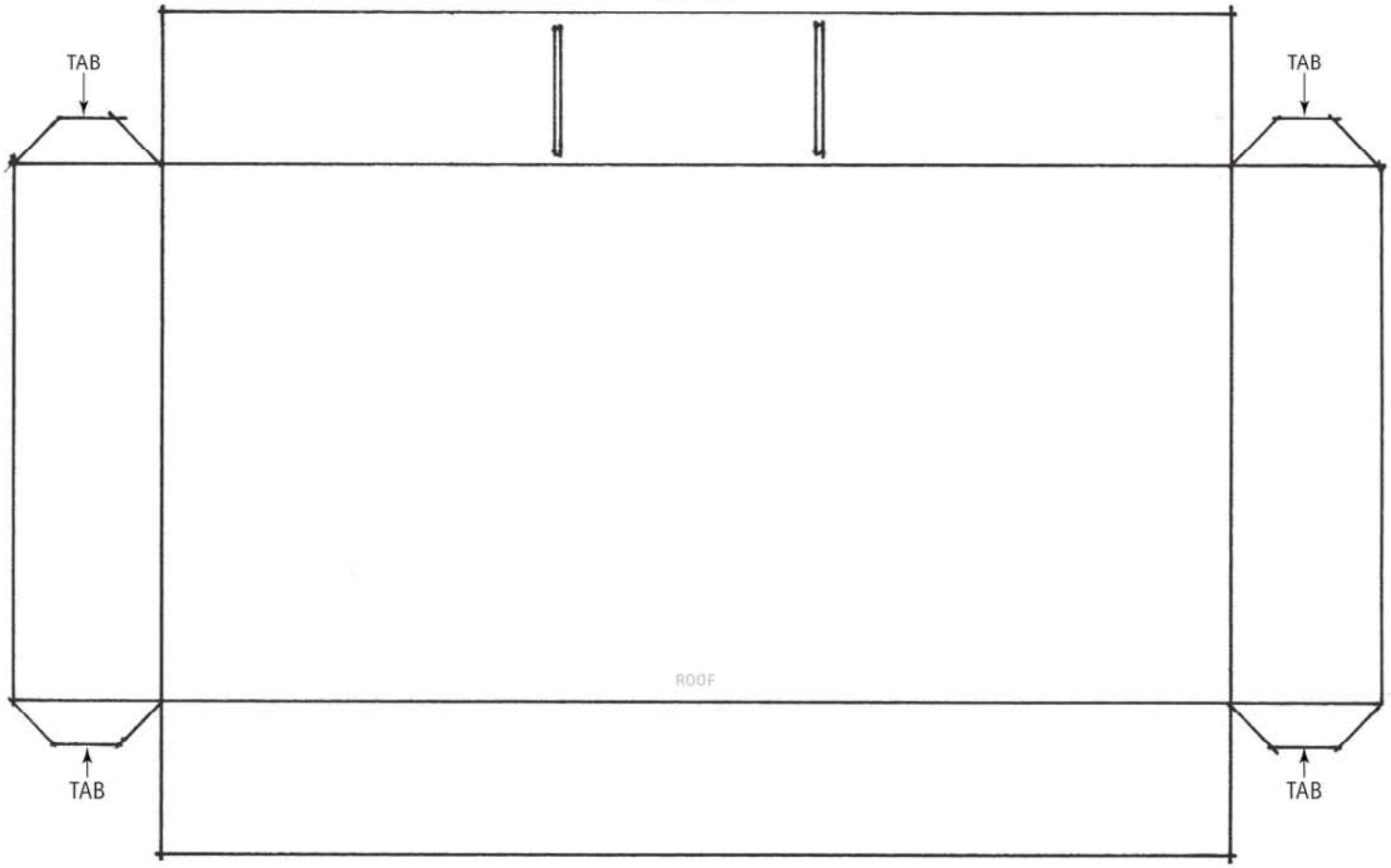
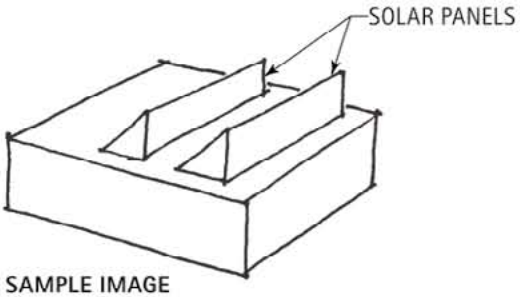


SCHOOL



SCALE: 1/8" ≈ 1'-0"



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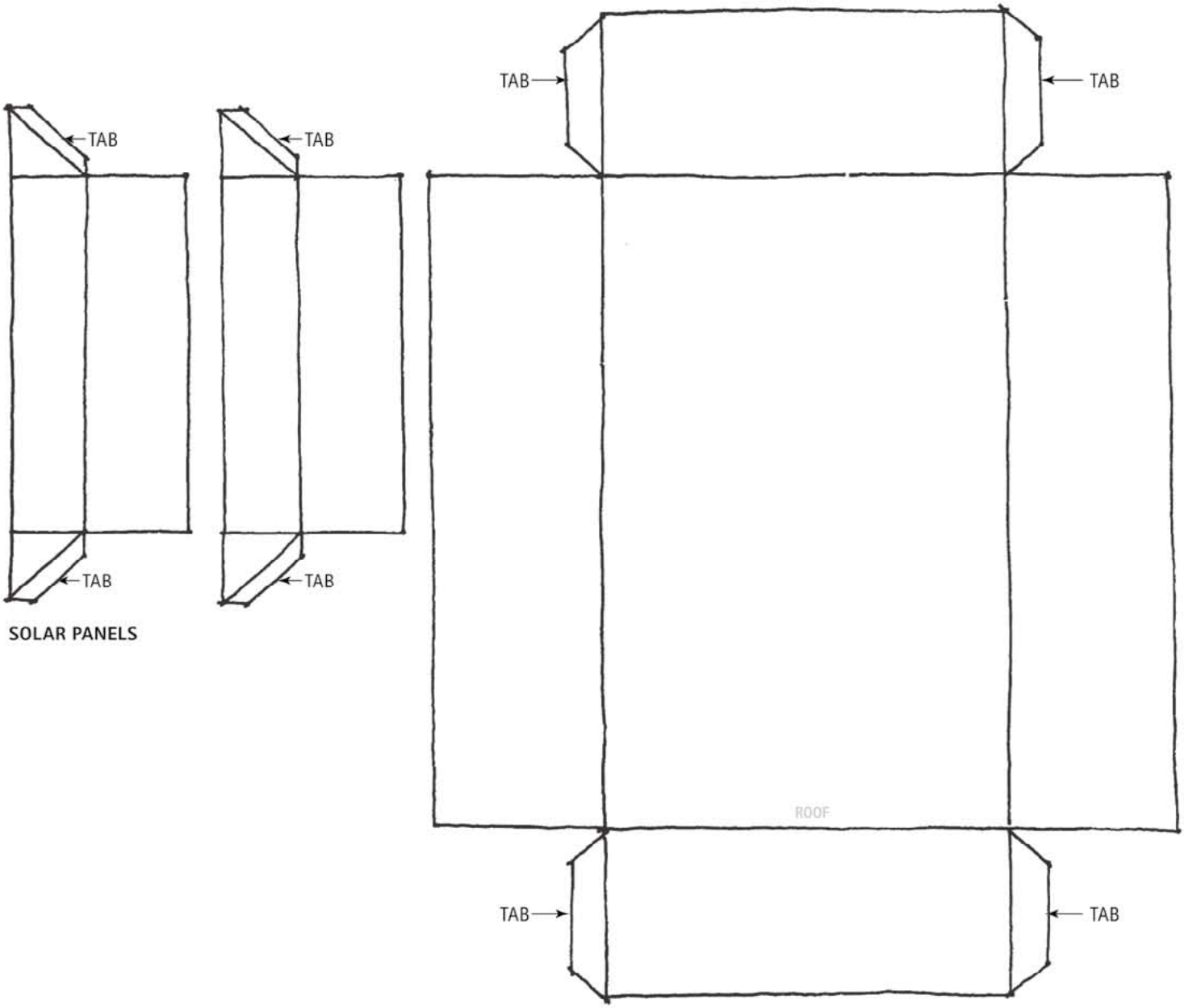
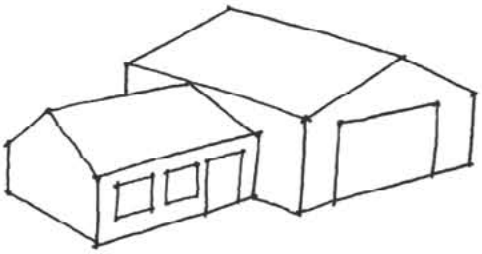


SOLAR PANELS

SCALE: 1/8" ≈ 1'-0"



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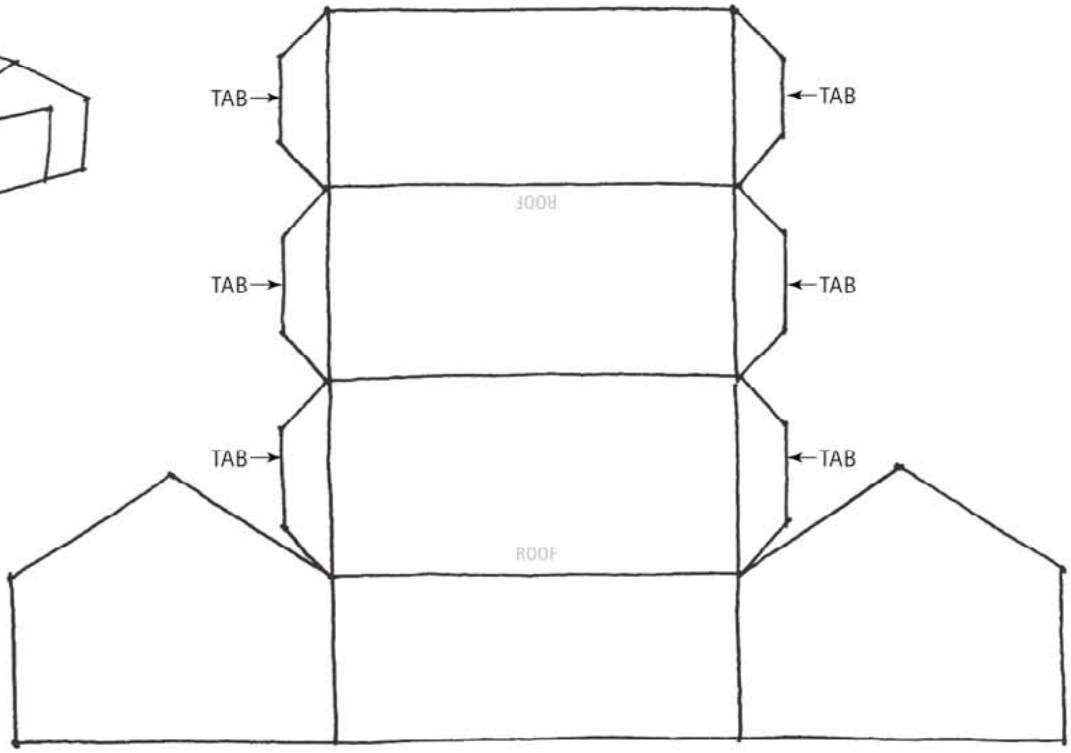
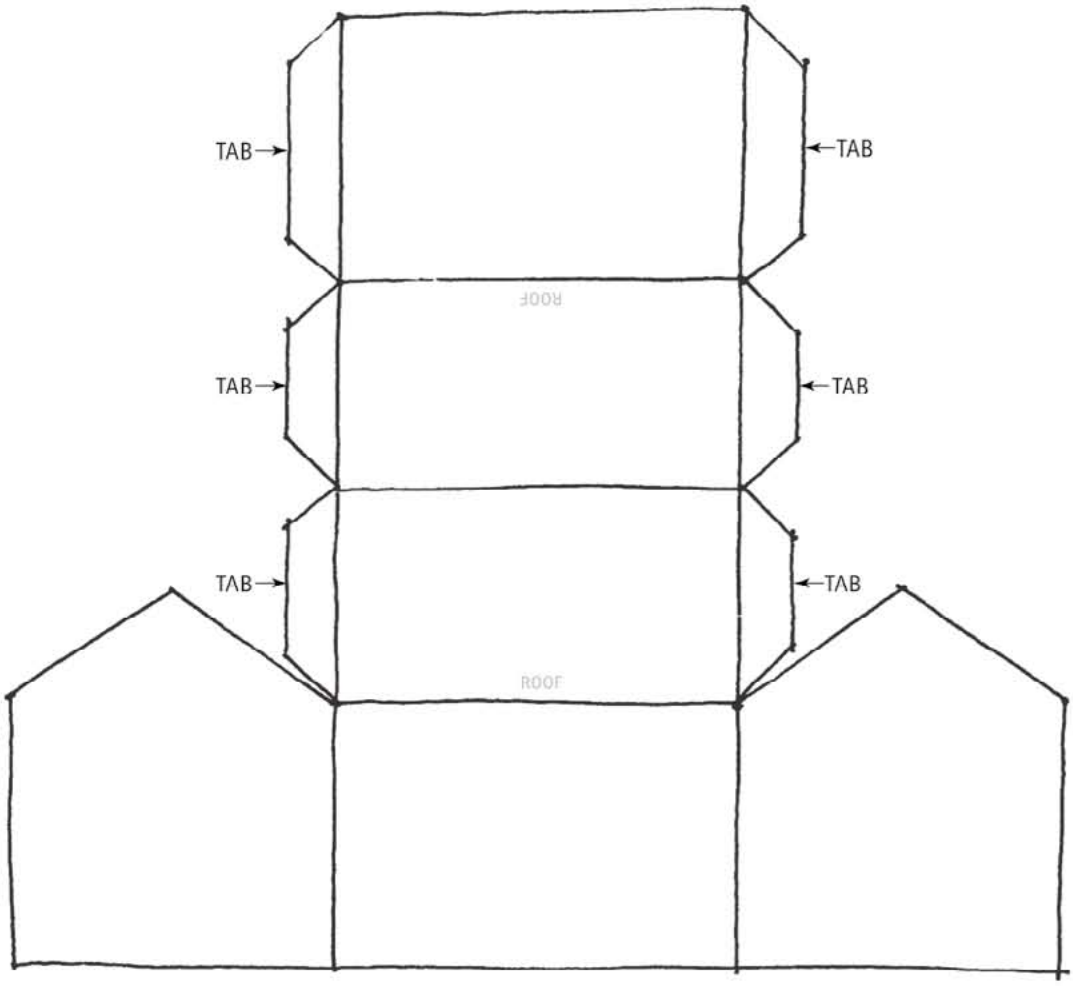




SCALE: 1/8" ≈ 1'-0"

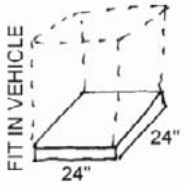
DESIGN FAIR EXHIBITION AND COMPETITION

REQUIREMENTS

DESIGN FAIR

DESIGN FAIR EXHIBITION & REQUIREMENTS

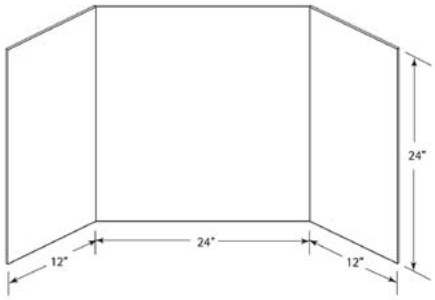
A Design Fair will be held to showcase student work. In addition to a display of their three-dimensional models and tri-fold panels, the Design Fair will offer students and volunteers the chance to talk with visitors about the entire planning and design process.



DESIGN LAB DESIGN FAIR ENTRIES

Each classroom may participate in the Design Fair by creating both a:

- 3-dimensional tabletop architectural model not to exceed 24" x 24" (base)
- 24"h x 48"w Tri-fold panel (provided by AFC)
- A maximum of (3) projects per classroom may be submitted



THREE (3) TRI-FOLD BOARDS WILL BE PROVIDED FOR EACH CLASSROOM

The tri-fold display gives students the opportunity to describe and illustrate the work they do leading up to the design and build of their model. Please have students collect and keep evidence of their Design Thinking in action. This evidence will help to tell the story of how they utilized the phases of the Design Process -- Discovery, Interpretation, Ideation, Experimentation, & Evolution to complete the challenge. As you determine which projects will be selected for the Design Fair, the student teams can use the tri-fold display to tell the story of their journey.

REQUIRED: DESIGN LAB FAIR ENTRY LABELS AND PROJECT DESCRIPTION

- Entry Label 1 (one half): Securely fixed to underside of the 24" x 24" model
- Entry Label 2 (other half): Turn in at the time of drop-off on April 30, 2016
- Project Description: Displayed/affixed on the Tri-fold panel

All models and tri-fold panels MUST BE LABELED at the time of submission. Please use entry labels provided in this packet.

PROJECT SUBMISSION

INFO & REQUIREMENTS

DESIGN FAIR EXHIBIT FORMAT: Models and tri-fold displays will be viewed primarily from one side, lined up side-by-side along a table and back-to-back with other projects. Model and tri-fold orientation and any labeling of elements should take this into consideration.

TEXT & LABELING: Students should strive to communicate as much as possible about their designs through graphic representation. Information may be written or typed on the tri-fold boards, and should be legible, neat and organized. Any labeling of individual features on models should be discreet and not distract from the presentation.

STURDINESS: Submitted entries should be well-constructed and able to be moved without fear of destruction. Models and tri-folds will be shifted and re-arranged as needed after drop-off. While every effort is made to protect submitted projects, we cannot take responsibility for any accidental breakage of models. A "fix-it" station will be available upon arrival with supplies for emergency repairs.

SCALE: Scale is strongly encouraged for 6th – 12th grade projects. Projects in the K-2 and 3–5 with at least some element of scale is also encouraged (but not required). Neatly and discreetly label drawings & models with the scale designation, e.g. Scale: 1/4" = 1'-0". More than one scale may be used for the tri-fold presentation. The **Project Description sheet** should be part of the tri-fold panel design. Layout of presentation boards should take this into consideration.

CREATIVE WRITING: The **Project Description** is your students' chance to describe to the jurors and exhibit visitors how they approached the Learning Spaces challenge, their green design solutions, and tell the how and why of their designs. Using the information and ideas recorded on the **Design Ideas Form** and any additional records, have them write a project description summary; include important, descriptive language that will highlight ideas and help the jury visualize a trip to the designed Learning Space. Use the **Project Description** sheet provided at the end of this guide.

JURY REVIEW: The Jury will be made up of professionals from local architecture, construction, design, education and engineering communities. A team of approximately 3-4 jurors will be assigned for each of the three award categories. Jury members will consult one another for the Juror's Choice Award.

PRIZES: Students & educators selected for award categories will receive a prize and ribbon/certificate. Afterward, a photo of their model, their names, school name, educator name, and project title will be listed on the AFC web page.

RECEPTION & AWARDS: Will be held from 9:00-1:00pm on May 7, 2016 at the Main Branch Library. **We kindly ask that projects be left in-place for the duration of the reception to give students an opportunity to present their work, and everyone a chance to see all the projects.** Often, this is the only occasion students have to see the work of others. Projects may be checked-out at the main reception desk from 9 am - 12 noon. Afterward, all projects are to be removed from the exhibition space by 2:00pm.

PROJECT COLLECTION: Projects will be checked-in on Saturday, April 30 **(use Design Fair Entry Labels at the end of this guide)** and checked-out on May 7th. **Educators: If you cannot be at the awards reception on May 7th, please designate a parent to collect your class' projects.** We do not want to toss student work, but must dispose of projects that remain uncollected after 2:00 pm.

CERTIFICATES: Educators may pick up their blank **Certificates of Participation** for all students who complete a Design LAB project at the drop-off on April 30, 2016 or, at the time of the awards reception on May 7th, at the Main Branch Library. If pick-up is not possible, please contact AFC for other arrangements. A digital version of the Certificates will also be available.

DESIGN FAIR

RECOGNITION

All Design Fair entries will be reviewed and evaluated by our Fair Jury Panel, local professionals and educators in the built environment. The jury panel will review entries in these grade categories: (K-2,) (3-5), (6-8) and(9-12). In the case of multi-grade groups, projects will be placed according to the highest grade level represented.

Awarded entries will be recognized at the Design Fair Program on **Saturday, May 7, 2016**. Three recognition awards will be given in each of the four grade categories to the participating students and their teachers.

ENTRIES WILL BE REVIEWED FOR THESE ELEMENTS:

- comprehensive, thorough and innovative ideas
- real world design solution success in meeting needs of client
- sustainable materials and green building solutions

AWARD CATEGORIES

INSPIRED INNOVATOR: *Project is unique and represents excellence in inventive design thinking*

- The learning space prompts the viewer to think, and reflects the designers' ability to creatively collaborate and express their work
- The space is energizing, inspiring, and motivating to promote learning and foster chosen activities
- The design concept and materials clearly demonstrate an innovative response including size, shape, orientation, treatment and functionality

COMPREHENSIVE CONSTRUCTOR: *Project represents a well-researched, well-documented, and comprehensive design, which appropriately addresses client needs.*

- The tri-fold and model tell the story of the entire design process and were created with precision, accuracy and attention to detail
- The learning space could be built in the real world using the presented design and selected materials for a real world client
- The project demonstrates a thorough understanding of the chosen site and client needs, while expressing a developed design solution

SUSTAINABILITY SURVEYOR: *Project strongly exhibits an awareness of the design's environmental impact and utilizes sustainable materials and solutions*

- The learning space design utilizes responsibly sourced materials and systems
- The space clearly and effectively incorporates sustainable design solutions, such as natural lighting, solar or wind power, water catchment or green roofing
- The project strongly demonstrates how the learning space design limits its impact on the environment

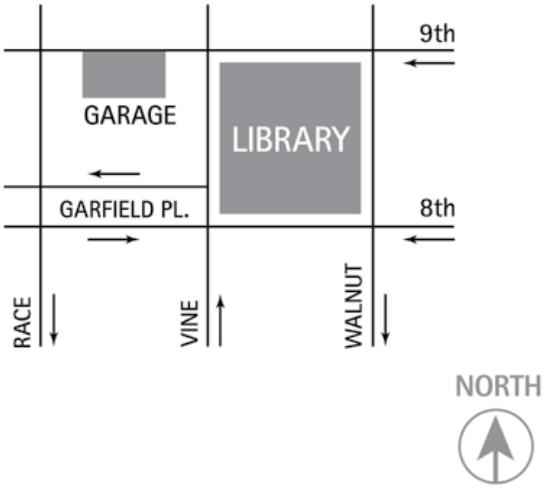
JURORS' CHOICE: *Jurors are invited to give the Jurors' Choice Award to outstanding project(s) in each grade category.*

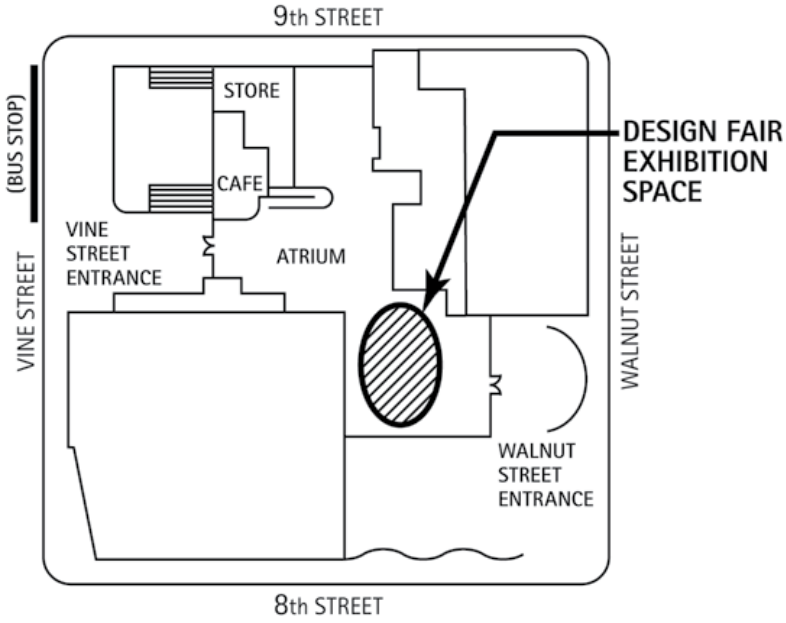
PEOPLE'S CHOICE: *A ballot box will be provided during Design Fair Exhibit Week for the general public to vote on a favorite design.*

DESIGN FAIR

APRIL 30 - MAY 7, 2016

PUBLIC LIBRARY OF CINCINNATI AND HAMILTON COUNTY, MAIN BRANCH
800 VINE STREET, CINCINNATI, OH 45202





DESIGN FAIR DROP-OFF

- Between 9:00am to 12:00pm on Saturday, April 30, 2016 *(Volunteers will be available to assist)*
- South building of the Main Public Library, Downtown Cincinnati.

PARKING

- METERED PARKING available on Vine, Walnut, 8th and Garfield Place.
- GARFIELD GARAGE (public) 13 W. 9th St., 45202 (on 9th Street between Vine and Race Streets).
  RATES:
  0-1 Hour: $1.00
  1-2 Hours: $2.00
  2-3 Hours: $3.00
  3-4 Hours: $4.00
  4-5 Hours: $5.00
  5+ Hours: $6.00 (Daily Max.)

WHAT TO BRING

- Models **(WITH Entry Label)**
- Tri-fold panels **(WITH Project Description)**
- Extra Entry Label to Check-in

DESIGN FAIR ENTRY LABEL

IMPORTANT: Complete and affix label on model BEFORE dropping off at Main library and BRING EXTRA COPY for check-in

School _____ Teacher _____

Project Title _____

Student Designer / Design Team:

Name _____ Grade _____

Name _____ Grade _____

Name _____ Grade _____

Name _____ Grade _____

Name _____ Grade _____

Name _____ Grade _____

Classroom Volunteer Name(s) & Company / Organization:

_____

Client _____ Location / Site _____

DESIGN FAIR ENTRY LABEL

IMPORTANT: Complete and affix label on model BEFORE dropping off at Main library and BRING EXTRA COPY for check-in

School _____ Teacher _____

Project Title _____

Student Designer / Design Team:

Name _____ Grade _____

Name _____ Grade _____

Name _____ Grade _____

Name _____ Grade _____

Name _____ Grade _____

Name _____ Grade _____

Classroom Volunteer Name(s) & Company / Organization:

_____

Client _____ Location / Site _____

PROJECT DESCRIPTION

IMPORTANT: Complete and affix label onto tri-fold panel.

School _____ Teacher _____

Project Title _____

Student Designer / Design Team:

Name _____ Grade _____ Name _____ Grade _____

Name _____ Grade _____ Name _____ Grade _____

Name _____ Grade _____ Name _____ Grade _____

Classroom Volunteer Name(s) & Company / Organization:

_____

Client _____ Location / Site _____

Project Description *(font 10pt size minimum, please)*: