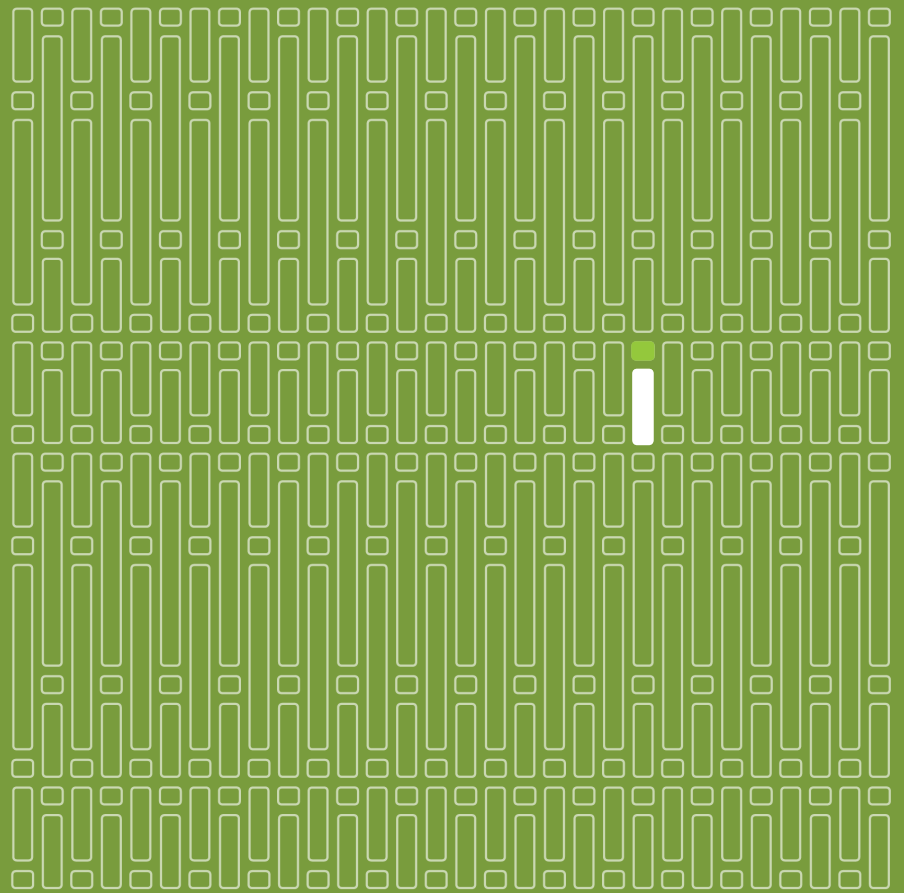


introduction to
DESIGN LAB
LEARN + BUILD

2024 EDUCATOR and VOLUNTEER RESOURCE GUIDE | GRADES K-2



build awareness ■ build knowledge ■ build community

DESIGN LAB: LEARN AND BUILD MISSION

Our mission is to create awareness, appreciation, and understanding of the built environment through education.

We do this by:

- Offering our distinctive K-8 education program to area classrooms
- 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 & VOLUNTEERS,

Welcome to **Design LAB: Learn And Build 's K-8 education program.** This is a design education program as much as it is a wonderful community of people who are passionate about the built environment and the next generation. As the Executive Director, it is truly this program that makes my job so meaningful and a big part of why a lot of our board members are passionate in their roles. While we find meaning in managing the program, it is you who brings it to life and makes it possible for the enormous amount of students who participate each year. It is my hope that you, too, will benefit from being a part of the program, as I know each year the students, educators, and volunteers who participate bring a little bit more into my life than was there before.

For over 20 years, this program has aimed to assist students in learning about how they can plan, communicate, and thoughtfully build their environments. As students design and model their projects, they also build awareness, knowledge, and confidence. They start to understand how to engage with their world as curious and thoughtful citizens.

Throughout this program, students will gain an appreciation of the built environment and the role they can and will have in shaping it. Please feel free to reach out with any questions, concerns, or input into how to improve the program.

Thank you for your participation!



Christen Lubbers, Executive Director
Design LAB: Learn and Build
CLubbers@architectureincy.org
(513) 421-4469

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important information for educators

THANK YOU FOR PARTICIPATING IN DESIGN LAB! We hope that this experience will be a great one for you and your classroom. This page contains some tips and information to make sure that it is the awesome experience that it should be.

TAKE FULL ADVANTAGE OF THE TIME YOU HAVE WITH YOUR VOLUNTEER IN THE CLASSROOM. They have a depth of knowledge and exposure to the built environment that can bring this program to life in the classroom. However, these volunteers do have a career and likely cannot be in your classroom each time you work on Design LAB. They are also not educators and for some, this may be their first foray into a classroom environment.

MAKE YOUR GOALS AND EXPECTATIONS FOR YOUR CLASSROOM'S PARTICIPATION IN DESIGN LAB CLEAR, TO BOTH THE STUDENTS AND VOLUNTEERS. This project is yours to direct and your volunteer is an assistant and a knowledge resource. They also give students a look into a potential career path, one of the many perks of this program. Be sure to ask them about their profession (or program in school, for our wonderful student volunteers) and allow them to talk to the students about what their days look like and about real-world challenges/solutions.

MAINTAIN GREAT COMMUNICATION WITH YOUR VOLUNTEER. Collaborate on a plan for the program and remain flexible. You will likely need to make adjustments, but going in with a plan is a pro move. Support your volunteer with any unfamiliar classroom circumstances and lead the process to implement the best ways of reaching achievement goals for your students.



LESSON PLANS AND ACTIVITIES This guide contains foundational education about the built environment, instructions on how to implement a constructive and fun critique/presentation, as well as suggested activities pertaining to the annual challenge. The initial presentations and activities are necessary for a successful program and we do highly encourage the critiques/presentations as part of the learning process. However, **the entirety of this guide is yours to use as a resource**, do not feel like you have to use every page. **Pick what works best for your class and your students** and feel free to add your own activities or lessons as you see fit.

LEARNING OUTCOMES We ask educators to conduct a pre and post assessment with their students and return them to our office (electronically or by mail). The data we collect from these helps us improve the program and support fundraising efforts. While our program is extremely versatile, there are key learning components that will be covered in the initial presentations and these cover a foundational understanding of the built environment.

The learning that occurs during this program that we can test for is limited. The growth that occurs is usually based around teamwork, creativity, confidence, and an array of other great outcomes that cannot be tested, but are applicable in the real world. What we are testing for are foundational aspects that are very important to modeling and building. Do let your students discover through tinkering and fumbling through their model builds. **This program is truly about the process, try not to focus on the end result.**

ABOVE ALL, HAVE FUN! This can become frustrating for students as they build their models. Laugh at and learn from failures and highlight the growth that occurs from rebuilding. That is what the built environment is all about!

If you have any questions or need assistance during the program for any reason, please contact us at CLubbers@architectureincy.org or 513.421.4469. We want to know how the program is going in your classroom and if there is anything we can do to help.

important information for volunteers

THANK YOU FOR PARTICIPATING IN DESIGN LAB!

We want to make sure that you go into this program prepared so that it is a great experience for you, your educator, and your students. Please read this page carefully, as it will provide information and advice that will help you make the most of your time with Design LAB.

THE CULTURE OF CLASSROOMS WILL VARY BASED ON THE SCHOOL TYPES AND LOCATIONS.

Talk your teacher to understand the classroom dynamics and to understand the best way to communicate with the students. Keep in mind that the more challenging the classroom, the more you and the students will gain from the experience. Remember to be patient with your students. The model build can be frustrating for some and with students having different levels of exposure to the information that is presented to them, some of them may find it difficult. Each student will benefit from your willingness to share your passion and creativity, even if it does not always seem that way. It is not essential for a third grader to completely understand scale, it is essential that they use their creativity and have fun while taking a closer look at the built environment.

TIMING

You are an extremely valuable resource for the classroom, but your time there is limited. Your creativity, expertise, and passion is all of great use to your classroom; so be mindful of effective ways to leverage the time you have available to your students.



STAY FLEXIBLE WHEN PLANS CHANGE.

Things don't always go per the plan, especially when it comes to building models. If there are any differences in visions or goals for the classroom, this is something you should speak to your educator about.

LEARN FROM YOUR STUDENTS.

Don't look at this as a one-sided relationship. You can gain just as much from this experience as the students can, be open to it. Acknowledge their innovative thinking and lack of inhibition, realize how keyed in they are to the problems facing their communities and the creative responses they have for solutions. Understand how much they have to offer the world and treat them accordingly.

ABOVE ALL, HAVE FUN!

Don't get caught up if students are having a hard time grasping certain aspects of this project. If you are having fun, they will likely be having fun as well and the learning will occur naturally throughout the course of the program. Laugh through the "trying" phase with them.

Encourage them to keep going. 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 proven potential to elevate career aspirations.

If you have any questions or need assistance during the program for any reason, please contact us at CLubbers@architecturecincy.org or 513.421.4469. We want to know how the program is going in your classroom and if there is anything we can do to help.

acknowledgements

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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.

2023-2024 DESIGN LAB: LEARN + BUILD COMMITTEE

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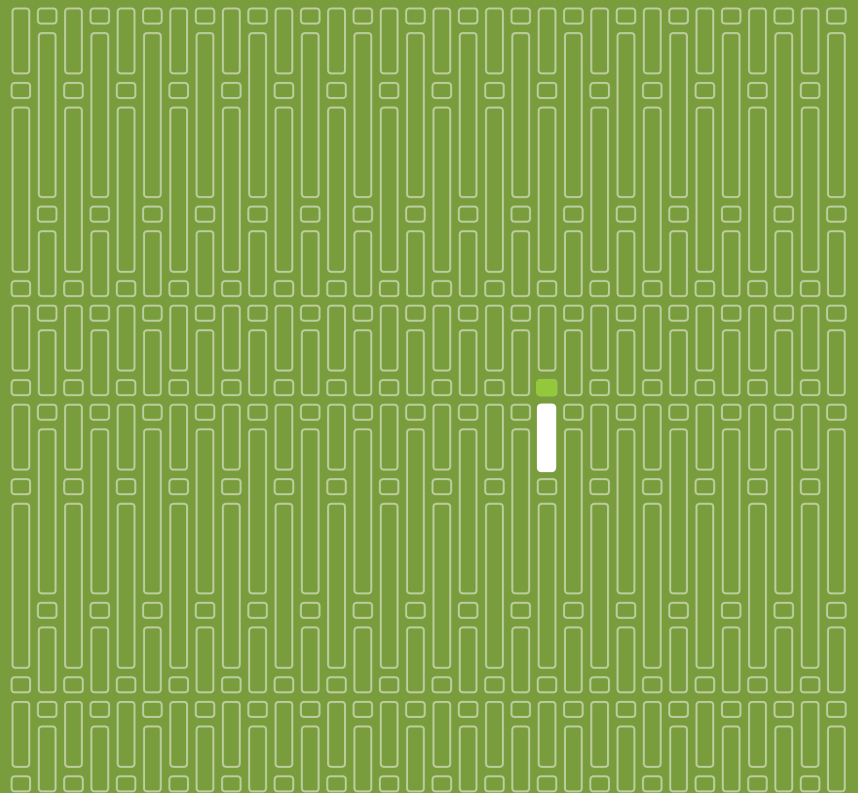
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Graphic Design
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■ ■ ■ program overview



build awareness ■ build knowledge ■ build community

■ ■ ■ NOVEMBER 20 & 21, 2023 | VOLUNTEER & EDUCATOR ORIENTATION

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. Orientations will be held November 20 & 21. If you are a new educator or volunteer and haven't been to one of these, it is mandatory. In the past, some volunteers have met with their students in December before the holiday break – feel free to do this if you and your educator can make it work.

■ ■ ■ DECEMBER 2023 | FIRST CLASSROOM VISITS

Volunteers and educators will coordinate their first classroom visits after receiving the volunteer/educator assignment information. This class visit will have an ice-breaker activity to go along with it, but it is a great way for the volunteer to get to know the teacher and students before the program officially kicks off in January.

■ ■ ■ JANUARY 2, 2024 | PROGRAM KICK-OFF

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

■ ■ ■ JANUARY 2 - MAY, 2024 | RESEARCH, DESIGN, AND 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, MAY 11, 2024 | PROJECT DROP-OFF

■ ■ ■ MAY 11-18, 2024 | DESIGN LAB EXHIBIT WEEK

■ ■ ■ TUESDAY, MAY 14, 2024 | DESIGN LAB EXHIBIT JURY REVIEW

See the **DESIGN LAB EXHIBIT & COMPETITION REQUIREMENTS** for jury award categories.

■ ■ ■ SATURDAY, MAY 18, 2024 | DESIGN LAB EXHIBIT RECEPTION & AWARDS CEREMONY

***Based on availability, the dates of the exhibit may change, but it will not be earlier than the predicted dates. We greatly appreciate your flexibility & understanding!*

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.

	MONTH/WEEK	PROJECT PHASE	SUGGESTED ACTIVITIES	
	DECEMBER	INTRO VISIT	Getting Acquainted	Activity, Materials Reminder, Pre-Assessments
CONCEPTS	JANUARY			
	Week 1	DISCOVER	Project Introduction	Intro Presentation, Q&A
	Week 2	Discover	Site & Client Phase	Understanding Site & Client
	Week 3	Interpret	Design Concepts	Structures
	Week 4	Interpret	Design Concepts	Spatial Awareness
DRAWINGS	FEBRUARY			
	Week 5	Interpret	Sustainability	Understand Sustainability
	Week 6	INTERPRET	Community	Understanding Community
	Week 7	Ideate	Design Planning	Plan, Section, & Elevation
	Week 8	Ideate	Design Planning	Color/Light
MODELS & TRI-FOLDS	MARCH			
	Week 9	Ideate	Design Planning	Materials
	Week 10	EXPERIMENT	Work Week	Develop Plans
	Week 11	EXPERIMENT	Work Week	Begin Models - Base
	Week 12	EXPERIMENT	Work Week	Models - Buildings
	APRIL			
	Week 13	EVALUATE	Work Week	Models - Buildings
	Week 14	EVALUATE	Work Week	Models - Decorate Buildings
Week 15	EVOLVE	Work Week	Finalize Models	
Week 16	EVOLVE	Presentation	Final Class Presentation, Post Assessments	

field trips for extended learning

RUMPKE LANDFILL OR RECYCLING CENTER

<https://www.hcdoes.org/332/field-trips>



- The District offers free field trips, including **transportation**. To qualify for these, schools must be registered with the District's **Recycling Assistance Program** and be willing to submit **student reflections** after the trip.
- Whether you teach Environmental Science, Engineering, Physics, Economics, or Civics, this field trip is a real eye-opening experience for both students and faculty. Groups are welcome to pack a waste free lunch and eat indoors at the MRF before heading to the landfill. The trip requires a minimum of 10 students and is limited to a maximum of 40 students.
- Want to make it a full day? You may also visit Fernald Preserve and tour an exhibit including environmental cleanup, ecological restoration and legacy management. *Times will be adjusted accordingly.*

CIVIC GARDEN CENTER

<https://www.civicgardencenter.org/learn>



- The Civic Garden Center (CGC) is a non-profit horticultural resource whose mission is building community through gardening, education and environmental stewardship.
- The Green Learning Station at the Civic Garden Center is home to a hands-on field trip for students to learn about green solutions to common urban environmental issues. Trained guides lead small groups of students through the site, facilitating discussion and engaging students in group-problem solving and scientific inquiry.

MUSIC HALL TOURS & EDUCATIONAL PROGRAMS

<https://friendsofmusichall.org/music-hall-tours/#school>



Friends of Music Hall offers a variety of Music Hall tours, speakers, and classroom presentations of this world-class historical landmark.

Visit the Friends of Music Hall website for information and details.

design thinking and the design process

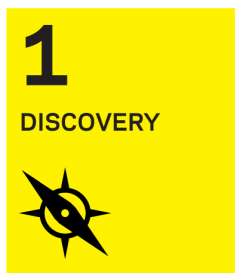
WHAT IS DESIGN THINKING?

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 way of thinking, acting, and innovating 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 5 PHASES OF THE DESIGN PROCESS



I have a challenge.
How do I approach it?



I learned something.
How do I interpret it?



I see an opportunity.
What do I create?



I have an idea.
How do I build it?



I tried something new.
How do I evolve it?

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 solution 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** – Uncover your challenge to understand how it impacts the community you chose as your client or even a more global community.
- **Prepare Research** – Look into the challenge and research the community you are focusing on improving, how will this challenge address their needs?
- **Gather Inspiration** – How have others used similar challenges to improve communities? Collect images and stories, anything that can inspire your project.

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.

design thinking and the design process

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 from 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

Prior to the first visit with the class, we strongly recommend that educators and volunteers schedule a meeting without the students. We recommend having this in the classroom, outside of classroom hours, so the volunteer knows where to go and has seen the classroom before the program begins. We recommend doing this some time in December, before the first official classroom visit.

It is recommended that educators and volunteers schedule an introductory classroom visit in December 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:

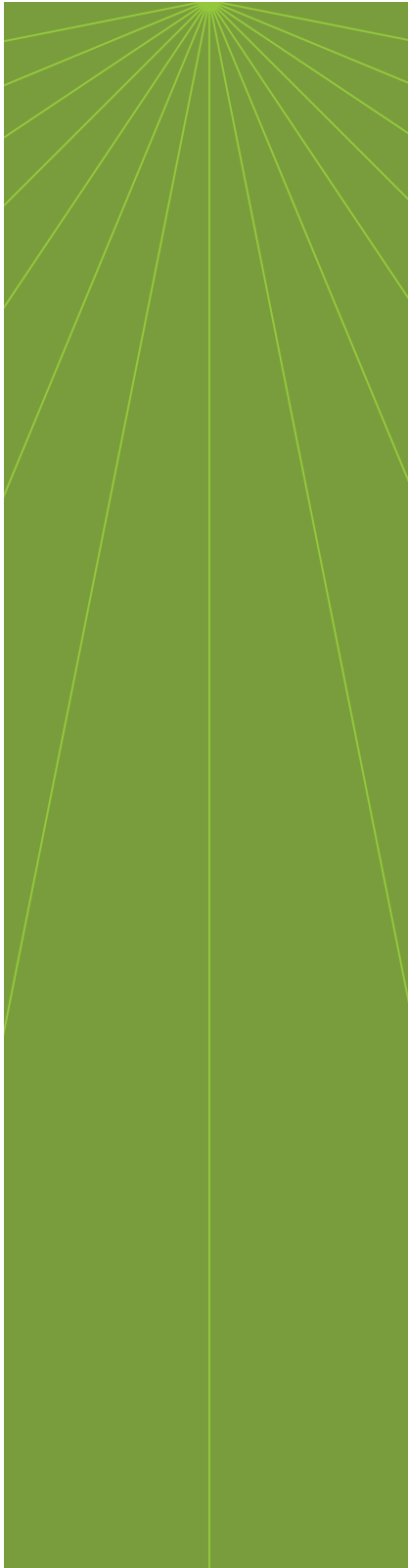
- The factors that are important in the design of a new structure or space.
- Which systems make up a building and what they are designed to do (this is a great place to make a comparison to the body – the building envelope is the shell, the structure is the skeleton, HVAC is the respiratory system,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

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

■ ■ ■ 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 activity



INTRODUCTION ACTIVITY

DURATION: 5 - 10 Minutes

ACTIVITY: Ask students what they think of when they hear “BUILT ENVIRONMENT” and write their answers on the board. See if you can push them to think of different types of built environments aside from just buildings - different kinds of parks, different structures, roads, or anything else you can think of -- challenge them to think of something you can't even think of.

MAIN ACTIVITY

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.

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.

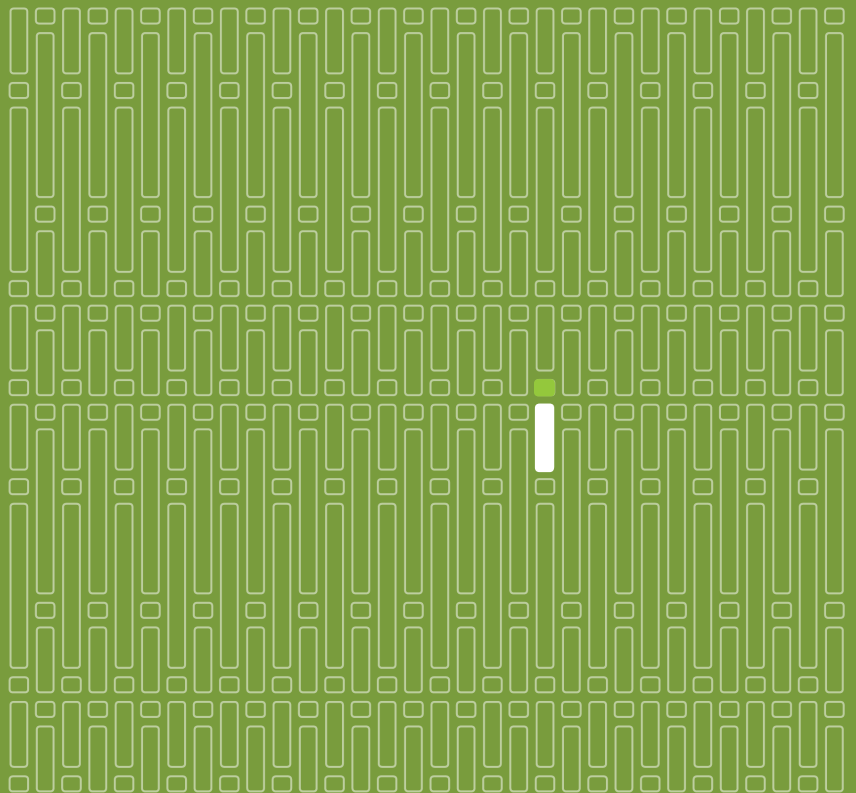
Continue through two more iterations of this process, until each student has had an opportunity to work on all four of the building typologies. This exercise becomes difficult in the third and fourth rounds, as students may feel that there is little left to contribute to the design-in-progress. Encourage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

■ ■ ■ introduction to the built environment



build awareness ■ build knowledge ■ build community

the challenge: what does YOUR community need?

OVERVIEW & PROJECT REQUIREMENTS

■ ■ ■ **THE CHALLENGE IS TO INSPIRE YOUNG LEARNERS TO LOOK AT THEIR COMMUNITIES IN A DIFFERENT WAY.**

This means understanding how it came to exist and how it continues to evolve.

RULES OF THE ROAD

Projects may be developed in teams or individually. We recommend teams of four students. This limit ensures that each student will have ample opportunity to contribute to the design process, drawing, and model-building.

1. Each model needs to have at least one building on it. This could be done creatively, like a butterfly house in a park; or it could be done in a more obvious way, like a new library or a new fire station.

2. Models should offer real-world solutions to the design challenge. Embrace innovation and build something that can address a real-world problem. Your students will be building something they believe is needed in their, so really talk to them about what their community needs. Is it an animal shelter, a new fire station, or maybe a house that can also travel to Mars? As long as they have sound reasoning behind their plans, any ideas are welcome.

■ ■ ■ **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.

3. Make sure you are thinking about the natural environment both in your design and in how you build your model. See if you can reimagine old/used/thrown-away items and only use these to build your model.

4. To enter your project into the Design Exhibit, you must have a completed tri-fold board unique to your project as well as a 3D model spanning no more than 2'x2'. Adults may assist, but the work must be designed and completed by students. There will be ONE project submitted from each class. Refer to the model rubric for details on judging.

CONCEPTS: DISCOVERY & INTERPRETATION

Throughout the first 6 weeks of the program, use the Powerpoints to guide you through the groundwork. This will involve a lot of basic principles to provide a very solid base understanding of the concepts before the students begin their models.

IDEATION & EXPERIMENTATION

Use the Design Planning weeks to help your students understand different aspects of the built environment - like light, color, and materials. This time is meant to really open them up to what all goes into creating the built environment and should be exciting for them.

DEVELOP PLANS

Before you begin building, ensure that each group has a plan for their models. Refer to their drawings to support their plans. These plans do not have to be perfect, but they do need to show that they are thinking about arrangements and plans before they start throwing materials on their boards.

MODELS & TRI-FOLDS

Time to BUILD! Students seem to look forward to this the most, but the foundational work that occurs before it is so important. Teachers who have tried to skip past that step in the past have learned how regrettable it can be.

For scale, create a few pipe cleaners (or a similar, cheap material) models to help figure out sizing for your model. They could be in the shape of people if their client is a person or a group of people or even made into the shapes of animals or whatever they choose to have as their clients. This activity is meant to help them with the sizing of their models. Refer to the modeling section of this guide for more tips, tricks, and ideas for building the model.

■ ■ ■ **TAKE PHOTOS!**

Please take photos and send them to us.

We love to see what the students are up to and use photos to show off the students' work. If there are students whose photos we cannot show publically, just let us know and we will ensure they are not made public. We love to post photos on social media and use them for marketing as well as fundraising for the program.



introduction to Design LAB

LEARNING OUTCOMES

- Students will more fully understand what Design LAB is and what they will be doing during the course of the program. They will be given a chance to ask questions if they are unsure of anything.
- Students will have a better overall understanding of what goes into creating the Built Environment.

MATERIALS NEEDED

- Digital Presentation 1
- Notebooks
- Marshmallows and Spaghetti
- Yardstick

This lesson is meant to give students a cohesive understanding of what they will be doing throughout the program. If they haven't completed their pre-test yet, they must do that before going any further with this lesson.

Present the introductory information found in the Powerpoint which is located at: <https://www.designlearnandbuild.org/education-resources>

After the powerpoint, see if any students have questions.

Once the students questions are answered, do the activity on the following page to give them a better understanding of how buildings are built. This is a messy activity, so prepare your classroom! You may choose to cover desks with newspaper or a drop cloth.

VOCABULARY

BUILT ENVIRONMENT: the man-made surroundings that provide the setting for human activity, ranging in scale from buildings and parks or green space to neighborhoods and cities that can often include their supporting infrastructure, such as water supply or energy networks

DESIGN PROCESS: an approach for breaking down a large design project into manageable chunks.

Architects, engineers, scientists, and other thinkers use the design process to solve a variety of problems.

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

TWO DIMENSIONAL (2D): A shape that has height, width, but no depth (it is flat)

THREE DIMENSIONAL (3D): A shape that has height, width, and depth (it is not flat)

TYPES OF BUILDINGS:

- **RESIDENTIAL** - places where people live
- **COMMERCIAL** - places where people buy and sell things
- **INSTITUTIONAL** - places where people get help, learn, or receive government services
- **INDUSTRIAL** - Places where things are made, disposed of, or processed
- **OPEN/PUBLIC SPACE AND PARKS** - Places where people play, exercise, or enjoy nature
- **MIXED USE** - Places that serve more than one function

marshmallow challenge



MATERIALS NEEDED:

- Sticks of spaghetti
- Large marshmallows
- Yard stick (to measure)

RULES:

- Your challenge is to build the tallest freestanding structure using ONLY spaghetti and marshmallows.
- The winning team is the one that builds the tallest freestanding structure measured from the table top surface to the top of the structure.
- The team's structure must stand on its own for measuring. Teams touching or supporting their structure will be disqualified.
- Teams can use as much or as little of the spaghetti and marshmallows provided. Extra materials CANNOT be provided.
- The entire marshmallow must be on the top of your structure. Cutting or eating part of the marshmallow will disqualify your team.

***NOTE: the students will probably have no idea what they are doing and that is kind of the point. They will be learning this stuff during the program! So allow them to fumble around, it is just to get them thinking about how structures are built and get them excited to build after they have some foundational knowledge of how to do so (and maybe even encourage them to pay attention during those classes).**

OPTIONAL ADDITIONS: Have one wall of the room assigned "triangles" and the other side assigned "squares". Ask students which they think is more stable, triangles or squares, and have them go to the wall they believe is correct. They can only use these shapes to create their structure.

types of buildings

Name: _____ Grade: _____

Date: _____ Teacher _____

■ ■ ■ **INSTRUCTIONS:** Color each building according to what building type it is.

Residential - YELLOW

Commercial - RED

Institutional - BLUE

Open/Public Space & Parks - GREEN

Mixed Use - COMBINATION OF COLORS



spatial awareness & light

LEARNING OUTCOMES

- Students will understand how they relate to the space they occupy and how different structures and natural elements exist in a space.
- 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.
- Students will understand their own bodies as they relate to the size and nature of different spaces.

MATERIALS NEEDED

- Open space

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.

ACTIVITY

The best way to understand Spatial Relationships is to experience them!

1. Explain to your students that they are going to measure some rooms today. But not with a yard stick, or even measuring tape - they are going to use their bodies to measure them!
2. Start by teaming students up and have them help measure each other.
3. Then, have each student stand up and put their arms out on either side. Did they know that they are as tall as they are wide? In other words, their "wing-span", or space from fingertip to fingertip with their arms out like that, is the same as their height.
4. Match some students of the same height up to test this theory out and show the class.
5. Once they know this, it will be easy to measure the classroom - just by putting their backs against the wall, with one fingertip against the connecting wall, and seeing how many times they have to "flip" to get to the opposite connecting wall.
6. See if they can find the measurements of the classroom by doing this. They may need help with some of the math.
7. If there is time, try this again in other rooms of the school.
8. Go through the discussion questions below.

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?

VOCABULARY

SPATIAL - HOW OBJECTS FIT TOGETHER IN A SPACE

spatial awareness & light

LEARNING OUTCOMES

- Students will understand that visual relationships are determined by light, shadow, edges and contrast. Design is experienced with human sensory perception.
- Students will understand that visual thinking is a key to awareness of the built environment.

MATERIALS

- Classroom Evaluation Worksheet
- Pencils

LIGHT ACTIVITY

1. Show the students examples of rooms that indicate a variety of lighting, color and textures (found in Digital Presentation 5). While discussing the examples, use words on the Classroom Evaluation Chart to describe how they might feel or what they see.
2. Have students score their classroom using the Classroom Evaluation. Have the students discuss how they feel about the various characteristics of their classroom and ways to improve any unfavorable ratings. This exercise will be done as a class.

VOCABULARY

NATURAL LIGHT: Illumination from a natural source, e.g., sunlight, moonlight, candlelight or light from a fire

ARTIFICIAL LIGHT: Light that is created by humans instead of by natural means, such as sunlight

CLASSROOM EVALUATION CHART

	VERY	SOMEWHAT	NEUTRAL	SOMEWHAT	VERY	
LIGHT						DARK
NEW						OLD
NOISY						QUIET
SMALL						LARGE
MULTI-PURPOSE						SINGLE-PURPOSE
BOLD COLORS						SOFT COLORS
OPEN SPACE						CLOSED SPACE
SOFT LIGHTING						HARSH LIGHTING
UNFRIENDLY						FRIENDLY
CITY						COUNTRY
LIKE						DISLIKE
PUBLIC						PRIVATE
ROOMY						CROWDED

structures & scale

LEARNING OUTCOMES

- Students will know different types of structures and understand the forces that they are built to withstand.

MATERIALS NEEDED

- Digital Presentation 3
- Notebooks
- Pencils
- Open Space

This week and the next week will be physically active weeks, so make sure there is plenty of room in your classroom for students to move! It is important to get your students out of their seats and actually FEEL how structures work against different forces.

Go through each of the structures on the next page (also found in the Powerpoint) and have your students act them out. Use something to show them the force of the load, even if it is just your hand pushing where the load puts pressure on the structure. In addition, test out compression and tension and really put emphasis on these forces that work against structures.

VOCABULARY

STRUCTURE - parts or elements of a built object and how they are combined and organized to hold the object together and keep its shape

LOADS - natural forces that work against structures (gravity, weight, movement, vibrations, weather events, movement of the earth)

SCALE - the ratio of a distance or size on a drawing or a model to the corresponding actual distance.



SPACEFRAME



COMPRESSION



CANTILEVER



TENSION/TRUSS



COLUMN

structures

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.

TENSION:



A pulling, stretching, and expanding action

COMPRESSION:



A pressing, pushing, squeezing, and compacting action

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.*

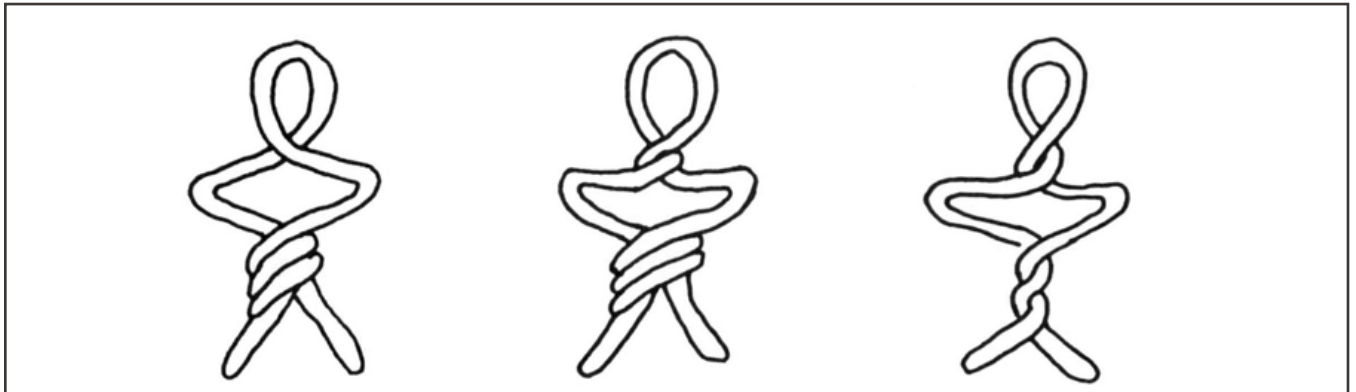
scale figure activity

In this activity, students create a figure that 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.

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 gathering 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.



sustainability & materials

LEARNING OUTCOMES

- Students will understand what sustainability means to the built environment and different ways to build a sustainable building.
- Students will learn about alternative ways in which the built environment can help the natural environment.
- Students will understand the impact that their behaviors have on the environment and which behaviors are more sustainable.

MATERIALS NEEDED

- Digital presentation 4
- Notebooks
- Pencils
- Poster board
- Markers / crayons

Mounting environmental concerns increase the importance of thinking about how sustainable practices and products affect our lives. There is growing popular interest in sustainable living and more ways to adopt sustainable practices in our lives.

This activity introduces students to the basic ideas behind being “green” or living in a sustainable way. Students discuss the concept, brainstorm ways to practice it in their own lives, and then market the idea to their peers.

There are two main aspects to sustainability: sustainable design and sustainable actions.

1. SUSTAINABLE DESIGN is an approach to building that minimizes harmful effects on human health and the environment. That is accomplished by:

- Creating products/buildings that have the least negative impact on the health of people, the economy of an area, and the environment.
- Meeting the needs of present generations without depleting the ability of future generations to meet their own needs.

2. SUSTAINABLE ACTIONS are choices you make which have a positive impact on the environment. For example:

- Wash your face and brush your teeth without letting the water run constantly.
- Decide what you need from the refrigerator or freezer before you open the door.
- Sell or donate items that are in good shape to keep them out of the landfill.
- Bike, walk, or use public transportation instead of driving in order to save energy.
- Turn off the lights/TV/stereo when leaving the room.
- Recycle bottles, paper, etc.
- Reuse scrap paper for notes
- Put lunch in a reusable bag and not a plastic bag.
- Take shorter showers.

VOCABULARY

SUSTAINABILITY - ability to continue a defined behavior indefinitely

RENEWABLE - relating to a natural resource, such as solar energy, water, or wood, that is never used up or that can be replaced by new growth indefinitely

ORGANIC - of, relating to, or derived from living matter

PERVIOUS - allowing water to pass through; permeable

SOLAR POWER - power obtained by harnessing the energy of the sun's rays

SUSTAINABLE DESIGN - an approach to building that minimizes harmful effects on human health and the environment.

understanding sustainability



- 1) Brainstorm with your students what it means to be sustainable (or green, eco-friendly, etc) and write their responses on the board.
- 2) Ask your students why we need to protect the environment?
- 3) Go through the digital presentation on Sustainability
- 4) With the students, brainstorm ways to “protect” or “conserve” the environment. What are things they can do at home? What are things they can do at school? Keep a running list on the blackboard or whiteboard. Challenge the students to think about how valuable it is for even one person to recycle their soda bottle. Is this worth it? Why? Some students may argue that they have little say in how environmentally friendly their home or school is. Encourage them to think of helpful things they can do without their parent’s or school administration’s permission.
- 5) Assign students to share what they have learned today by creating a poster, newsletter, comic strip, or flyer that explains one or a few of the ways the built environment can aid the natural environment. Maybe that means building a wall that seconds as a recycling center, a green roof that helps catch rainfall, a creative way to incorporate solar panels, or even a roof that sports homes for animals like bats or owls.

This is meant to be a creative lesson, so let students explore and share what interested them the most about sustainability in the built environment. This could also educate their peers about what sustainable design is or certain aspects of it.

- ■ ■ Before your students leave, remind them that they will be building models at the end of this program to show off everything they learn and they will have the chance to make a sustainable choice with what they use to create them.

They can use new materials like unused paper, or they can make a sustainable choice and use scraps of paper or magazine paper. They can also start collecting materials now (if they haven’t already) and keeping them somewhere in the class. Any clean piece of garbage could come in handy for the models - we have seen everything from wine bottle cork chairs to old fruit cups turned into tables. Looking at these materials in a new and exciting way is a chance they have to use their creativity and make a difference!



sustainability in the built environment

OPTIONAL ADDITIONAL INFORMATION

A “Green Structure” does not mean the structure is colored green. A “green” way of creating structures 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 structure. To keep nature happy, healthy and friendly, choose to be considerate in the following ways:

1. RESPECT THE EARTH. Place structures 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 structures so it can be used for other needs in the structure 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 structures 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. Structures 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 structure.

4. RESPECT THE SUN. Let the sun help light the inside of your structures instead of using lots of electric lights. To collect heat and light for winter face the structure 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 structure 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 structure 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 structures on the land in places that protect them from cold wind in the winter. Plant evergreen trees on the side of the structure where they can block the winter winds. Try to let the breezes get into or around the structure 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 structures 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. Structures 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.

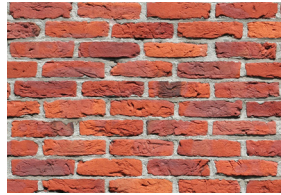
– Joel Elliott Stout, AIA, Committee On The Environment, 11/17/2000 (adapted)

material examples

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. 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 that 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



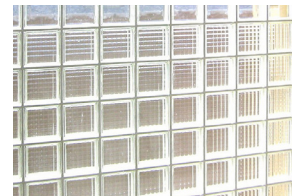
SIDING: ALUMINIUM, VINYL, OTHER



WOOD



STUCCO



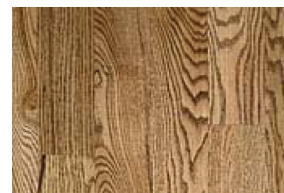
GLASS

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



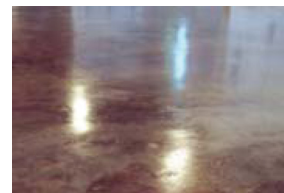
HARDWOOD



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.

RESOURCE EFFICIENCY can be accomplished by utilizing materials that meet the following criteria:

- **RECYCLED CONTENT:** Products with identifiable recycled content, including postindustrial content with a preference for postconsumer content.
- **NATURAL, PLENTIFUL OR RENEWABLE:** Materials harvested from sustainably managed sources and preferably have an independent certification (e.g., certified wood) and are certified by an independent third party.
- **RESOURCE EFFICIENT MANUFACTURING PROCESS:** Products manufactured with resource-efficient processes including reducing energy consumption, minimizing waste (recycled, recyclable and or source reduced product packaging), and reducing greenhouse gases.
- **LOCALLY AVAILABLE:** Building materials, components, and systems found locally or regionally saving energy and resources in transportation to the project site.
- **SALVAGED, REFURBISHED, OR REMANUFACTURED:** Includes saving a material from disposal and renovating, repairing, restoring, or generally improving the appearance, performance, quality, functionality, or value of a product.
- **REUSABLE OR RECYCLABLE:** Select materials that can be easily dismantled and reused or recycled at the end of their useful life.
- **RECYCLED OR RECYCLABLE PRODUCT PACKAGING:** Products enclosed in recycled content or recyclable packaging.
- **DURABLE:** Materials that are longer lasting or are comparable to conventional products with long life expectancies.
- **INDOOR AIR QUALITY (IAQ)** is enhanced by utilizing materials that meet the following criteria:
 - **LOW OR NON-TOXIC:** Materials that emit few or no carcinogens, reproductive toxicants, or irritants as demonstrated by the manufacturer through appropriate testing.
 - **MINIMAL CHEMICAL EMISSIONS:** Products that have minimal emissions of Volatile Organic Compounds (VOCs). Products that also maximize resource and energy efficiency while reducing chemical emissions.
 - **LOW-VOC ASSEMBLY:** Materials installed with minimal VOC-producing compounds, or no-VOC mechanical attachment methods and minimal hazards.
 - **MOISTURE RESISTANT:** Products and systems that resist moisture or inhibit the growth of biological contaminants in buildings.
 - **HEALTHFULLY MAINTAINED:** Materials, components, and systems that require only simple, non-toxic, or low-VOC methods of cleaning.
 - **SYSTEMS OR EQUIPMENT:** Products that promote healthy IAQ by identifying indoor air pollutants or enhancing the air quality.

plan, section, and elevation

DRAWING ACTIVITY

LEARNING OUTCOMES

- Students will draw a plan, a section, and an elevation to understand how this applies to the built environment.

MATERIALS NEEDED

- Digital Presentation 5

FOR 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.)

FOR EACH STUDENT:

- a pencil
- a blank sheet of paper oriented horizontally and creased in thirds

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

- 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.

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.



ELEVATION

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**.



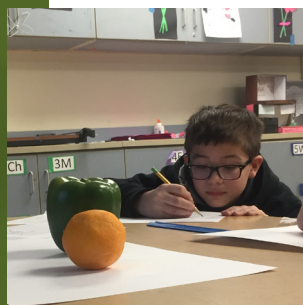
PLAN



SECTION

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.



your plan, section and elevation sketches

Sketch the plan you have for YOUR SPACE now, as an elevation, a plan, and a section. The sketches don't have to be professional quality – and they likely won't be! It is good to plan your space out before you begin to build.

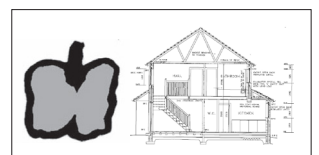
ELEVATION



PLAN



SECTION



understanding community

LEARNING OUTCOMES

- Students will understand that social structure, culture and the built environment have a direct influence on one another.
- Students will work in teams and as a total class to incorporate their buildings into the “community” in a logical manner.
- Students will understand the types of buildings and places and their logical proximity to each other.

MATERIALS NEEDED

- Building Cut-Out Pages
- Markers/Crayons
- Pencils
- Notebooks
- Prepared Streetscape
- Glue/Tape
- Scissors

BACKGROUND

Social structure, culture and the built environment have a direct influence on one another. When we decide where we are going to build a building, it is essential to think about the impact it will have on the community around it. Climate and the natural environment also influence design decisions and they must be at the forefront of building decisions as well to ensure we are building responsibly.

This week, students will start to look at their own community and build a community as a class. This will be a good warm-up to their models, which will be based on something they think their community needs.

ACTIVITY

Preparation: Create a “Streetscape” for the buildings your students make. It could be tape on the ground, or on a table, but identify streets (tape works well for this) and intersections. If you want to get more in-depth, add trees and waterways.

- 1) Discuss the parts of their city with the students. Have the students make a list of examples of each of the following eight categories as a class. List the categories and examples on the chalkboard:

a. Places to live	d. Food/growing & production	g. Places to play
b. Transportation	e. Places to work	h. Natural areas
c. Government buildings	f. Places to buy things	
- 2) Sample questions for discussion:
 - What do you think is important in your city/town to keep it operating well for the people who live and work there?
 - What parts of your city/town remain from the past?
 - What kind of places or buildings does your city/town need that it does not have now?
 - Are there features that make certain buildings recognizable from the outside?
- 3) Divide the class into approximately equal numbers of students for each category. Allow the students some freedom to select the category they like.
- 4) Each student should select one place (building type or area) to create. Use the building cut-outs on the following pages. Have students color them in before they cut and build.
- 5) Once the buildings have been created, have the students as a class figure out the best placement for their buildings. Facilitate discussion about where, but let them make the decisions so they understand what goes into city planning.
- 6) Once the community is complete, if there is time, give them a chance to make flowers, trees, benches, or anything else they think their community may need. Are there any buildings missing?

Please photograph this process & email us a few at CLubbers@architecturecincy.org

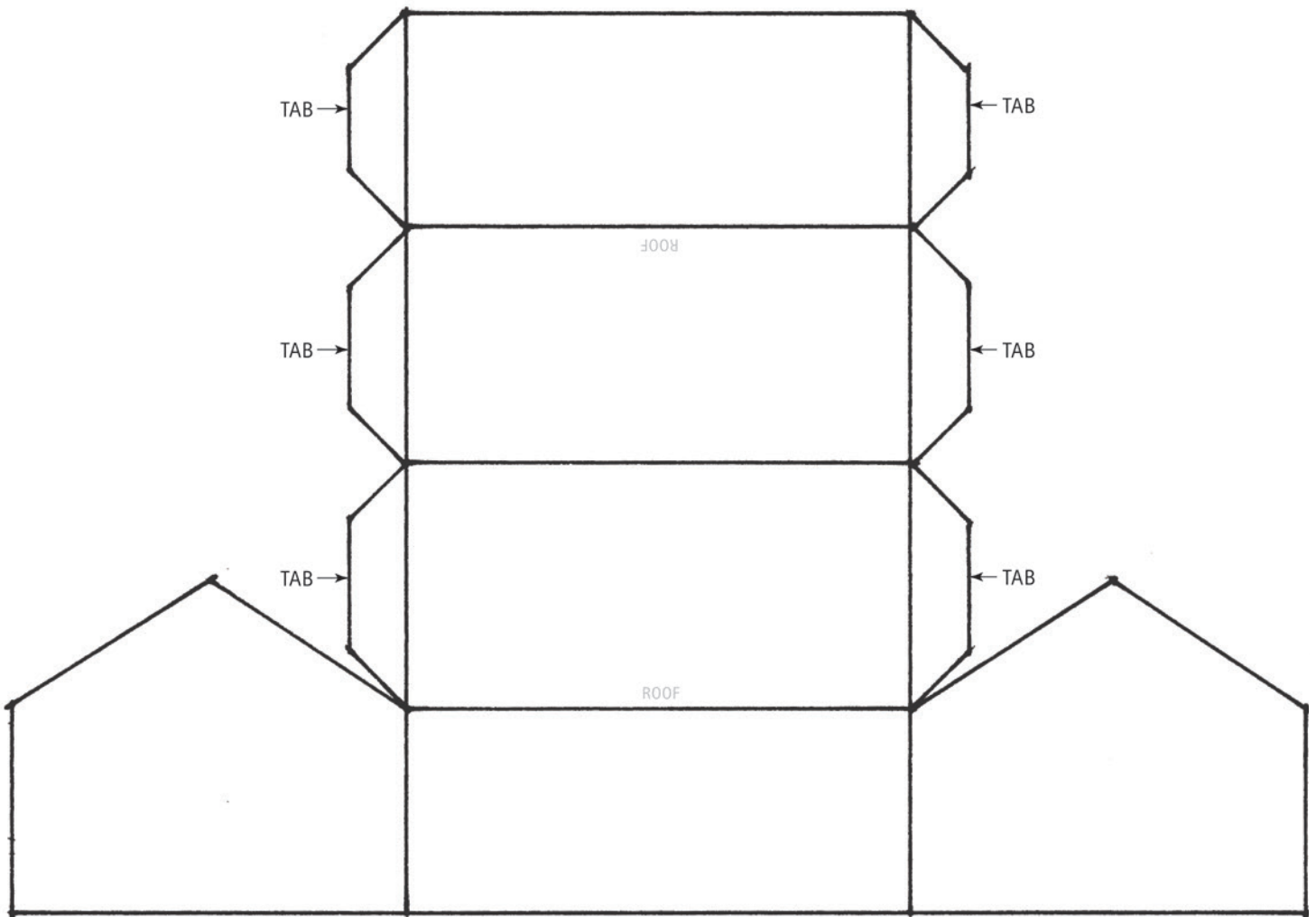
VOCABULARY

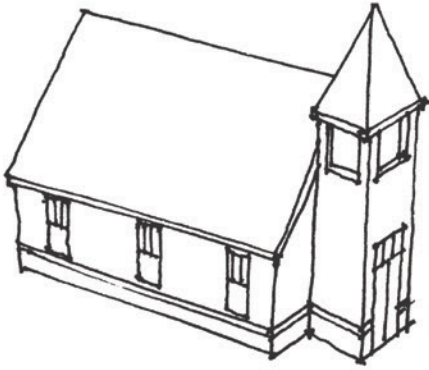
COMMUNITY - a group of people living in the same place or having a particular characteristic in common; a feeling of fellowship with others, as a result of sharing common attitudes, interests, and goals

ORDER - the arrangement and organization of elements to help solve visual and functional problems.

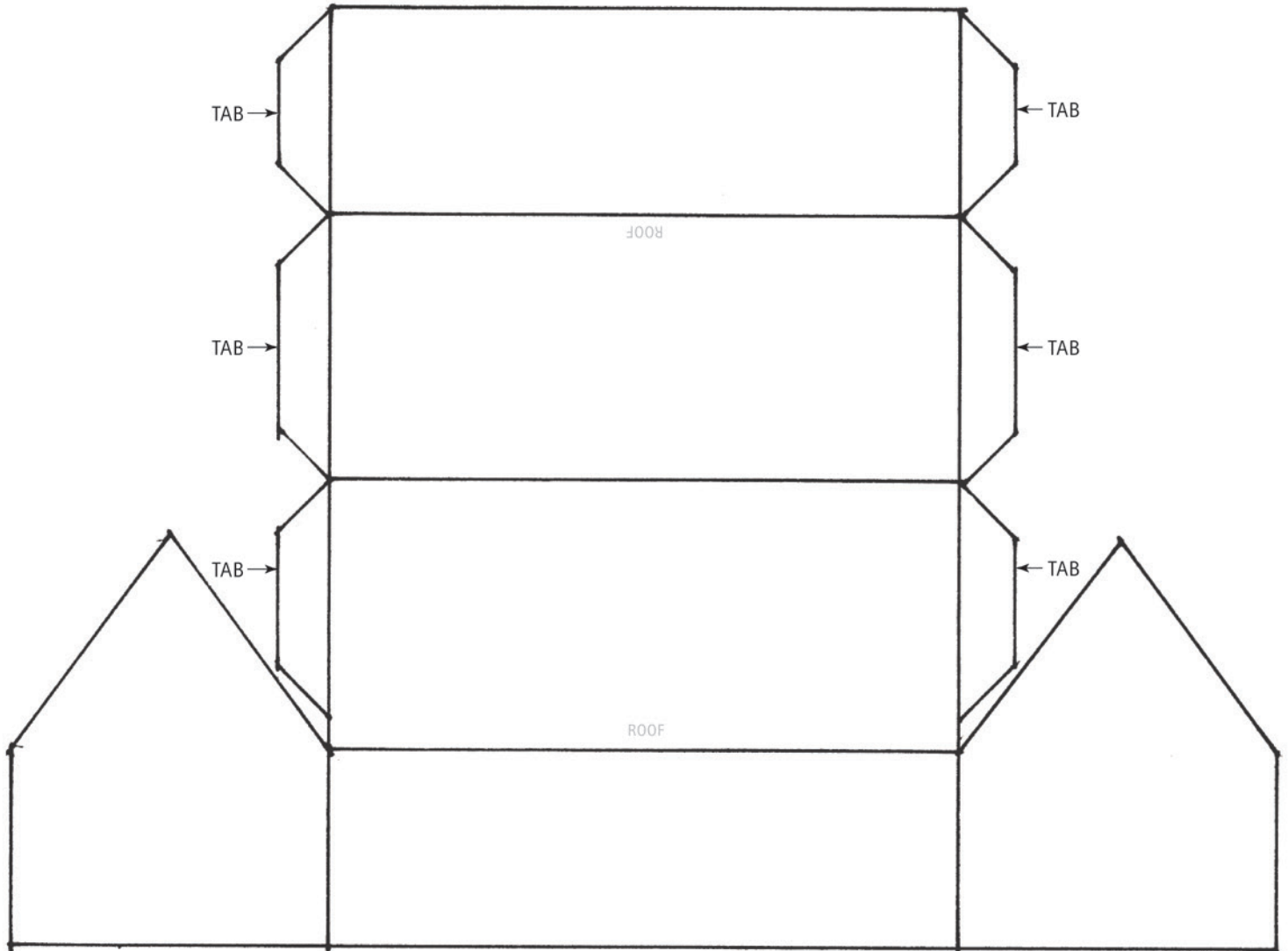
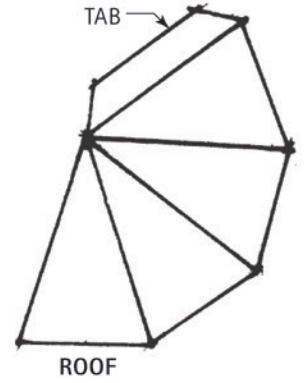
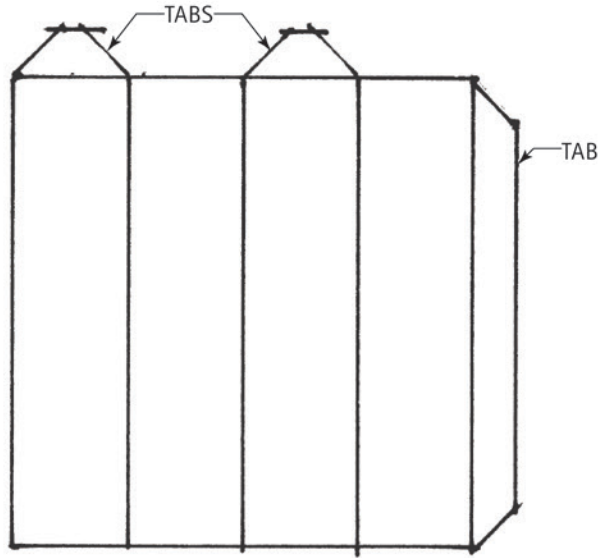


SAMPLE IMAGE



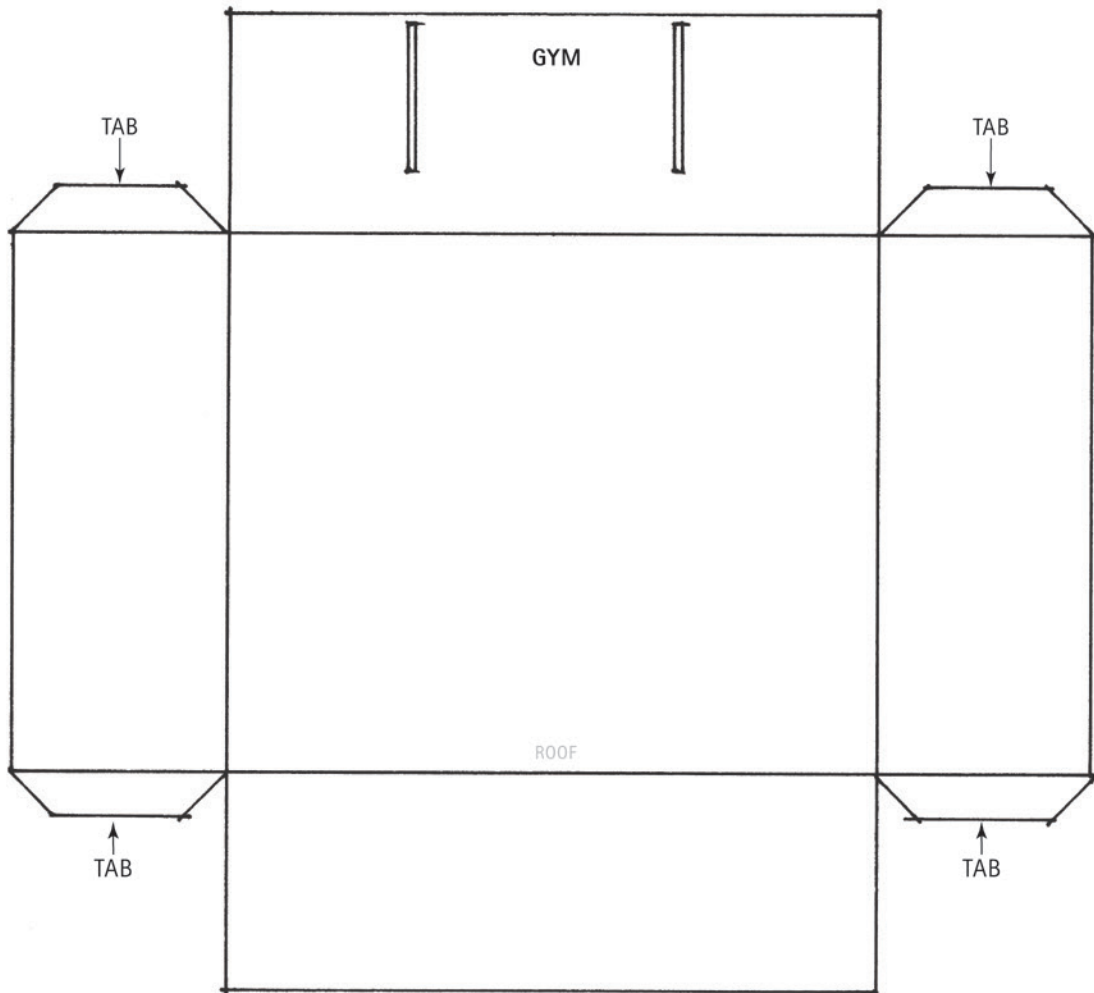
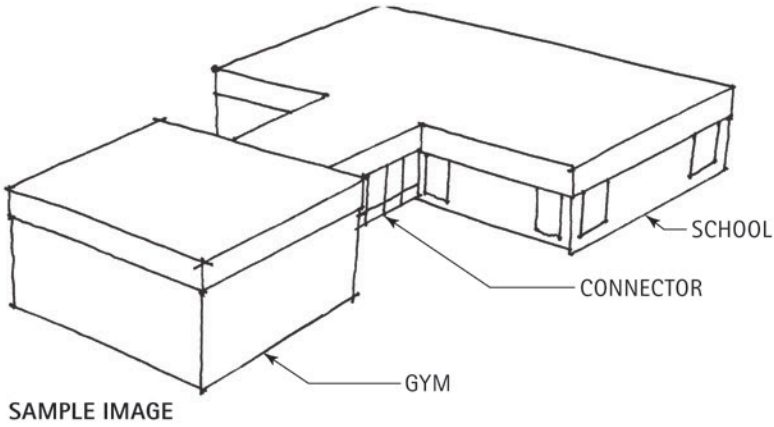


SAMPLE IMAGE

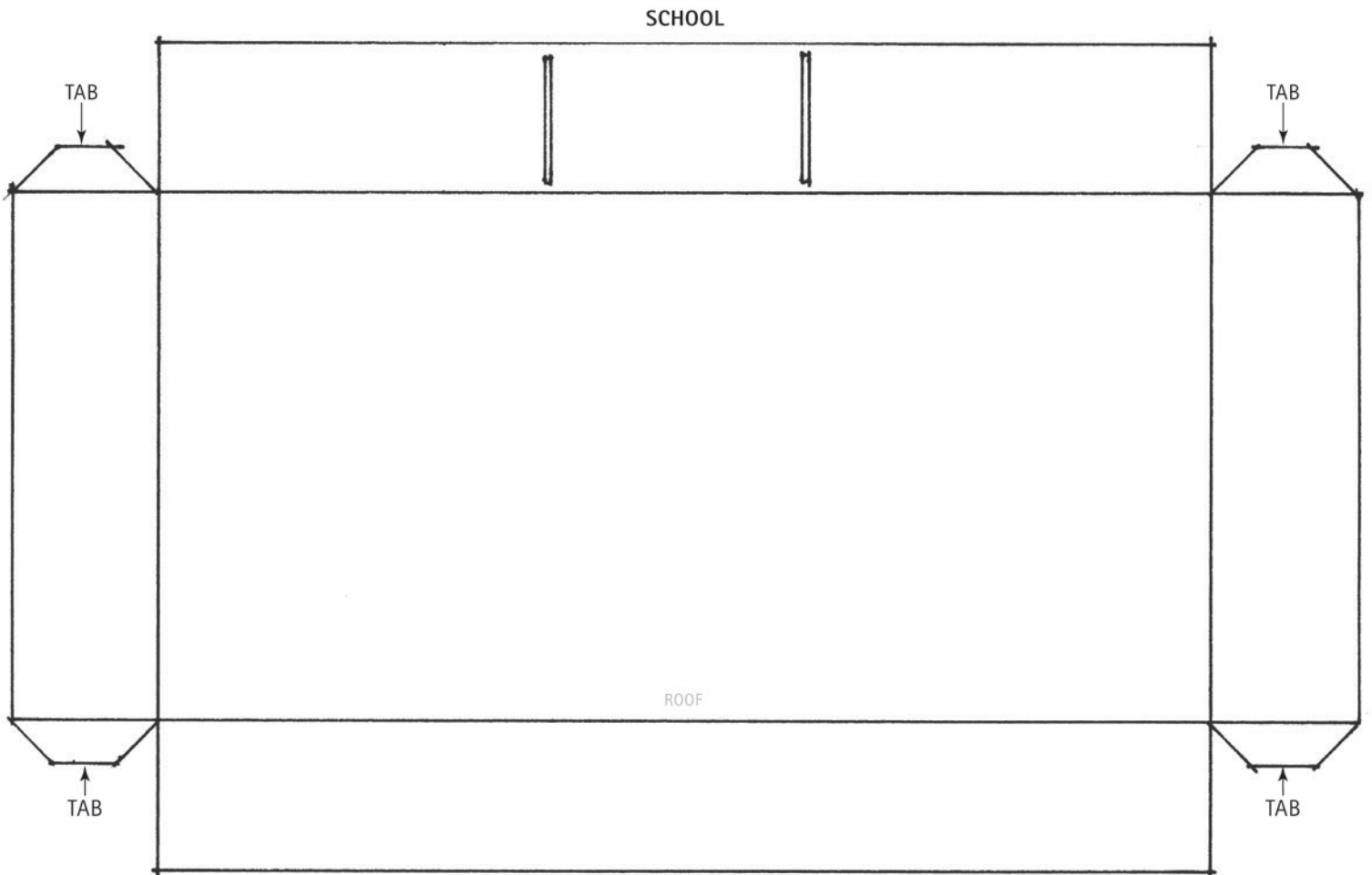
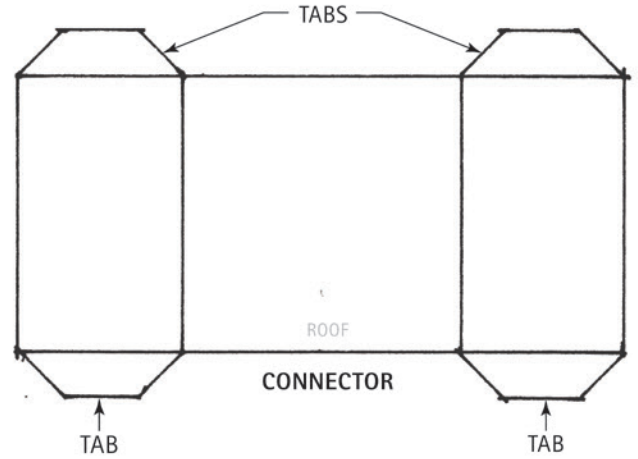
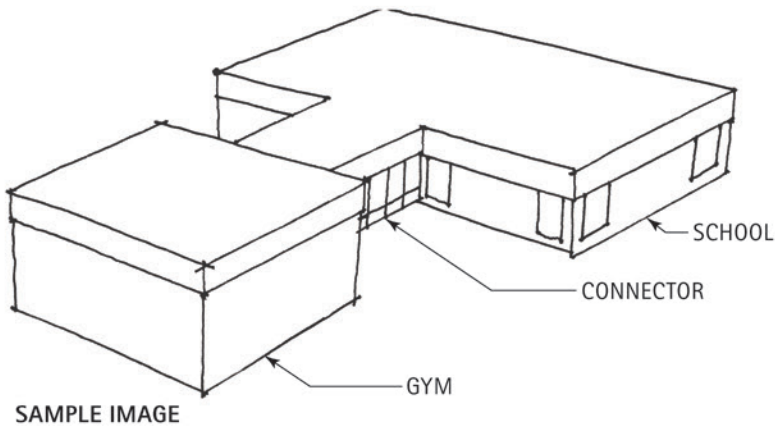


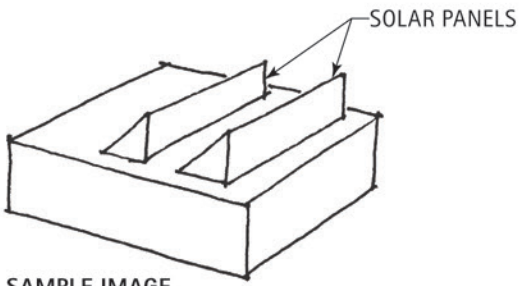
PATTERN #3: a gym, to be added to an elementary school to make a high school

BUILDING CUTOUT

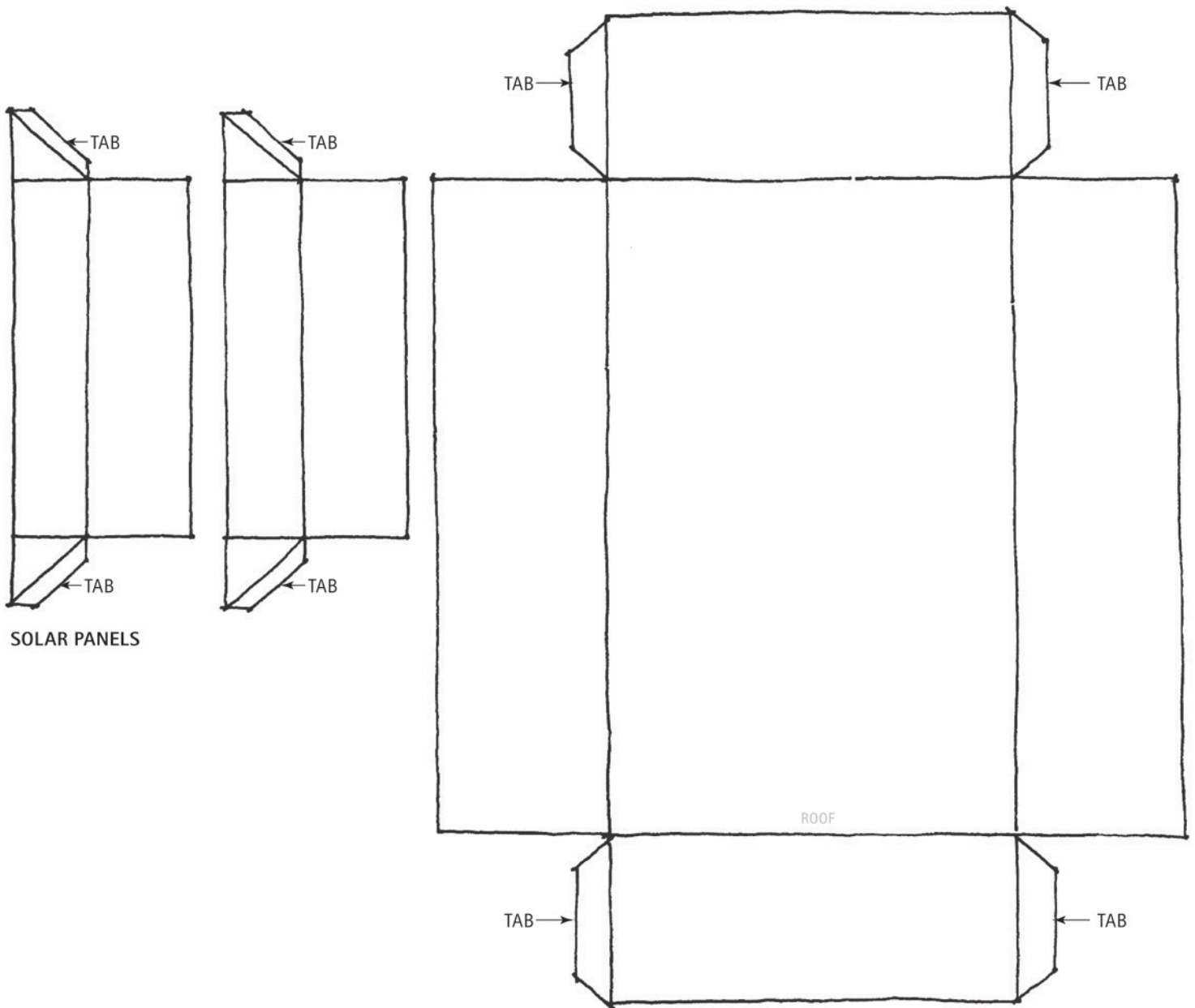


SCALE: 1/8" ≈ 1'-0"

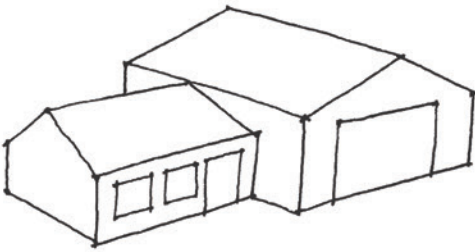




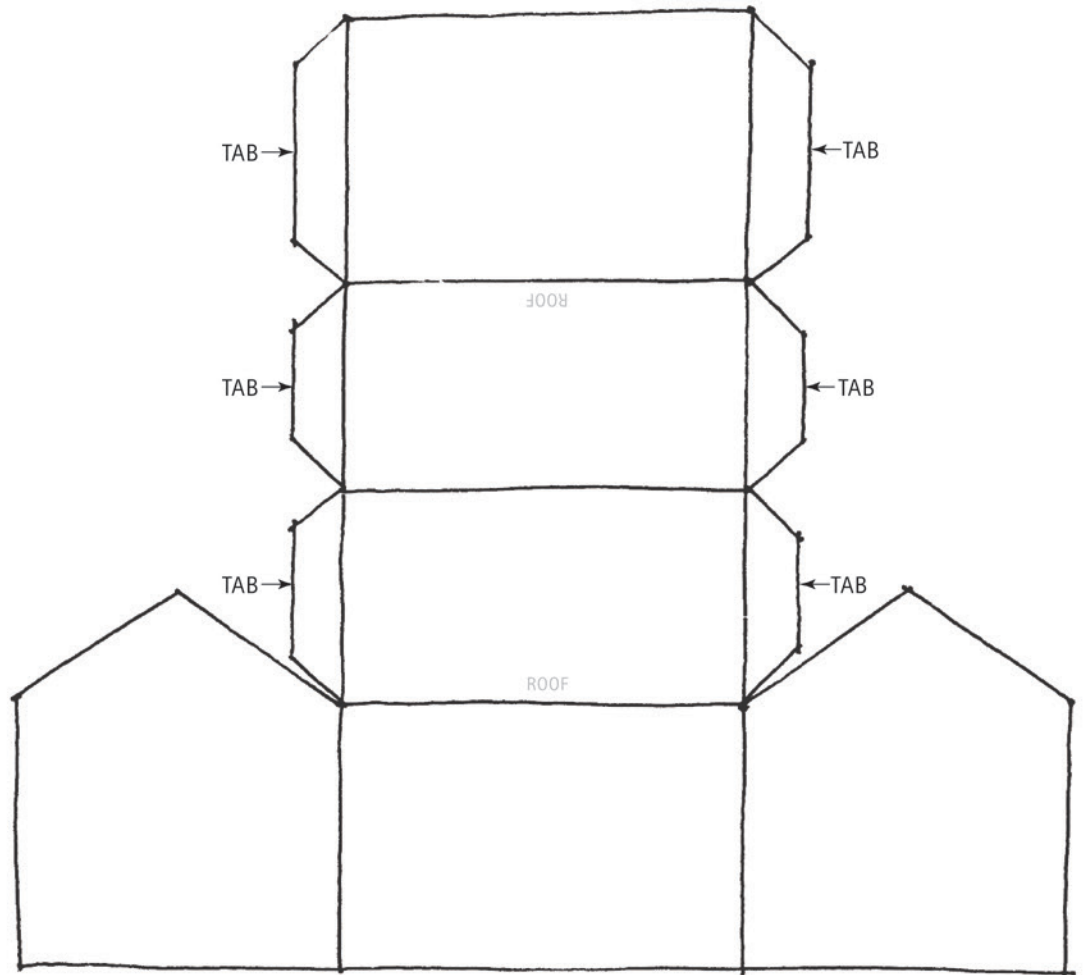
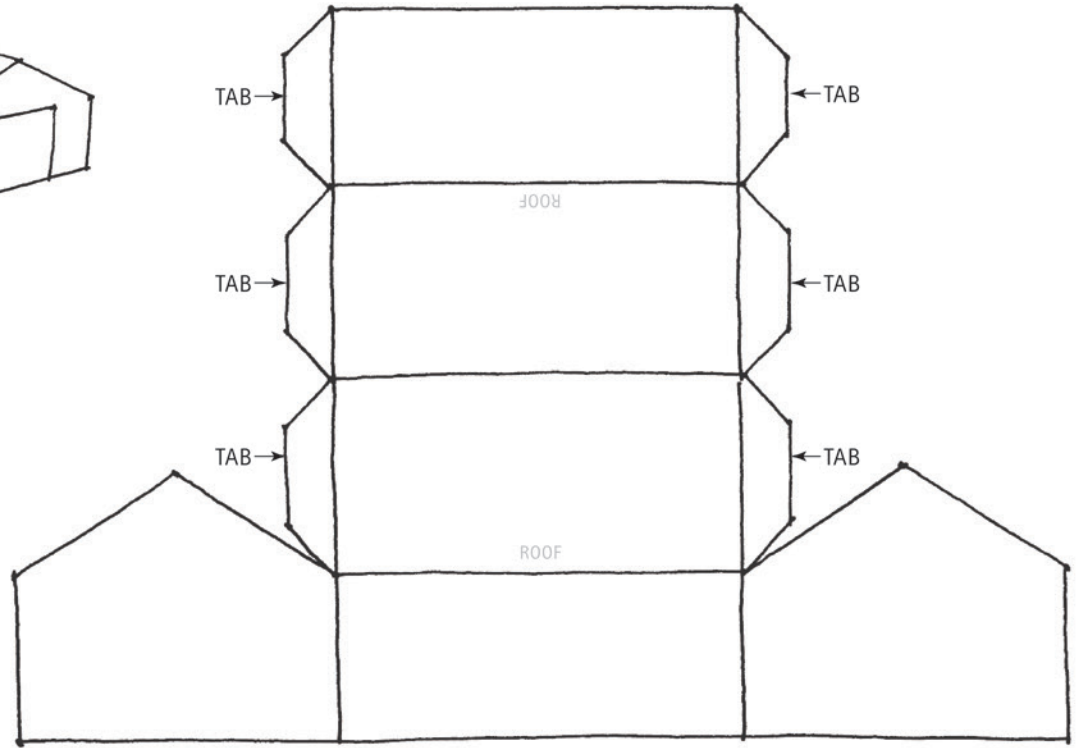
SAMPLE IMAGE



SOLAR PANELS



SAMPLE IMAGE



your community: what would you change

Name: _____ Grade: _____

Date: _____ Teacher: _____

What do you believe is the biggest thing missing or needed to be replaced/rebuilt in your community?

Why did you choose this? _____

Who is your client? _____

Where will your site be? _____

(Remember: the site has to be a place that exists in your community)

What Land Use Category will your site be? (circle one):

- Residential Commercial Industrial Institutional Open/Public Space & Parks Mixed Use

My building is located in a/an _____ area:



Urban

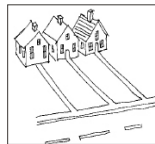


Suburban



Rural

My building is:

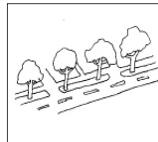


Set Back From the Street

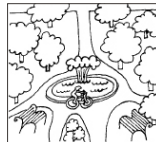


Close to the Street

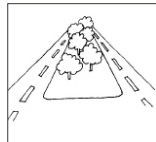
My building is located on a:



Tree-lined Street



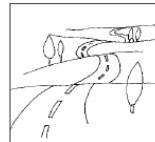
Park



Boulevard



Busy Highway



Curvy Road



Other? Draw it.

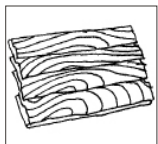
What types of buildings are near your building?

- Places of Worship Businesses Factories Schools Other? Write it _____
Office Buildings Hospitals Houses Stores None

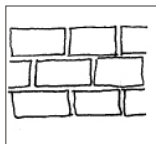
What types of transportation can be used to access your building? (circle all that apply):

- Parking Lot Bus Stop Metro Stop Bike Path Sidewalk

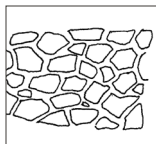
My building is made out of _____ (circle all that apply):



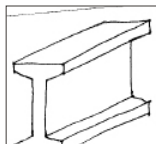
Wood



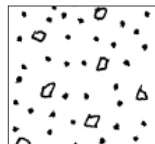
Brick



Stone



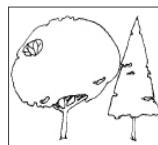
Metal



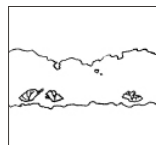
Concrete

How will this building improve your community?

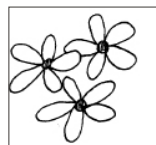
The plants that are found near my building include (circle all that apply):



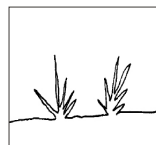
Trees



Bushes



Flowers



Grass



Other? Draw it.

understanding client & site

LEARNING OUTCOMES

- Students will understand what a client is in regards to the built environment and the process that goes into selecting your client.
- Students will understand what a site is in regards to the built environment and the process that goes into selecting your site.

MATERIALS NEEDED

- Digital Presentation 2
- Client & Site Exercise Worksheet
- Notebooks
- Pencils
- Crayons

Use the Digital Presentation 2 to guide you through these questions for your students and give them some examples.

WHO IS A CLIENT?

- A client, in the built environment, is someone or something that a structure or area is built for. Each client has needs, so you must make sure you understand them before you can build them the perfect building.

WHAT IS A SITE?

- A site is the place you plan to build on for your client. It must help meet the needs you have identified for your client.

Remind your students that before they begin building their models, they will need to decide who their client is and identify their needs. These clients will all be in their community, so they can start thinking now about who they want to help in their community.

Use the worksheet on the next page to understand the relationships between Clients & Sites.

VOCABULARY

CLIENT - a person or organization using the services of a professional person or company

SITE - an area of ground on which a town, building, or monument is constructed

client & site exercise

Name: _____ Grade: _____

Date: _____ Teacher: _____

CLIENT

For today, this is your client:



CLIENT'S NEEDS

Please list all of the needs and wants your client has:

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Name: _____

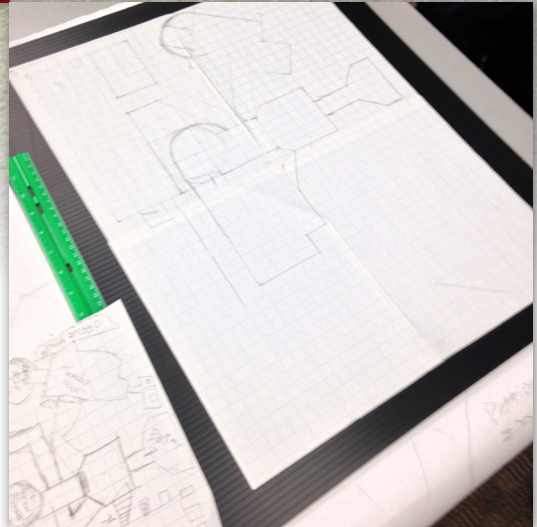
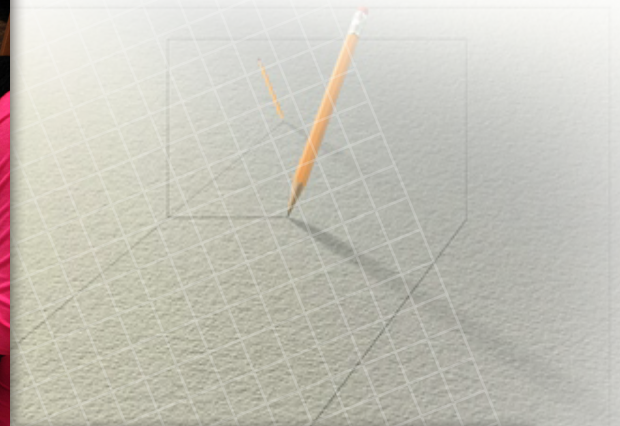
PERFECT BUILDING SITE

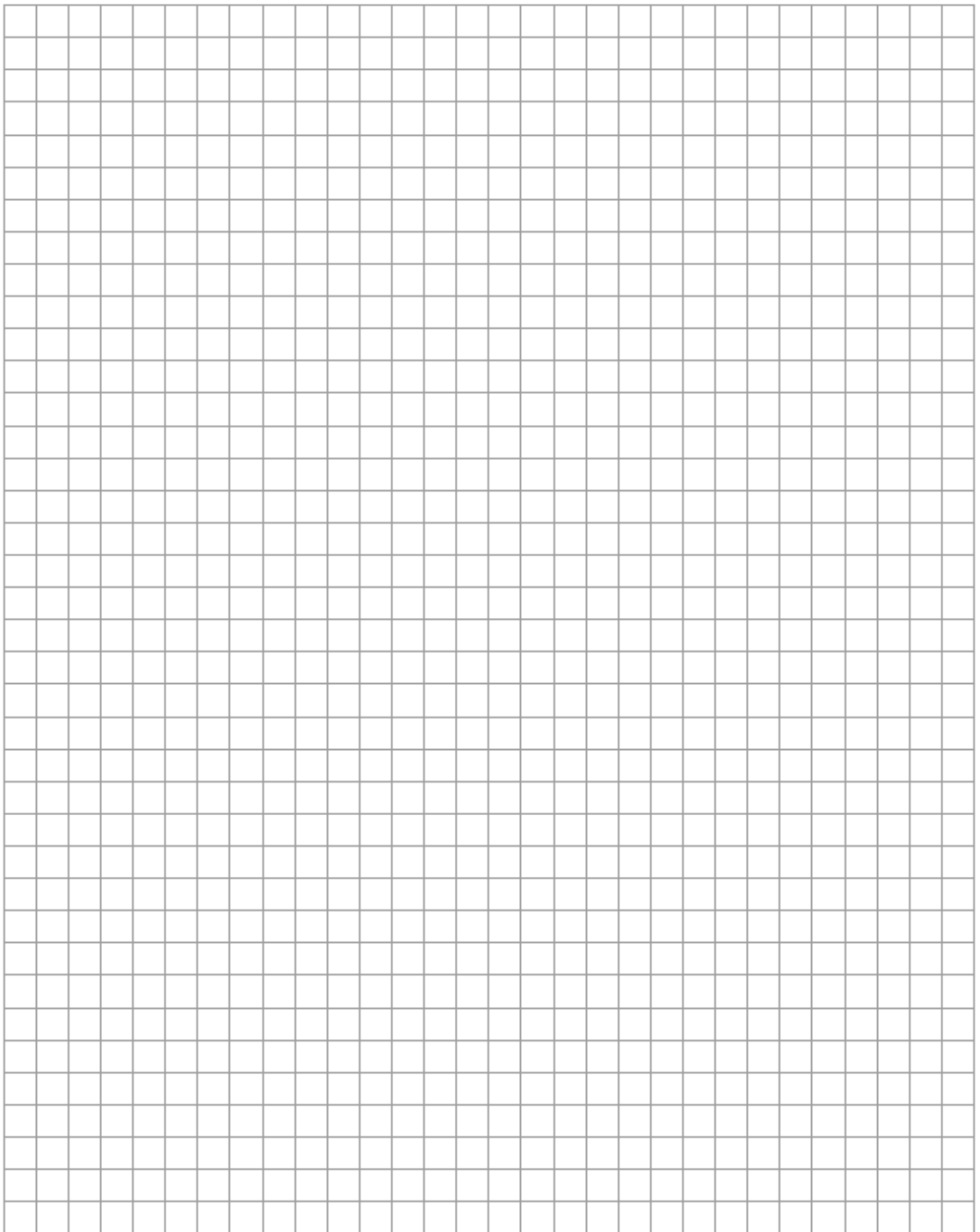
Once you have identified your client's needs, draw the perfect building site to meet those needs. Is it a beach, a backyard, an alley, or Mars? Be as creative as you would like:

plans & sketches

From this week on, it is work time! Before your students actually begin building, have them talk through and sketch through some plans. They should draw what they plan to build and create floor plans. The following page has grid paper you can print out so you do not have to purchase grid paper.

Do your best to keep the class building together. For example, build the bases together. The bases may be covered with green carpet if it is going to be a garden or maybe gray construction paper if it's a building that will go on a concrete lot - but it will make the project much easier if you can do these steps as a group.





the design challenge

LEARNING OUTCOMES

- Students will understand the impact on communities and the environment of material choice when building.
- Students will break into teams and decide what aspect of their community they want to improve.

MATERIALS

- Digital Presentation 6
- *Your Community: What Would You Change?* Worksheet
- Pencils

This is an important lesson, as it will be the week that students decide on what their building will be.

When people started to live together in groups, they required housing and/or buildings that were portable and made from light materials (like a teepee) for their nomadic life. These buildings were temporary and did not have a long life. Permanent cities required stronger building materials like wood, brick and stone. Are some materials used more than others for particular types of buildings?

Different communities also need different types of buildings. Some communities need a new library, some need an animal shelter, and some need more parks or gardens. As your students decide on what they will build, make sure they are addressing the needs of their own community.

VOCABULARY

RENEWABLE MATERIALS: Materials that can be created infinitely, like bamboo, which grows fast and uses a very small amount of resources and nutrients to grow.

EFFICIENCY: the ability to avoid wasting materials and energy; the ability to do things well, successfully, and without waste

ACTIVITY

1. Talk to your students about the Three Little Pigs - did they make good choices in their building materials?
2. Remind them of the community activity they did a couple weeks ago. Do a short brainstorm about different things their community needs and go through the Digital Presentation 6.
3. Let them know that they will be broken into groups and will build a building that they believe is needed in their community. So their community is their main client, but they could have specific clients within that group - maybe the homeless of their community need a shelter, or the stray animals need an animal shelter. They could also have the community as a whole as their client if they want to build a park or a garden.
4. They must build a building. If they believe a garden is needed, maybe their building would be a greenhouse that sits in the garden. Aside from the model dimensions, this is the only requirement for their design.
5. No matter what building they choose, they will have to make decisions about materials. Each material comes with a choice, go through the Powerpoint about different materials and how to choose better/best options.
6. Break them up into groups and have them begin the *"Your Community: What Would You Change?"* worksheet. When they are choosing materials, urge them to consider the environment in their decisions.

INFORMATION, TIPS, & RESOURCES

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

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 - <https://www.archdaily.com>
 Architectural Digest - <https://architecturaldigest.com>
 Design Boom - <https://www.designboom.com>
 Dezeen - <https://www.dezeen.com>
 Pinterest - <https://www.pinterest.com>
 YouTube - <http://www.youtube.com>

3D MODELING

SketchUp 3D Digital Modeling:

<https://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 "DLAB2024" 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.

mini design lab exhibit

We are limited this year to one project per classroom at the Design LAB Exhibit. This has created an opportunity for classes to decide which project will represent them at the exhibit. This can be done on a small scale (ie. in a classroom during class time) or a large scale, if you want to make it a school-wide event or even invite parents. This is up to the teacher's discretion, as they will be the ones implementing it.

Students should be the ones deciding which project will move on the exhibit, but the teacher can determine how the voting process will work. They can use a rubric sheet (on the following page) to judge the projects in a similar way that the judges at the exhibit will during the Jury Review Night. This team will get the tri-fold board to prepare for the Design LAB Exhibit. Make sure students understand that the winning team will be representing their entire class at the library's exhibit, so they will want to send the best project there, not necessarily their best friend's project.

Have fun with this aspect of the project and give your students a chance to celebrate all of their hard work!



architecture and design vocabulary

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

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"

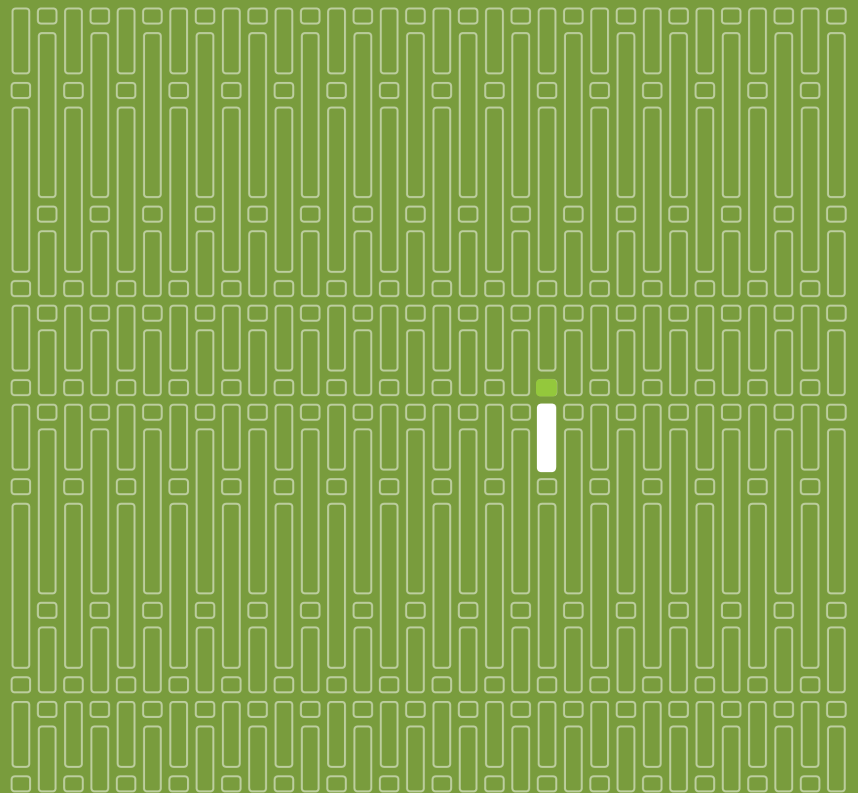
TWO-DIMENSIONAL (2-D): A shape that only has two dimensions and no thickness (x, y)

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

■ ■ ■ EXHIBIT & COMPETITION
requirements



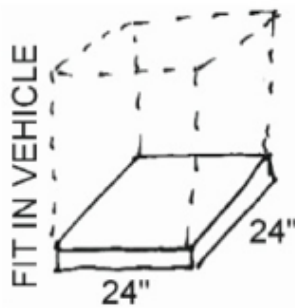
build awareness ■ build knowledge ■ build community

design lab exhibit



DESIGN LAB EXHIBIT & REQUIREMENTS

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



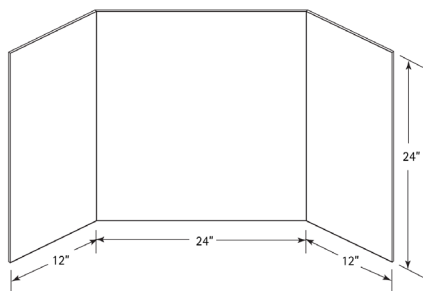
DESIGN LAB EXHIBIT ENTRIES

Each classroom may participate in the Design LAB Exhibit by creating **both**:

- 1.) a 3-dimensional tabletop architectural **model** not to exceed 24" x 24" (base)
- 2.) a 24"h x 48"w **tri-fold panel** (*provided by Design LAB*)

.....

Each class will submit the project that the students vote to send to the exhibit.



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 project will be selected for the Design LAB Exhibit, the student teams can use the tri-fold display to tell the story of their journey.

DESIGN LAB EXHIBIT 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: _____ Grade: _____

Student Designer / Design Team:

Name: _____ Grade: _____

Name: _____ Grade: _____

Name: _____ Grade: _____

Name: _____ Grade: _____

Classroom Volunteer Name(s) & Company / Organization: _____

Client: _____ Location / Site: _____

REQUIRED: DESIGN LAB EXHIBIT ENTRY LABEL

- Entry Label: Turn in at time of drop-off
- Project Description: Title of model and description needs to be on the front of the tri-fold somewhere.

.....

**ALL PROJECTS MUST BE LABELED AT THE TIME OF SUBMISSION.
PLEASE USE ENTRY LABELS PROVIDED IN THIS PACKET.**

project submission

INFO & REQUIREMENTS

DESIGN LAB 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–8th 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.

CREATIVE WRITING: The **Project Description** is your students' chance to describe to the jurors and exhibit visitors how they approached the challenge, their sustainable 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 space.

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.

RECEPTION & AWARDS: 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. Afterward, all projects are to be removed from the exhibition space.

PROJECT COLLECTION: Projects will be checked in the day before the exhibit begins and checked out the day of the awards ceremony. If you cannot be at the awards ceremony, please designate a parent to collect your class' project. We do not want to throw away any students' work, but must dispose of projects that remain uncollected after the awards ceremony.

CERTIFICATES: Educators will be offered digital or printed certificates of participation for their students. The digital certificates will be emailed out and the printed ones will be available for pick-up at the project drop-off and the awards ceremony.

design lab exhibit

RECOGNITION

All Design LAB Exhibit entries will be reviewed and evaluated by a Jury Panel of local professionals. The jury will review entries in these grade categories: K-2, 3-5, & 6-8. 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 LAB Exhibit Program. 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 gathering 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 gathering 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 gathering 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 LAB Exhibit Week for the general public to vote on a favorite design.*

SOCIAL BUTTERFLY: *The models who do not make it to the library will be displayed on a social media page where people can "vote" for them. The project with the most votes will win this award and it can be displayed at the library on the day of the awards ceremony.*

POLISHED PROFESSIONAL: *On the day of the awards ceremony, the group or individual who does the most outstanding job of presenting their award will win this award.*

DESIGN LAB LEARN + BUILD **EXHIBIT 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 _____

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