CITIZEN SCHOOLS

RESOURCE GUIDE

Design It!

A resource guide for designing high quality architecture apprenticeships

Prepared by:
Jan Ham and the National Apprenticeship Shop

Version 1.0 **August 2005**

Written by Jan Ham with assistance from Polly Carpenter AIA, based on the work of Learning by Design in Massachusetts, a children's design education program of the Boston Society of Architects.

Overview

Introduction
On working with young designers
Designing your apprenticeship
Sample outlines of architecture apprenticeships
Pre-preparation

Session 1: WOW 'em!

- Introductions
- Do Now! Sketchbook Ritual
- Agenda Review
- Setting Student Performance Expectations:
  "Form Follows Function "
- Introducing the WOW!
  Making Clients
  Prioritizing Client Needs
- Review and Preview
- Clean-up

Session 2: Field Trip

- Agenda Review
  Preparing Students for the Field Trip
- Walking Tour
  Site Analysis
  Alternate Mapping Activity: Gateways and Crossroads
  Extensions: Discussions along the route
  Design for All People / A Sense of Place / Changes over time
  Do Now! Sketchbook Ritual
- Review and Preview
- Clean-up

Session 2A: Rainy Day Field Trip -- Alternate Session

- Agenda Review
- Architectural Awareness Activities
  Identifying architecture
  Elements and principles of design
  Activity: Being a Structure
  Natural forms in Architecture

- Culminating Activities
  - Activity: Collage
  - Activity: Drawing a facade
- Do Now! Sketchbook Ritual
- Review and Preview
- Clean-up

Session 3: Client Interview

- Do Now! Sketchbook Ritual
- Agenda Review
- Developing the Client Interview
- Interviewing the Client
- Review and Preview
- Clean-up

Session 4: Defining the Design Problem

- Do Now! Sketchbook Ritual
- Agenda Review
- Design Process Step 1: Define the design problem
- Note on Design Process Step 2: Investigate the design problem
- Activities on Scale
- Demonstration: Bubbles and Trace
- Design Process Step 3: Generating Ideas
- Design Process Step 4: Choose One Solution and Describe that Solution
- Review and Preview
- Clean-up

Session 5: Communicating Ideas through Drawings

- Do Now! Sketchbook Ritual
- Agenda Review
- Design Process Step 5: Create the Solution: Drawings
- Activities: Creating schematic drawings
  - Creating floor plans
  - Drawing with CAD
  - Drawing elevations
  - Creating site plans
- Review and Preview
- Clean-up

Session 6, 7: Communicating Ideas through Models

- Do Now! Sketchbook Rituals 6 and 7
- Agenda Review
- Design Process Step 5: Create the Solution: Scale Models
- Review and Preview
- Clean-up

Sessions 8: Preparing the WOW Presentations

- Do Now! Sketchbook Ritual 8
- Agenda Review
  Group Planning Meeting
- Activity: Creating a Presentation Board
- Activity: Developing the Oral Presentations
- Review and Preview
- Clean-up

Session 9: Preparing the WOW presentations

- Do Now! Sketchbook Ritual 9
- Agenda Review
- Design Process Step 6: Evaluate the Solution
- Activity: Practicing the presentations
- Review and Preview
- Clean-up

Session 10: The WOW!

- Design Process Step 7: Present the solution

Appendix:

- Do Now! Sketchbook Rituals List
- Resources for Teachers and Students
- Architectural Design Education and the Massachusetts Curriculum Frameworks
- A Young Person's Guide to Architecture as a Career
- Reproducible Student Handouts

Example Activities Chart

The following are example activities that are appropriate in terms of both group development and apprentices' understanding of the apprenticeship topic

Note: 1) Times are approximate
2) Sessions 1-9 do not include: Agenda, Review, Preview and Clean UP: 10 minutes

Session	Title of Activity	Approx. Time	Type of Activity
1	**WOW 'me!**		
	Introductions	5 min	
	Do Now! Sketchbook Ritual 1	10	sketchbooks
	Setting Student Expectations: Form Follows Function	10	discussion
	Introducing the WOW!	50	discussion
	Activity: Making Clients		hands-on activity
	Activity: Prioritizing Client Needs		hands-on activity
2	**Field Trip**		
	Preparing Students for the Field Trip	5	discussion
	Activity: Walking Tour	60	observing, sensory awareness, drawing, writing, photographing
	Activity: Site Analysis		observing, recording, writing, photographing, mapping, scale
	Alternate Activity: Visit to an Architects' Studio		observing, inquiring
	Alternate Mapping Activity: Gateways and Crossroads		observing, mapping
	Extensions: Discussions along the Route		discussions
	Do Now! Sketchbook Ritual 2	10	sketchbooks
2A	**Rainy Day Field Trip – Alternate Session**		

	Architectural Awareness Activities	30	
	Identifying Architecture		visual awareness
	Elements and Principles of Design		visual awareness
	Being a Structure		physical activity
	Natural Forms in Architecture		visual awareness
	Culminating Activities	40	
	Collage		art and design activity
	Drawing a Façade		drawing activity
	Do Now! Sketchbook Ritual 2A	5	Sketchbooks
3	**Client Interview**		
	Do Now! Sketchbook Ritual 3	5	
	Activity: Developing the Client Interview	30	writing, verbal skills
	Activity: Interviewing the Client	40	recording, verbal skills
4	**Defining the Design Problem**		
	Do Now! Sketchbook Ritual 4	5	sketchbooks
	Design Process Step 1: Define the design problem	15	design process, writing
	Activities on Scale	10	hands-on & physical activities
Session	**Title of Activity**	**Approx. Time**	**Type of Activity**
	Demonstration: Bubbles and Trace	5	drawing activity
	Design Process Steps 3 and 4	40	
	Step 3: Generate Ideas		writing, drawing & hands-on
	Step 4: Choose & describe solution		design process
5	**Communicating Ideas through Drawings**		
	Do Now! Sketchbook Ritual 5	5	sketchbooks
	Design Process Step 5: Create the solution: drawings	70	
	Activities: Creating Schematic Drawings		
	Creating floor plans		drawing activity

	Drawing with CAD		drawing activity
	Drawing elevations		drawing activity
	Creating site plans		drawing activity
6,7	**Communicating Ideas through Models**		
	Do Now! Sketchbook Ritual 6	5	sketchbooks
	Do Now! Sketchbook Ritual 7	5	sketchbooks
	Design Process Step 5: Create the solution: scale models	70, 70	art and design activity
8	**Preparing the WOW Presentations**		
	Do Now! Sketchbook Ritual 8	5	sketchbooks
	Group planning meeting	10	planning, discussion
	Activities: Presentation Boards & Oral Presentations	60	
	Creating a Presentation Board		art and design activity
	Developing the Oral Presentations		writing and verbal skills
9	**Preparing the WOW Presentations**		
	Do Now! Sketchbook Ritual 9	5	sketchbooks
	Design Process Step 6: Evaluate the Solution	15	design process
	Activity: Practicing the presentations	55	presenting
10	**The WOW!**		
	Design Process Step 7: Present the solution	90	design process; presenting

Citizen Schools Architecture Apprenticeship

Introduction

Design is a creative process of setting goals and accomplishing those goals: "Using the power of architecture and the design process can help form within each child an underlying structure for learning and creating that will serve every endeavor in their lives: how to define a vision for themselves out of hazy impressions … how to proceed along a path to completion, confident that the vision will result in something of value. [American Architectural Fndn.]

Over the course of ten 90-minute sessions the students will:

- take part in architectural awareness activities,
- identify a design problem in their community,
- research and analyze that design problem,
- develop a design solution, and
- Communicate that solution to others.

As they design, the students will:

- use the design process to solve, justify and communicate solutions*
- use oral presentation, writing, drawing, mapping, model-building and graphic design skills to clearly communicate those ideas;
- use mathematics and data analysis within a real-world context*
- understand science and technology in the contexts of society, history and human affairs*
- work alongside professional architects and explore design as a career path
- develop a sense of stewardship for the environments that sustain them now and for Generations to come.* [*Massachusetts Curriculum Frameworks]

All types of architectural projects can be realized through this framework—together the students and designers
[Architects, interior designers, landscape architects, and community planners] can successfully design a room,
A building, an entryway, an outdoor space, or a streetscape.

Given the opportunity, children are eager to, and wholly capable of, expressing their ideas about their world, and about themselves, through design. They will rise to the

challenge; they will amaze you with their work. To teach an *Architecture Apprenticeship* is, quite simply and quite powerfully, *to give children the opportunity to design*.

On Working with Young Designers

Even when they are pretending not to care, middle-schoolers want to get things right. They want to work within an atmosphere of respect, yet may be unable to create that atmosphere by themselves. They don't want to waste their time on things they don't need (or don't think they need) to know; and, creatively speaking, they are reluctant to take risks. So how do you work with these creatures? *You convince them that this is their process.*

You start where they are--helping the young designers to see that they already know a great deal about their built environment: they know how spaces feel; and they know what spaces they like and what spaces they don't like. They may know how to design forts out of blankets and pillows, or wood, or snow. They have built with blocks. Some may have tried to draw ideas for houses; some may know people who design for a living.

You *model* and *coach*: show them through your actions not only the skills they will need to use, but that designers respect each others' ideas; you help them to *teach themselves* what they need to know. You *scaffold*: give them a supporting structure that includes plenty of small ways to succeed at first, and help them to build on those successes.

And then you *fade*: gradually get out of their way, becoming more of a co-designer than a teacher. You trust that the enchantment inherent in process of design will carry them through. And as it all comes together, those silent strangers from session one will become a collaborating, supportive, excited group of young designers.

Design as *their* process, and yours

You get to make a living doing what kids do every day - play with spaces. Children love to hear about real-life places and spaces that you remember, know, designed or built: your first forts, the coolest building you've ever been in, the most difficult space you've ever designed, and so on. The sense they get of you as someone who has chosen a path and is working hard to follow it (and cares so much about it that you are there to share it with them), this is the gift hidden in your time with these young people.

Be honest with them: design is fun, of course, but it is also hard work. As a teacher you try to lead your particular group of students through a design task that is challenging, but not overwhelming.

This "design studio" style of learning may be new to them: "Is this good?" they will ask. You could reply, "How well do you think your idea solves your design problem?" and "Can you give me some reasons why your idea is good?" (As you will see, the children should, in every step of the process, be referring back to their original design parameters: who are they designing for, what is the space or place they are designing, when will people be using this space, where is the space, and why do these people need this designed space?)

As you come close to the end of the sessions and you are tempted to take the students' projects and "polish them up a bit," think twice. After all is said and done will the students feel better about, and learn more from, having presented ideas that are all their own, or by presenting final projects that an adult felt the need to "polish up?" Design educators believe that children feel better about *projects that are truly theirs rather than truly perfect.*

Some specific suggestions:

Keep the course **active**. Demonstrate a lot, and lecture as little as possible. When you show slides, for example, don't tell them what you see, ask them questions, getting them to tell you what *they* see. As shown in sessions 2 and 2a (walking tour and architectural awareness activities) rather than just showing a design element or a structural element, have the students find those elements on a walking tour, draw them, act the elements out with their bodies, or cut up examples of them from magazines and create a collage.

Break large tasks down into smaller ones. They will build on those successes, step by step.

Encourage them to share their discoveries with each other, social creatures that they are. Listening to their conversations when deep in design mode is one of the pleasures of teaching courses such as these.

What if some of the group loves to draw, while others need to build? Discuss this with the group, and come to some agreement, perhaps having each sub-group contribute something different to the final project. As the "multiple intelligences" approach to education suggests--and experience bears out--some children take in information and express ideas more easily through words, some through visuals, and some through

manipulating objects. Design is inherently interdisciplinary, so have the students working in a variety of hands-on ways.

For some groups, "transitions" are difficult. Give a 5-minute warning before shifting activities. For some groups, sitting still is difficult; even just a moment now and then of being able to get up and get their own materials may give them the time they need to stretch and move. Be ready to adjust a schedule, varying sitting and moving activities, individual and group work, to keep the children focused.

What if some students want to spend hours on one drawing, while others work too quickly, while others take a middle road? Using an agenda and project timeline, and prefacing each activity with a time-frame will help.

How complicated should you let the students' projects become? You know, for example, that making a model from a floor plan with lots of crazy angles will take longer to make than a model of a rectangular space; so tell them that, and let them decide. They are going to be pleased to be honestly involved in the decision-making process.

Use real space, real bodies, real objects and lots of visuals
Relate real space to scale space as often as you can. Many children try to fit too much stuff into their drawings. "How large is that room you've drawn on paper, compared to this room that we're in?" Have the children pace off the real space and prove it to themselves.

Have them use their bodies to feel the forces of tension and compression; have them roll paper to make a column; have them put their model in the sun or under a flashlight to see shadows; have them make quick mock-ups with small boxes or blocks to see how a drawn building looks in three dimensions.

Bring in visuals and display them around the room – things that you've drawn—early process pieces and final drawings, design boards, images from calendars, books, and so on. Encourage them to bring in visuals and to post the photographs and drawings they have made. Sometimes one photo can inspire an entire design.

Draw, and write, then draw and write some more
From day one, show the students that drawing isn't something you're graded on and writing isn't a chore. Designers work through ideas by drawing and writing. Do this by drawing a lot, and writing when you need to clarify your ideas or organize your

thoughts. Encourage the students to use lots of paper; and to start over if they have a valid reason for doing so.

Have the students save their "process pieces" in a folder. Weeks later they'll be pleased and amazed to see how far their ideas have come, and later they may need those pieces to add to a presentation board.

When drawing, some children really do have a hard time with a blank page - they truly don't know where to begin, or they are afraid of drawing something wrong! If they can see what they want in their heads, but can't draw it, have them draw it out on scrap paper or on the chalkboard first (writing on the board has not lost its timeless appeal), or have them cut and fold paper or oak tag to show you what they're envisioning.

If you want to show a student a different way to draw some part of a plan, realize that they may not take too kindly to you erasing and redrawing their efforts. That is where trace paper works like a charm. Say "I have an idea for this area. May I show you on trace paper? Use it if you like, or don't, it's up to you." Or, "do you want to ask anyone in the class if they have any ideas for this area?" After a day or so of realizing that their design decisions really are up to them, they will begin self-correcting, replacing not-so-good ideas with better ones.

You may know the advantage of patiently developing ideas over time, but young designers do not. Drawing bubble sketches and using trace paper to layer their ideas, then, are important lessons. Students readily see the value of trace paper, and enjoy using it: In a recent class one high school girl was uninspired, barely enduring the drafting part of the course. A short time after learning to use trace paper she was waving scraps of trace in the air, exclaiming "what a great invention! I love trace paper!" After that her drawings simply took off.

On model-building

You know, from experience, a logical sequence for thinking through, making pieces for, and assembling a model. Children don't. Break model-building down into steps. They won't think far enough ahead to develop their landscape on their cardboard base before they start attaching the model pieces, so make landscaping a first, separate activity. You also know good ways to connect things, and to make things stand up, but children don't; so plan on demonstrating these skills.

Take a no-nonsense approach to safety. If the students will be using knives and/or hot glue guns, sit the group down, go through safety procedures, demonstrate every step of

the way, and have each child prove to you, using scrap cardboard, that they can cut and glue safely.

Set up a cutting area or areas, with a hardboard cutting surface underneath, and insist that the students use it. If you are a guest in a teacher's classroom, being careful with that room is a good idea.

At model-building time (just when some children might be using knives) the pace of the entire group may begin to fly. Slow things down. If you see tired faces, take control, shut the whole model-building process down, shift to something else, and begin fresh the next session.

On taking creative risks

As a designer, you have worked for years in an atmosphere were positive, creative risk-taking is welcomed. Realize, though, that some children are afraid to be creative. They may think "what if this vision I've got in my head for this space is really a bad idea? Do I dare tell anyone about it?" You can help by projecting an attitude, every day, that their visions are valuable, and worth exploring; by creating an atmosphere where it is safe to take risks and share ideas. Explain that the challenge for them [with help from you and the other group members] is to figure out ways to get their ideas out of their heads and down on paper. So it's not personal, it's more a matter of finding what way works for them. The more often children succeed the more ready they will be to take the risk of creating. Begin where they are, reward what they learn, and above all, reward their willingness to try.

Designing your Apprenticeship

Middle-school students connect more with design work that:

A). has something to do with themselves; and

B). involves real spaces in their communities.

Citizen Schools believes that children's learning should:

- Be real (meets the standards of quality met by professional adult designers)
- Add value to the community (the students' product – their design—is needed by the community)
- Be public (will be presented, demonstrated, displayed and celebrated).

Past *Citizen Schools Architecture Apprenticeships* include:

- Design a Neighborhood
- Plan a Community Center
- Design a T-Station
- Design a Community Park
- Redesign City Hall Plaza
- Be a "Mapping Boston" Docent
- Design a Playground
- Guide to Beacon Hill
- History of Scolley Square
- Report on Dudley Square
- Redesign of Fenway Park
- Design the Central Artery

Each design apprenticeship will be different—designing a large outdoor space may lend itself to different field trips and final projects than designing a small indoor space. Plus, each designer that teaches an apprenticeship will bring his or her own design experiences to the course. This guide offers you an adaptable framework that will get you and your students through a successful design experience; one that, in many practical ways, will answer your **key question**: **"*I* know how to design a space, but how do I get *these children* to design a space?"**

First, decide: **what will the students' design problem be?** Do you have a specific design problem in mind for the young designers, or will you have them explore a few pre-selected spaces and define their own design problem? Will the students develop design solutions for the same area, or for different parts of a larger area?

Teachers will tell you that one simple, in-depth project is better than a project that is too broad. Teachers plan the best they can; they know that students often take longer than expected; and they have extra activities ready should they need to fill in. They get to know their students, stay flexible, and reassess along the way.

As you plan, consider **what form will the students' final projects take?** Drawings (floor plans, elevations, site plans, renderings, perspective views); scale models; presentation boards? PowerPoint presentations, video productions, action letters or articles for publication?

Next, think about the steps you would take to get a design job done, and decide what skills and knowledge your students will need to complete their project. If you think an activity from another book or a favorite activity you learned in design school would work well, plan on trying it.

Balance your ideal outline with the realities of time, people and space. For example: a **Visit to an Architect's Studio** is a valuable experience for students of this age. If you know the architects well, and they have the studio space, the students might spend a whole session at the studio, doing some skill-building activities (such as those in session 5) there. If all you can arrange is a short visit, you might incorporate that into the **Field Trip** session (observing and drawing on the way to the studio; touring the studio, talking to designers; then observing and drawing on the way back to class.)

Take a look at the **Sample Sessions** outlined on the next page. As you read through the chapters that follow, realize that the text follows this general sequence, but that *you will need to develop your own outline for your ten sessions.* Creating an apprenticeship is an interesting process of design.

Here are two examples:
In the first example (interior site; e.g. a redesign of an existing community room), the study site is in the same building as the students' classroom. The client comes to the classroom to be interviewed. More time has been allocated in the later sessions for fairly complex final projects (floor plans and a group model).

In the second example (exterior site, such as a streetscape, park, or entryway) more time has been built into earlier sessions for outside site explorations; and the final projects are less complex (site plans and presentation boards). In the second example a visiting landscape architect explores the study site with the students, and a full session is given over to having the students do skill-building activities at the architect's studio.

Sample Outlines of Architecture Apprenticeships

Session	Interior Site	Exterior Site
Session 1	WOW 'em!	WOW 'em!
Session 2	Design Process Step 1: Defining the Design Problem Step 2: Investigating the Problem Developing the Client Interview Mini-walking tour with Client Interviewing the Client	Design Process Step 1: Defining the Design Problem Step 2: Investigating the Problem Developing the Client Interview First site visit with Client
Session 3	Skill-building: Scale activities Step 3: Generating ideas Activity: Bubbles and Trace Step 4: Choosing one solution	Client Interview Second site visit with landscape architect
Session 4	Skill-building: schematic drawings Step 5: Creating the solution: Floor Plans	Visit to landscape architect's office Demonstrations and skill-building: Scale; Site drawings; CAD drawing; Presentation Boards
Session 5	Design Process: Floor Plans	Step 3: Generating ideas Activity: Bubbles and Trace Step 4: Choosing one solution Step 5: Creating the solution: Site Plans
Session 6	Design Process: Model-building	Design Process: Site plans
Session 7	Design Process: Model-building	Design Process: Presentation Boards
Session 8	Group Planning Meeting Developing Oral Presentations	Group Planning Meeting Developing Oral Presentations

Session 9	Design Process Step 6: evaluating, writing Practicing the Presentations	Design Process Step 6: evaluating, writing Practicing the Presentations
Session 10	The WOW! Design Process Step 7: present the solution	The WOW! Design Process Step 7: present the solution

Pre-Preparation

Determine the program for the students' WOW: where is the study site, who is the client, what are the clients' needs, and so on. What design problem will the students solve, how does this design project fit in with larger community goals, and what form will the students' final projects take?

Get to know the sites the children will use for study. Research the history, current use, and future plans for the study site. Walk the study site. Will the children be able to safely navigate the site during field trips? Take notes and make measurements if you'll need them; take pictures of broad views and especially of close-up details.

Think about the space that you will be teaching in, and the surrounding area. What would be a good room, building, or outdoor space in which to hold a discussion on how spaces feel? Where could the students best learn about structures, about pathways, about light, color, textures, about views?

Begin collecting **resources**: books, maps, floor plans, design boards and photographs to aid the students in their work. The Internet has a growing collection of architecture activities for students. Resources are listed in the appendix.

Use an **agenda** so everyone feels informed. That final goal, 10 weeks away, may seem distant at times—so build shorter-term goals into the course. Develop a **project timeline** to help the students see where they are in their process.

Plan on having each student (and yourself) maintain a **sketchbook**: a comfortable place to write notes, draw sketches, paste in graphics; an organizational aid and creative tool for designers.

Consider what **materials** the students will need. Where will you keep materials, store in-process projects, and display the work? Will you make or purchase sketchbooks?

<u>General Materials you will need on hand for sessions include:</u>

- Agenda; easel paper, sketchbooks, student file folders or portfolios
- Pencils, thin black markers, good erasers, markers, colored pencils, crayons
- Rulers, measuring tape(s), string, compasses to draw curves
- Scissors, white glue, scotch tape, masking tape, pencil sharpener, stapler
- Paper: drawing paper, white lined paper, ¼" graph paper, preferably 11" x 17"
  Oak tag, assorted construction paper, green construction paper

Trace paper (students like the rolls of canary yellow trace)

Decide what **handouts** you will use, and how you will want the students to keep track of them. [Children have little reverence for handout—loose ones will disappear.] You can a). Give each week's handouts out each session; and make "putting your handouts in your folder or binder" a part of each clean-up time; or b). Bind the entire set of course handouts into booklets that can open up and lay flat for easy use.

Decide what handouts you want to turn into **transparencies** to facilitate group viewing.

What **equipment** could you use: Does the room have a chalkboard, or will you need an easel? Will you have access to an overhead projector, slide or LCD projector, a paper cutter, a decent pencil sharpener? Will you and/or the students use cameras; will the photos be reproduced by prints, slides, or digitally?

Consider how you will set up your room. A U-shaped arrangement of tables means everyone can see you and each other, facilitating more sharing and group involvement. Knowing the **layout of the room's work spaces** will make the children feel more competent. Explain it the first day: "This is your work space. We share it. Drawing area here, materials kept here, cutting area here, trash here, reusable materials here." If you expect them to take care of their own materials, they will.

Session 1: WOW 'em!
Total Time: 90 Minutes

Objectives:

- To help students express prior knowledge about architecture and design
- To build their knowledge base of architectural vocabulary;
- To begin building positive relationships between students
- To introduce the purpose and planned product of their WOW
- To give students a first, successful design experience.

Preparation:

Create a description of the client and a list of his needs. Determine how many small groups of students will work on the hands-on "Introducing the WOW" activity. Make a large, simple base map or floor plan of the study site on easel-sized grid paper for each group. For each group also make a set of wooden blocks. Print a client need on each of 6 - 10 blocks; and have 10 or so extra blocks available for each group.

Gather sample architectural drawings, plans and sketchbook pages. A collection of *visuals and real objects* to facilitate the "Form Follows Function" discussion: photographs or slides of buildings, landscapes, community spaces; products and graphics.

Write the agenda for this session on an easel sheet; include a list of student skills objectives for this session; and "Steps to WOW," (listing what the students will have to get done this week to get to their WOW.)

Handout to use: *Making a Scale Figure*
Each student will need; sketchbook, pencil, eraser materials for scale figures (see instruction sheet: pipe cleaners, fabric pieces, yarn, index cards)
Also have on hand: easel-sized grid paper, thin markers, wooden blocks, stapler and a camera

Introductions **[5 minutes]**

Briefly introduce yourself, and show the students a few pieces of your work, "wowing" them with samples of spaces you have designed. Have each students introduce themselves through a quick name game.

Sketchbook Rituals
The opening rituals suggested in this guide use the following format: students do a brief sketchbook activity – drawing, writing or adding graphics to their sketchbook. This establishes the use of sketchbooks to record ideas; and establishes a routine of sharing ideas. [Note: the **sketchbook rituals** are described in each session. To facilitate modifications you may wish to make to your apprenticeship plan, the opening rituals have also been listed together in the appendix.]

Especially in the early sessions, ask for volunteers who are willing to show the group what they drew and wrote, and to tell the group about that space. Prompt the speaker with questions that introduce the idea that design ideas can be described by using the "5 W's:" "Who used this space? "What did you make it out of? What did it feel like? When did you use it? Where was it? Why did you create it?" Have the group leave their sketchbooks open on their desks, and ask them to do a brief "walk-around" to ensure that everyone has a chance to see everyone else's work.

Do Now! Sketchbook Ritual 1 **[10 minutes]**
Preface this activity by showing the students some architects' sketchbook pages; and model the activity for the students, drawing your ideas on an easel sheet and talking about your ideas as you draw. Explain that they may draw in any view with which they feel comfortable; and that sketchbook drawings need not look professional or finished, they are merely a place to begin forming up design ideas.

To begin, ask the students to visualize ***their favorite place in which to spend time***. Next, have them each draw something about that space on a sketchbook page. Then have each student describe that space in one of three ways: 1. verbally (describe their drawing); 2. Physically (act out the structure of that space; act out being in that space); 3. Visually (hold up their drawing; have others guess what and where the space is).

Agenda Review **[10 minutes]**
Have students read off agenda items and the session skills objectives list. Answer questions as needed. Clearly state what is expected of each student for this Apprenticeship; refer to the campus behavior rules and systems.

Setting Student Performance Expectations: "Form Follows Function" **[10 minutes]**
Show examples of designed objects, buildings, graphics and landscapes. For each, have the students describe its function first, then its form. Help them to see that, as the adage says, "form follows function."

Example 1: a pencil contains a material that writes on paper; it is to be held in a hand, and written with [function]. Hence the pencil's shape (width, length, ridges for better gripping); and hence the graphite shaft enclosed in a shaft of wood.] To exaggerate the point, hold up an object whose form would definitely not make a good form for a pencil; or ask the students to think up an object that would not make a good pencil.

Example 2: doorways were invented so that people could enter and exit a space; when the door is closed the space is closed off; when the door is open the space can be passed through [function]. Hence doors are made of certain materials, of certain sizes, with hinges, handles, locks, and so on [form]. What would make a good door? What would make a poor door? What if it were a door in outer space? A door for a mouse? And so on.

Ask the students to try to verbalize what they envision will be the *function* of their 10-week architecture apprenticeship. ["By the end of 10 weeks we will have created and presented this particular community design project… we will have successfully gotten to our WOW… and so on."] Next, ask them to then define some details about the *form* of their apprenticeship: What will we need to do, individually and as a group, to help us reach this goal? [We will need to explore architecture and create things. So we will need to pay attention, give others the chance to explore and create, work together, and so on."

Write their comments on *function and form* on an easel list for future review. Or, have a student write each response on a wooden block; then have the students work collaboratively to build a structure with those blocks. Take a photo of or otherwise document the students' ideas.

Introducing the WOW/ Hands-on Activities [50 minutes w/ 5 min. break]

Objectives:

- To introduce the design process and the students design program
- To offer hands-on activities that helps students identify with their clients
- To increase student understanding of the connection between people and designed spaces.

To begin, post and discuss the *Steps to WOW*" list. Explain that they will be working on a design project that adds real value to their community; and culminates in a public WOW where they will present and celebrate their accomplishments. Show examples of other Architecture WOWs.

Next, describe the design problem, beginning with details about the client. Have the group make a list of all of the people that may be impacted by their WOW design project. The client(s) will be directly involved, but who else may ever use the site, walk by the site, and feel that that site is a part of their community? Explain that they will meet their client in the next session.

Share information about the site with the students (a prepared base map or floor plan, photographs, maps.)

Activity: Making Clients:
Have each student make two scale figures as directed in the *Scale Figure* handout. Depending on the design program, the scale figures are to represent the client(s), community members, and/or the students themselves. After stapling each scale figure to an index card, have the students write a few words on the card to describe that figure (e.g. name, age, occupation, client or community member…)

Activity: Prioritizing Client Needs:
Sort the students into small groups. Give each group a large base map or floor plan of the study site; the wooden blocks with client needs written on them; the extra wooden blocks; and their scale figures.

Have the groups 1. Set their scale figures on the base map; 2. work together to stack the "client need blocks" on the map in order of importance, most important need on the bottom, most important on the top; 3. set the remaining blocks on the base map to represent any initial ideas they may have for the site (e.g. walls, rooms, walkways, fences, benches, focal points and so on.)

Have each group briefly describe their design and their decisions. Take photographs of each site map model; photograph or make a list of each group's stack of prioritized client needs...

Review and Preview **[5 minutes]**
Review what was learned and accomplished during this session. Ask "if someone in your family asked you what you did and learned today, what would you say?" Have each student pass around a "talking stick" and complete the sentence "Today I learned how… "Preview the next session's activities.

Clean-up **[5 minutes]**

Have each student

1) Organize his personal items – sketchbook, handouts, drawings and tools
2) Clean up his work area (table and floor)
3) Work with the group to return all common materials to the materials area

Session 2 Field Trip
Total Time: 90 minutes

Objectives:

- To increase students' awareness of self, place and community;
- To practice skills of observation and recording; to develop a common language and vocabulary of design.

Preparation:

The field trip is a shared experience for the students. It creates a common story upon which to anchor subsequent new learning about design. Tailor the walking tour to focus on specific design elements that relate to the students' upcoming WOW project. Consider incorporating a short **Visit to an Architect's Studio** into the tour session.

Visit the tour site. Take close-up photographs of details on which you will want the students to focus. Find photos, floor plans, site plans, street maps and/or if you can, of the site; and any information indicating what these places looked like in the past. Make a transparency and/or large copy of one map of the area.

Decide on a route for the field trip; prepare a **route map** (see sample) that has the students stopping at specific stations to observe, compare, and record their observations (by writing, measuring, mapping, drawing, taking photographs, and so on.

Tailor the **identifying architecture; elements & principles of design; being a structure, natural forms in architecture and drawing architectural details** handouts to your tour site: take out features from the sheets that do not appear in your route, add drawings or photographs of buildings or places that you want the students to notice. In the packets, also include: blank sheets for extra drawings; graph paper for mapping; area street map.

Copy one set of handouts into a walking tour packet for each student. Plan to develop and print copies of the walking tour photographs after the field trip, for use in upcoming sessions.

Each student will need: sketchbook, pencil, walking tour packet. You may also want to bring: photos and maps, extra pencils, drawing and graph paper, markers, cameras; measuring tapes, a compass.

[See also: preparation for Site Analysis.}

[Note: Session 2A offers a rainy-day alternative plan.]

Agenda Review **[5 minutes]**
Have the students take turns reading off agenda items and session skills objectives list; answer questions as needed.

Preparing Students for the Field Trip **[5 minutes]**
Review the walking tour packets with the students. Identify design features to be found on the walking tour; introduce vocabulary; and show them the planning map of the study area and the surrounding areas.

Set expectations for the field trip. Connect this to the "Form Follows Function" discussion from session 1: "What form do we need to follow as individuals, and as a group, to achieve our objectives for the field trip?"

Walking Tour **[60 minutes w/ 5-minute break]**

At points along the designated route, have the students:

- Check off the design elements from their walking tour sheets
- Write, draw, take photographs
- Act out the structural elements and forces that they see.
- Do a site analysis (see below)
- Map gateways and crossroads (see below)
- Consider "What is the function of this space? Does its form follow its function? "
- Look at; listen to, smell and feel the natural and built environment around them. What adjectives describe this space: open, enclosed, quiet, noisy, formal, informal, comfortable, uncomfortable, welcoming, and so on?
- Engage in discussions (see extension ideas, below)

Activity: Site Analysis
Objective:

- To gain information about the study site; to practice observational and mapping skills

Preparation
Find topographic and planning maps of the site and surrounding area. Visit the site, noting site dimensions and solar orientation; and pre-figuring a scale for the student site plans. If you think drawing accurate site plans will be too difficult for the students, pre-draw some elements of a base map

The students will need: sketchbooks, pencils, erasers, drawing paper, graph paper, clipboards, rulers, measuring tapes, compasses. You may need: (traffic or gym) cones, string, chalk.
Sheets to use: *Site Analysis; Sample Site Plan* (and base map of site, if applicable)

[Resource note: Map Making with Children and Walk around the Block offer many mapping techniques, from simple to complex.]

To begin, bring the students and materials out to the study site. Have the students walk the entire site -- without carrying anything, and without talking, they should look, listen, smell and touch the site. After they have walked for a few minutes, ask them if they noticed any pattern to their walking – were there places they naturally wanted to walk, places they were more likely to stop in, places they avoided?

Work together to set out cones (or use stakes and string, or chalk) to divide the space into grids for easier mapping. Next, either hand them each a copy of your pre-drawn base map, or have two-student teams map the general outline and dimensions of the site on graph paper. Help the students to see how **measuring and counting their paces** can give a good estimation of a distance. Help them to estimate a building's size by measuring one window, and extrapolating from that dimension. Then have them:

- Draw in prominent site features such as trees, fences, focal points and so on [students seem to like inventing symbols and creating map keys.]
- Note north, south, east and west; and discuss how solar orientation affects a site.
- Relate the site space to a space they know: how many classrooms could fit the site?

Have them each fill in a **site analysis** sheet, noting natural site features, boundaries, and so on.

Alternate Mapping Activity: Gateways and Crossroads
Have the students look at how an area is organized: Can this space clearly be considered to be organized along an axis, radially, or in a grid?

What spaces are like gateways, saying "this area starts here?" What spaces connect people, bring them together? What features separate people, create barriers, enclose them, or give them privacy? Where are the key intersections, the crossroads that give people the choice of moving one way or another? What helps people move from one place to another?

Discuss what geographic or man-made shape may influence the design of the whole area (e.g. a straight main street may define a mainly symmetrical area, with stores on each side; a curved river may force the roads and buildings to follow that curve; a monument may serve a focal point, with the rest of the features of the area radiating out from that focal point.)

Extensions -- Discussions along the route

Design for All People: *Universal Design, or "human-centered design,"* is the design of products, information, buildings and landscapes to meet the needs of people of all ages and abilities. Discuss: Do the places and spaces in our designed world work for all people? Should we expect our community spaces to meet the needs of all people? Should a place be comfortable and accessible to young children, and to people with reduced abilities (temporarily or permanently) to walk, hear or see? Which people have the right (and/or obligation) to participate in design decisions about a community?

A Sense of Place: Sometimes people say a particular space has "a sense of place." Ask the students what they think is meant by this. Find a few places along the route that do or do not, in the students' opinions, have a strong "sense of place."

Changes over Time: Discuss why, over time, people transformed this area into what it is today – what design decisions, for better or for worse, led to the look and feel of the area that is now here?

[Resource note: Changing American Cityscape is a set of seven posters detail the many changes in a fictional city, years 1875 to 1990. A smaller version was published as a book entitled New Providence.]

Do Now! Sketchbook Ritual 2 **[10 minutes]**

Ask each student to visualize the space that most sticks in his mind from the field trip; or a place he would most want to go back to. Have him sketch one view of that building or landscape element, and write a few words describing how that space feels. Do a "walk-around" and a brief discussion to see what details each student chose to draw.

Review and Preview **[5 minutes]**

Back in the classroom, review what was learned and accomplished during this session. Have each student create a set of cards, upon which they have written vocabulary words learned during the session, and their meanings. Suggest that the students take the cards home to share what they have learned with family members.

Preview the next session's activities. Discuss the plans for developing or printing field trip photo images for use in subsequent sessions.

Clean-up **[5 minutes]**

Have each student

1) Organize his personal items – sketchbook, handouts, drawings and tools;
2) Clean up his work area (table and floor)
3) Work with the group to return all common materials to the materials area.

Session 2A - Rainy Day Field Trip Alternative Session
Total Time: 90 minutes

Objectives:

- To increase design awareness
- To open a dialogue about designed spaces
- To develop a common language of design

Preparation

Gather visuals and objects for awareness activities:

- Magazine pages showing architecture (interiors and exteriors) for clipping.
- Slides or transparencies of one or two interesting building facades.
- Natural objects that have counterparts in architecture (e.g. branch, honeycomb, spiral shell).
- Hands-on objects for the structures activity: wooden blocks, string, paper

Pre-cut a set of graphics (squares) from the handouts (listed below) for the collage activity.
Consider making sets of graphics pasted on index cards for later student use.

Each student will need: sketchbook, pencil, eraser, and scissors
Have on hand: white glue, large poster boards (1 per group), slide projector; overhead projector

Handouts to use:
Identifying architecture / Elements & principles of design / Being a structure / Natural forms in architecture

Resource note: The book Architecture: Form Space and Order, a good source of graphics, goes a long way in explaining how specific elements of architectural design combine to make successful buildings. By Nature's Design features photographs of natural design elements. Books on structures include The Art of Construction and what it feels Like to Be a Building

Agenda Review **[5 minutes]**

Have the students take turns reading off agenda items and session skills objectives list; answer questions as needed.

Architectural Awareness Activities **[30 minutes w/ 5 minute break]**

To begin, project slides or show photographs that show examples of the terms in the student handouts. Have the students identify the images that they see. Consider alternating showing a series of slides with some of the following activities and discussions:

Identifying Architecture & the Elements and Principles of Design
The students should be familiar with these concepts through Art class. They can think of the elements as "ingredients" in a design, and the principles as the "recipe," i.e. how those elements work together.

Seven Elements: Value, Color, Form, Shape, Line, Space, Texture
Seven Principles: Contrast, Rhythm, Unity, Emphasis, Pattern, Movement, Balance

Discuss the *forms* that they see, and have them describe their *functions*.

But architecture is more than form and function. Aesthetics come into play. Discuss what places, buildings or architectural features did the students immediately like as they viewed the slides and why they those images appealed to them.

> "A building has harmony when everything about it—its shape, its walls, its windows, its doors—seems just right. Each must be a perfect companion for the other. When each suits the other so well that they come to belong to one another, the building is a work of art. "
>
> (Round Buildings, Square Buildings, Buildings that Wiggle like a Fish)

Activity: Being a Structure
Objectives:

- To building positive relationships between students
- To enable the students to kinesthetically experience structural forces
- To increase vocabulary

Show a few visuals that illustrate each structural term then have the children use their bodies to demonstrate the terms on the *Being a Structure* sheet:

Column / Post and Beam / Arch / Vault-tunnel / Dome
Cantilever/Flying Buttresses / Trusses / Tension / Compression.

Students can take turns acting out the structures; the group guesses which structure the students are trying to be.

Then have students use common objects to demonstrate each term: e.g. 3 wooden blocks to show Stonehenge-like compression; string to show tension; a curve of paper to show a vault tunnel.

Natural Forms in Architecture
Help the students to make connections between the built and natural environments. Have some natural materials on hand to facilitate the discussion. Ask: Why does nature use spirals, hexagons, and exoskeletons to build its structures? What natural design elements, such as branching, have we copied into our own architecture? How is a column like a tree? How are overlapping shingles like the scales on a fish? How is a spider web like a suspension bridge?

Culminating Activities **[40 minutes]**
Objective:

- To reinforce student learning.

Note: these activities are also effective in a later session as student review.

Activity: Collage
Show the group the graphics (squares) you have pre-cut from the architectural awareness handouts. Set the graphics pieces on a large table, along with the architectural magazine clippings. Explain that they will be working in groups to create collages that combine graphics, with magazine clippings that illustrates those features. Have them trim each clipping, glue their graphic square on top of it (as a label), then glue the clipping to the poster board.

Encourage discussions as the students continue to work, matching more graphics to clippings and adding them to the poster board. This activity allows the students to demonstrate what they already know; and it is a good activity because it can be stopped at a logical point or go on for a while. It also makes a good first-day project to save as a background display for the student presentations.

Activity: Drawing a Facade
Project a slide or transparency of an interesting building façade onto a chalkboard, whiteboard, or easel sheet (or use the **Façade to Trace** sheet). Have some students trace the architectural, structural and natural features that they see. Then turn off the projector, label and discuss those features.

Do Now! Sketchbook Ritual 2A **[5 minutes]**

Ask each student to visualize the space that most sticks in his mind from the session. Have him sketch one view of that building or landscape element, and write a few words describing how that space might feel. Do a "walk-around" and a brief discussion to see what details each student chose to draw.

Review and Preview **[5 minutes]**

Review what was learned and accomplished during this session. Give each student, or have them make a set of cards showing the graphics from the handouts. Suggest that the students take the cards home to share what they have learned with family members, and to look for architectural elements in their neighborhood. Preview the next session's activities.

Clean-up **[5 minutes]**

Have each student

1) Organize his personal items – sketchbook, handouts, drawings and tools
2) Clean up his work area (table and floor)
3) Work with the group to return all common materials to the materials area.

Session 3: Client Interview
Total Time: 90 minutes

Objectives:

- To give students practice in investigating their design problem
- Developing and asking questions
- And synthesizing the new information.

Preparation

Arrange an interview time with your client. If possible, meet at the design site.
Have the photos from the walking tour (or magazine clippings or architectural features) available for use.
Be prepared to type the final list of questions and generate copies of the questions for each student.

Each student will need: sketchbook, pen or pencil, white lined paper.
[See also: preparation for sketchbook ritual.]

Have your original set of wooden blocks labeled with client needs on hand, along with spare blocks, pen and labels.

Do Now! Sketchbook Ritual 3 **[5 minutes]**

Preparation: Go through the walking tour photographs (or magazine clippings), selecting photographs that show a fairly broad view or a streetscape [e.g. a sidewalk with a building behind it), or expanse of landscape or park -- views in which people could be doing things, as opposed to close-up images of architectural detail.]

Activity: Set the photographs out on a large table. Have each student: 1). select one photograph (and trim if necessary); 2). Tape that photograph onto a sketchbook page; 3). Take a minute to imagine one person or a group of people using that space; 4). Write a few sentences that answer the questions: "Who might use this space? What might they be doing there? When? And Why?" Do a "walk-around" and a brief discussion to share ideas.

Agenda Review **[5 minutes]**

Have the students take turns reading off agenda items and session skills objectives list; answer questions as needed. Set student expectations for behavior en route to, during, and after the interview.

Developing the Client Interviews **[30 minutes w/ 5-minute break]**

Ask the students what *functions* a client interview might serve (what do we need to know more about that the client may be able to tell us.) Then ask what *form* the client interview should take. (Should we develop a list of questions, and then decide to take turns asking those questions? Who will record the answers? In what format?)

Have the students review what they already know about the client and site. [Use the wooden "client need" blocks.] Set priorities for the interview: what do we most need to know, what would be good but not vital to know, and so on?

Then have the students work together, in small groups first, then as a whole, to generate, discuss, and refine the interview questions. Having them take turns *role-playing the questions* is a good way to refine the questions and make them more comfortable with the interview process.

Ask "What will we do with this new information?" Decide whether it would be beneficial for someone to type and make copies of the interview responses so each student could refer to them in upcoming sessions.

Interviewing the Client **[40 minutes]**

Meet the client. Have each student introduce him or herself. Have one student briefly summarize your intended design project. Then have the students ask their interview questions and record the answers. Finish up by asking the client(s) if they have any questions for you; thank the clients, and invite them to the WOW.

Review and Preview **[5 minutes]**

Review what was learned and accomplished during this session. If time allows, have the students work together to create more wooden blocks labeled with "client needs" to add to the original block collection. Preview the next session's activities.

Clean-up **[5 minutes]**

Have each student
1) Organize his personal items – sketchbook, handouts, drawings and tools
2) Clean up his work area (table and floor)
3) Work with the group to return all common materials to the materials area

Session 4: Defining the Design Problem
Total Time: 90 minutes

Objectives:

- To enable students to cooperatively define their design problem
- To use writing, verbal and drawing skills to develop their ideas
- To check student understanding of working in scale

Whether their final products are drawings, writings, plans, presentation boards, scale models or other media, the students will succeed if they use what they know and follow the steps of the **Design Process Checklist**. The checklist will help the students to focus their work: once they define their design problem that is the problem they should solve. *How* they solve it may change and develop throughout the process, but the problem they are solving should remain the same.

Preparation

Decide whether the students will work individually or in groups. Have the students save their process work, i.e. first sketches, inspirational clippings, etc, as they could become part of their presentation boards.

From the skill-building activities in Sessions 4, 5, and 6, select activities that will give your students the skills they need relevant to their design project. Consider setting up **work stations** to facilitate student time with materials**.**
Pre-select photos for the *sketchbook ritual.*

Prepare student copies of the site's floor plan or base map for the *Design Process Steps 3 and 4* activities.
Using the *Scale Rulers* handout, copy and cut (from thicker card stock, if possible); one for each student.

Each student will also need: sketchbooks, pencil, eraser, thin black marker, paper for writing and drawing, and their scale figures. Also have on hand: string, graph paper, measuring tape, small boxes
Sheets to use: *Design Process Checklist; Scale Rulers; People Spaces*

Do Now! Sketchbook Ritual 4 [5 minutes]
Preparation: pre-select one photograph from the walking tour that shows one interesting close-up detail of a building (e.g. one window, a curved metal bracket, a

porch railing.) Tape that photo onto the center of a piece of paper, and make one photocopy of that paper for each student (black and white copies are fine, if you've selected an image with enough contrast).

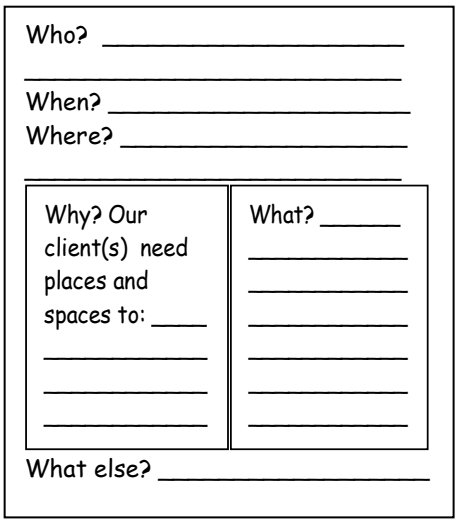
Activity: Ask each student to extend the lines of the photograph beyond its frame (out onto the blank area of their paper) and create a drawing of what they think exists beyond that image (e.g. the building façade surrounding the window). Model the activity for them using a photograph. Do a "walk-around" and a brief discussion to share ideas.

Agenda Review **[5 minutes]**

Have the students take turns reading off agenda items and session skills objectives list; answer questions as needed.

Design Process Step 1: Define the Design Problem **[15 minutes]**

Have the students review what they know about the client, site, and client needs. Then, as a group or individually, have the students fill in their *Design Process checklist* sheet.



Who: describe the client(s) who have the design need. Be sure they add the new information learned during the client interview.
Example: "Senior citizens and pre-school children, staff, family members… space should be accessible to people of all ages and abilities…"

When: when might the design be built; when will the space be used
"To be built in 2006; space to be used 8:00 am to 6:00 pm, Mondays – Saturdays, all year long…"

Where: describe the site (geography, climate, specific topography)
"In empty lot on A Street, between senior center and pre-school center. Lot is 100' wide by 200' deep. It is sunny much of the day…" Be sure the students add the information they gained from their *Site Analysis*.

Why: define the *function* of a space. "Our clients need places and spaces to: be together, work in a garden, relax, make and sell garden items; post community notices; enter and exit the site safely; be protected from sun and the rain, and store stuff…"

What? Working directly from the verbs in their **Why** column, have the students fill in their **What** column with ideas of what they could design, filling in the phrase "… so we will design…."

Our clients need places and spaces to…	*So we will design…*
Work together in a garden	A garden for people of all ages and abilities
Relax	Benches
Eat together	Tables and chairs
Make garden/craft items	Work benches
Sell garden craft items	Sales booth
Post community notices	Bulletin board
Be protected from the sun and rain	Areas for shade trees; roofed walkways, porches
Store stuff	Garden shed

What Else? Beyond function, what else do the young designers want this design to be? (Welcoming, beautiful, symbolic, connected to the community…)

Note on Design Process Step 2: Investigate the design problem.
After they define their design problem, designers investigate their design problem. They may:

- Generate questions for, and interview people who own, use and maintain the site.
- Do research from print and web media, from product and landscape catalogs.
- Visit the site to do a site analysis, take photographs, measure, map, and draw.

In this *Citizen School* curriculum model much of this work has already been done in session 1, 2, and 3.

Activities on Scale **[10 minutes]**
Select from the activities listed below:

- Have the students use the *scale rulers* to measure their scale figures. If every ¼" = 1' and a scale figure is 1.5 inches tall, how tall is the real person the scale figure represents? 6 feet. [Note: Could you change the scale of these figures? Yes, you can make figures for 3/8" = 1' and even ½" = 1' models from a pipe cleaner.

- Ask: "In ¼" = 1' scale, how much real space would a 1" x 1" represent? Have groups of four students use their bodies and a 16' loop of string to demonstrate what 4' x 4' of real space looks like. What would fit inside that space? How many 4'x4' spaces would it take to cover the whole classroom? [Note: students need this quick activity, as many of them have difficulty relating scale space to real space.]

- Give each student a small box or several wooden blocks. Using the scale rulers, have them determine how large that building would be in real life if that box were a model in ¼" = 1' scale; ½'" = 1' scale, and so on. Compare those dimensions to the size of your classroom.

- Referring to the *People Spaces* illustrations, have students use masking tape or chalk to lay out, in full scale, w much space a person in a wheelchair needs to clear a doorway, and to navigate a turn.

Demonstration: Bubbles and Trace **[5 minutes]**

Objectives:
- To demonstrate how to develop 3-d architectural ideas in 2-d graphic form
- To have students experience how plans evolve and how spaces are organized.

Preparation
Handout to use: *Bubble Sketches*
You will need: an easel sheet of paper, a black marker, and a few large sheets of trace paper

One value in having students start describing their spaces with bubbles is that drawing ability and straight lines are not an issue--every student can be successful at seeing his ideas on paper. Another value is that bubble sketches help students to think of the "whole" rather than the "parts." Without this step many students will labor to draw a floor plan of one corner of a building, and have no idea how that space relates to the rest of the building. At some point the design will begin to falter and the student may well feel that he is not doing a good job. So start with bubble sketches – something at which everyone can succeed.

To begin develop a bubble sketch of an interior space or an exterior site. When that bubble sketch is done, start a new layer, or layers, of trace-paper bubble sketches. Have students come up to the board and assist you with the drawing process. Ask "is this plan getting any better?" Demonstrate the other merits of trace paper – how flipping it

over can reverse a floor plan; and how to draw one feature, e.g. a set of stairs, on a scrap of trace and move it around under the trace paper layer.

Add a new layer of trace and start turning the bubble sketch into a more defined first draft, (e.g. rough drawing lines for walls, symbols for windows and doors.) Demonstrate how these sketches, over subsequent drafts, can become a finished **floor plan** or **site plan.** Ask for volunteers to draw as the sketched evolve.

Design Process Steps 3 and 4 [40 minutes w/5 minute break]
Objective:

- To enable students to use writing, verbal and drawing skills to cooperatively generate ideas, and choose one design solution.

Design Process Step 3: Generate Ideas: brainstorm, list, sketch

To begin, have each student, or design teams of students, review their *Design Process checklist* sheets, and then brainstorm solutions to their specific problem. Let each member of a design team express their ideas in several ways – talking, writing and drawing in their sketchbooks, doing bubble sketches, and so on.

Design Process Step 4: Choose One Solution and Describe that Solution

The students may need to cooperatively develop one design solution from their many ideas. Have every student, one by one, present their ideas to their group; then have one team member, with consensus, combine some or all of the ideas into one sketch. The students may collaborate more easily if they agree that the design project can only have "one big solution with "three big ideas." As long as each student has had his or her individual ideas heard, chances are they will work together well.

The students may develop a group bubble sketch, then a rough floor plan or site plan (more on floor plans and site plans in the next session). Or they may benefit from developing their ideas in more hands-on ways:

- If they are designing a building they may cut and shape paper or oak tag, and/or use small boxes or wooden blocks to quickly form up 3-d models to help visualize their ideas.

- If they are designing an outdoor community site they may draw a quick plan of the site, in scale, on a large, easel-sized sheet of grid paper. Then they may 1). Cut shapes out of construction paper to represent landscape and built features

(e.g. a hexagon-shaped paper could represent a gazebo; a curve of blue paper could represent a stream; a strip of black paper could represent a street). 2). lay the shapes on the easel grid paper, moving the shapes around and modifying them until they come up with a site plan that meets their design requirements.

When they are done, have the students do a "walk around" to view the sketches/models, and discuss the differences and similarities in each groups ideas.

Review and Preview **[5 minutes]**

Review what was learned and accomplished during this session. Suggest that the students take earlier drafts of their bubble sketches home to share what they have learned with family members. Preview the next session's activities.

Clean-up **[5 minutes]**

Have each student
1) Organize his personal items – sketchbook, handouts, drawings and tools
2) Clean up his work area (table and floor)
3) Work with the group to return all common materials to the materials area

Session 5: Communicating ideas through drawings
Total Time: 90 minutes

Objectives:

- To enable the students to work in collaborative design teams to choose and describe their design solution
- To demonstrate schematic drawing; to have the students communicate their 3-d ideas through 2-d schematic drawings (in scale and in plan view).

Preparation

From the skill-building activities described in this session, select those relevant to your students' design project.

Gather the materials they will need, as listed in each activity. Have the walking tour photos (or magazine clippings) on hand for the *sketchbook ritual.*

Each student will also need their sketchbooks *Design Process Checklist*, bubble sketches, drawing paper, pencil, eraser, and scale rulers.

Consider preparing a *project timeline* to help the students see what tasks will take them through the end of their project.

Note: You may be able to include some of the following student drawing activities in a **visit to an architect's studio**.

Do Now! Sketchbook Ritual [5 minutes]

Lay the walking tour photographs or a collection of magazine clippings out on a large table. Ask the students to select one or two photographs that they would like to use as an inspiration for a part of their current design project. Have them tape the photos into their sketchbooks. Do a "walk-around" and a brief discussion to share ideas.

Agenda Review [5 minutes]

Have the students take turns reading off agenda items and session skills objectives list; answer questions as needed. Introduce the *project timeline.*

Design Process Step 5: Create the Solution: Drawings

There are many ways to do the work of creating a design solution. Architects draw their ideas, make scale models, and so on. The session's activities focus on the work of drawing.

Activities: Creating Schematic Drawings [70 minutes w/ 5-minute break]

Activity: Creating Floor Plans
Objective:

- To give practice in the drawing of architectural ideas in scale and in plan view.

Preparation
Read through the following activities, and select those that will best prepare your students to do schematic drawings of their own. You may choose to "scaffold" the activity, i.e. provide them with a base floor plan or site plan already drawn to scale, and have them concentrate on modifying that plan and/or adding their design details. .

Note: Most students shift to being able to think and draw *in plan view* by grade 3-4 or so. Most students are able to comfortably work *in scale* by grade 5. They may balk if the math looks too complicated, but they can do it.

Equip each student with: ¼' graph paper (11" x 17"), trace paper, pencil, eraser, ruler, and a penny. If sets of drafting tools are available (board, T square, triangle), consider having the students use them. Despite being the computer generation, children like working with drafting tools; and they very much like using scale templates to draw in furniture and fixtures. If drafting tools are unavailable, try to find a plastic triangle for each student to use. Perpendicular, parallel, and even straight lines are better drawn when students use triangles. Students should use a compass or a template, when feasible, for curved lines.

Sheets to use: *Drawing a Floor Plan, Symbols.* If you plan on using transparencies, have an overhead projector on hand.

To begin, select from these activities:

- Project a transparency of, or draw, a simple, dimensioned floor plan on the board. With the *Drawing a Floor Plan* sheets to guide them, have the students draw their own copy of the sample floor plan on their graph paper. The students should be able to do the math necessary to figure out how large to draw those dimensions, in scale, on their paper. (E.g. a 40' wall in real life is drawn as 10").

- Give each student a copy of a floor plan and trace paper. Have them trace that floor plan.

- Set up a **work station** equipped with drafting tools and have the students rotate through a "tracing a floor plan" activity, alongside other quick activity work stations from this skill-building section.

Then, once the students have demonstrated a basic knowledge of the method of drawing floor plans, have them work to translate the ideas on their final bubble sketch into first a rough draft, then a second draft of a floor plan.

This order of drawing has proven to be successful with students of this age:
1) Exterior walls, interior walls [represented by two parallel lines 1/8th of an inch apart]
2) Doors, windows, stairs, [drawn as shown on handouts]
3) Details—furniture, etc. can be neatly drawn in, or drawn with templates. [If you do not establish an order for drawing, many details will get drawn first, and the walls may not get drawn at all.]

To assist the process, ask "how much space do people take up as they move through a space?" If students crowd too much into their floor plans, have them take **The Penny Test**: In ¼" = 1' scale a penny is a circle with a 3-foot diameter. Students take readily to the idea of sliding a penny across their plans, using that 3-foot space as space for hallways, doorways, wheelchair access, and so on. Review the connection made when the students used a 16' loop of string to experience 4' x 4' of real space (1" x 1" of scale space).

Have the students save their process work in their folders for possible inclusion on a presentation board.

Activity or Demonstration: Drawing with CAD
If you prefer, teach the students the basics of how to draw a simple floor plan using a CAD program. Include a CAD demonstration and a simple hands-on CAD activity during the student's **visit to an architect's office**; or set up a CAD work station.

Activity or Demonstration: Drawing Elevations
Will your students need elevation drawings for their projects? If so, now may a good time to demonstrate how one is drawn. As a hands-on activity, the students could cut the four elevations out from the *elevations* sheet and see for themselves how these pieces can be "raised up" around the floor plan to make the beginnings of a 3-d model.

Again, you may be able to include a demonstration and activity about elevations into your **visit to an architect's office**, or into a **work station** set-up.

Activity: Creating Site Plans
Objectives:

- To give practice in drawing site elements in plan view
- To have students demonstrate their ability to work in scale
- To have students work as a design team; to simulate solar orientation.

Preparation
Each student will need pencil, eraser, ruler, ¼" graph paper
You will need transparency of S*ample Site Plan,* overhead projector
Sheets to use: *Sample Site Plan*

For the 3-d site model activity, you will need a large table, green paper (or green plastic tablecloth), construction paper, scissors, string, pipe cleaners, small blocks or boxes, and a flashlight.

Give each student a *Sample Site Plan* and trace paper and have them trace the site plan. Ask the students to tell you what information the site plan communicates, and why that information needs to be communicated. Then have the students orient their papers to north, south, east and west, based on the room that you are all in. "If this room was magically picked up and placed into the center of that site, what would you see when you look out the windows?"

3-d site model: to extend the site plan activity, have the students gather around a large table covered in green paper. Have them measure, cut and lay construction paper shapes onto the table to represent the site features (e.g. blue for water). The students will need to do the figuring necessary to change the scale of the site plan to fit the larger table space. As this is meant to be a quick model, there is no need to glue anything down. Use common materials like pipe cleaners or tissue paper to make quick representations of trees.

To show the importance of **solar orientation** in siting a building, have the students place small blocks or boxes on the model site to represent buildings. Move a flashlight across the site to simulate the sun; discuss how sun and shadows fall on different faces of a building throughout a day. To simulate the penetration of light in windows, cut a 3-d paper shape with cut-out windows, and place that on the site.

Once the students have demonstrated a basic knowledge of the method of drawing site plans, have them work to translate the ideas on their final bubble sketch into first a rough draft, then a second draft of a site plan.

Have the students save their process work in their folders for possible inclusion on a presentation board.

Review and Preview **[5 minutes]**

Review what was learned and accomplished during this session. Preview the next session's activities.

Clean-up **[5 minutes]**

Have each student

1) Organize his personal items – sketchbook, handouts, drawings and tools
2) Clean up his work area (table and floor)
3) Work with the group to return all common materials to the materials area

Session 6, 7: Communicating Ideas through Models
90 minutes each session

Do Now! Sketchbook Ritual 6 **[10 minutes]**
Preparation: gather a collection of small and very small, plain boxes, wooden blocks, cardboard tubes, and plastic packaging of various simple shapes. Have one sheet of easel-sized grid paper available.

Activity: arrange 6 to 8 of the above items on a table, as if to resemble a model of a building, buildings, and/or an outdoor space. Ask each student to a). Draw a view (plan, elevation, or perspective) of that arrangement,
b). write what type of places and spaces he imagines that model to represent; and c). Tell what size he imagines the building to be in real life. Do a "walk-around" and a brief discussion to share ideas.

Do Now! Sketchbook Ritual 7 **[10 minutes]**
Gather the same collection of boxes, etc, used in Session 6's Opening Ritual. Set the collection on a table. Ask the students to brainstorm a sketchbook activity using the boxes. Help the group to agree on one activity. Have the students do that activity. Do a "walk-around" and a brief discussion to share ideas.

Agenda Review: **[5 minutes]**
For each session, have the students take turns reading off agenda items and session skills objectives list; answer questions as needed. Discuss the group's progress in relation to the *project timeline.*

Design Process Step 6: Create the Solution: Scale Models
[65 minutes each session, w/ 5-minute breaks]

Objectives:
- To communicate the design solution in 3-dimensional scale models
- To reinforce working in scale.

Model-building can be time-consuming. Having one model (alongside other project pieces) for the whole group may be enough of a goal. Foam core models are professional-looking, but learning to skillfully cut and assemble the pieces may be a challenge more suited for high school students. We discuss a variety of model-building methods, here; choose what will suit your student and project needs.

Preparation
Each student or design team may need:

- Basic drawing materials: sketchbooks, *scale rulers* paper, graph paper, rulers, pencils, markers, crayons, erasers
- Materials for model bases and walls: cardboard, or news board (chipboard), or foam core, small plain boxes of various shapes and sizes
- Construction paper, oak tag, scissors, tapes, glues; Paint and brushes, if you want to go there…
- A variety of model-making materials for buildings and landscapes:
  Small plain boxes, fabric, burlap, sandpaper, wallpaper…
  Recyclables: acetate packaging, foam pieces, small wood scraps, bottle caps…
  Tissue paper, craft sticks, toothpicks, clay, pipe cleaners, coffee stirrers….
  Twigs, thin wire, burlap, raffia, dried beans…

To begin, talk about scale
Help the students to determine what scale in which to work. Example: you want to build a model of a downtown information center. In real life the center is a one-story building 20′ wide by 12′ deep. It sits on a landscaped site that is 60′ wide by 32′ deep. It has many interesting features that you want to show people in detail.

- In **¼″ = 1′ scale** the model would sit on a piece of cardboard 15″ x 8″
  the building would be 5″ wide by 3″ deep; a 4′ tall person would be 1″ high.

- In **½″ = 1′ scale** the model would sit on a piece of cardboard 30″ x 16″
  the building would be 10″ wide by 6″ deep; a 4′ tall person would be 2″ high.

- In **1″ = 1′ scale** the model would sit on a piece of cardboard 60″ x 32″
  the building would be 20″ wide by 12″ deep; a 4′ tall person would be 4″ high.

Shift your scale the other way and you "zoom out:" a model of an entire neighborhood, landscapes, streets and all, can fit onto a sheet of cardboard, but the buildings will be quite small. In **1″ = 10′** scale a 4′ tall person would only be 4/10ths of an inch high.

Building a site
Students can build sites from layers of cardboard, burlap, fabric, construction paper, etc. Scale trees can be made from thin wire, paper, and tissue paper. Pipe cleaners fit into coffee stirrers also make for the beginnings of good trees. Sites should include representations of topographic features and compass direction/solar orientation.

Have the students build "from the ground up." Many will be so eager to get to the building they will think of landscape only as an afterthought. Help them to first determine what size cardboard base they will need, then have them do landscaping as a first step, then move on to the buildings.

Building a model of a building
Have the students concentrate on completing the basic structure of a building, *before* they get lost in adding details. Adapt the **scale rulers** to help them stay in scale.

Thin news board (or chipboard) makes good models; it may be cut with a paper cutter, and holds paint well.

Foam core needs to be carefully cut with sharp knives against metal straight edges, on a cutting surface.
Demonstrate safe cutting techniques; and then have each student show you that he or she can cut safely.

Students in our courses make many models out of small and very small boxes. The boxes already have a structure: combining them in creative ways can make for an interesting building, and strips of oak tag or cardboard can become porch roofs, curved walls, and can extend or join spaces between boxes.

One simple way to add a model-building component is to have the students build directly up from their floor plan. They can A). Glue a copy of the floor plan to a cardboard surface; B). Add oak tag or news board strips for walls; C). Build scale interiors from cardboard, wood scraps, fabric, etc; D). Add exterior details.

Building an Entryway model
For entryway models, much can be done with cardboard or foam core layers and common art materials. Columns can be decorated with impressed layers of clay. The façade wall can be defined with art materials: are the surfaces shingled, painted, brick, stone? A standing curve of oak tag stapled behind the entryway/façade piece can create a "room" or view one can see as they peer into the entryway. For an entryway to an outdoor space, create some elements of the surrounding site, too – sidewalks, gates, fences, park benches, plantings and so on.

At the end of sessions 6 and 7: Review and Preview [5 minutes]
Review what was learned and accomplished during this session. Preview the next session's activities.

Clean-up **[5 minutes]**

Have each student

1) Organize his personal items – sketchbook, handouts, drawings and tools
2) Clean up his work area (table and floor)
3) Work with the group to return all common materials to the materials area

Session 8: Preparing for the WOW Presentations
Total Time: 90 minutes

Objectives:

- To enable students to communicate and summarize planning ideas in a graphic format
- To have students work collaboratively to draft oral WOW presentations

Preparation

- Bring in sample design project boards.
- Each student or design team will need: sketchbooks, pencil, eraser a backing board –foam core, 24"x36"
- Basic art materials: white paper, graph paper, rulers, pencils, markers, crayons, erasers
- construction paper, scissors, tapes, glue, rubber cement

Equip the students working on the oral presentations with white lined paper and pen; a computer and printer; consider providing a tape recorder as well.

Sheet to use: *Sample Presentation Board*

Do Now! Sketchbook Ritual 8 **[5 minutes]**

Have the students go through their "process pieces" in their folders (e.g. early trace paper sketches). Have them tape one early sketch (or a cut portion of that sketch) into their sketchbooks. Have them write in their sketchbooks: a). what the idea was they were sketching at that point in the process; and b). where that idea is now (how that idea has evolved). Do a "walk-around" and a brief discussion to share ideas.

Agenda Review: **[5 minutes]**

Have the students take turns reading off agenda items and session skills objectives list; answer questions as needed. Discuss the group's progress in relation to the *project timeline*.

Group planning meeting **[10 minutes]**

Review what has been accomplished so far in the course. The students now have a background in architectural awareness, and how designers organize spaces. They have become skilled in communicating their ideas through schematic drawings and models.

The student's WOW presentations will be *designed* in much the same way as the students' projects were. Ask the students to verbalize how these two processes are similar and different. What *functions* will the WOW presentation serve, and thus what *form* should the presentation take?

- Who is our audience?
- What needs to be communicated?
- When (in what timeframe)
- Where (what will the presentation site be like)
- Why (is our goal the clear communication of our ideas?
- How should the information be organized?
- And so in what form would our design project best be presented?

Consider having half of the students work on their presentation boards (a hands-on activity) while the other half of the group drafts their oral presentations; then having the groups switch tasks.

Activities: Presentation Boards & Oral Presentations 60 minutes w/ 5-minute break

Activity: Creating a Presentation Board

Developing graphic summaries of design ideas can make a good stand-alone project, and will aid the students in presenting their ideas to clients and community members at their WOW presentation.

Ask the students what information they think an architect might convey on a presentation board. Then show them some sample boards.

Each board of the set can express a different theme:

Site / Exteriors / Floor Plans / Elevations / Interiors…..

Have the students review all of their design work – writings, maps, bubble sketches, drawings, photographs, as well as the architectural awareness sheets that show the elements and principles of design, and so on. All of these can be sources of graphics for their boards.

Student presentation boards may contains some of these components:

- Logo of Design Team / Project Title, Location, Date
- Text (paragraph summarizing who, what, when, where, why)
- Drawings (early sketches, trace sketches, site plans, floor plans, elevations…)
- Graphics - photographs of model / perspective drawings / computer-generated images
- Exteriors – photographs and clippings showing exterior details and materials

- Interiors – photographs and clippings of interior details and materials
- Landscaping – photographs/magazine clippings of landscape features

Discuss: Are the students really selling an idea to a client, or could Citizen Schools presentation boards convey to their audience *the process* that the students went through during their apprenticeship? Just as students tend to be amazed when they look back at their early process pieces – first sketches on trace paper, for example—so should the WOW audience have the chance to appreciate the journey each student has made.

Have the students:

- Choosing from the components, above, agree on what will be included on their board.
- Agree on a layout for their board (sketching trial layouts first on paper).
- Develop each graphic element on separate sheets of paper.
- Consider "framing" each graphic element (and unifying the elements) by backing it with contrasting paper.
- Lay out the graphic elements on their board.
- Do a mini-evaluation – does this look good – is it understandable – it too crowded – does it say what we want
- It to say – should some pieces be redone or rearranged?
- Neatly glue component pieces to board.

Activity: Developing the Oral Presentations

A presentation should include statements about the problem, the process, and the solution: "Our design problem was… these are the steps we took to solve it…. here is our solution." Have the students work together, in small groups first, then as a whole, to generate, discuss, and refine the pieces of and the sequence for the oral presentations.

Have the students choose an efficient method for recording their thoughts, arranging and rearranging them, until a final draft emerges. Writing ideas on index cards is one method; writing flow charts on easel paper is another.

Their presentations will quite naturally fall into terms of who, what, and where, and why ("Here's a small space where a person can sit and read or talk to a friend; it's next to the curved wall and the big shade tree.") Introduce the process of **debriefing:** have each group select three "big ideas" to talk about; then have a spokesperson for each group demonstrate how those ideas are communicated in their project.

Having them take turns role-playing parts of the presentation, even in draft form, is a good way to refine the text and make them more comfortable with the presentation process.

Review and Preview
Review what was learned and accomplished during this session. Preview the next session's activities

Clean-up **[5 minutes]**
Have each student
1) Organize his personal items – sketchbook, handouts, drawings and tools
2) Clean up his work area (table and floor)
3) Work with the group to return all common materials to the materials area

Session 9: Preparing for the WOW presentations
Total Time: 90 minutes

Objectives:

- To give students a forum in which they can develop and practice the presentation and public speaking skills they need to present their WOW.

Preparation:
Clear the room of extraneous project materials. Arrange the room to resemble a performance space (arrange chairs into an "audience" setting; define a "stage" area for the presentations; set up the displays.) Have any audio-visual equipment and/or computer equipment on hand that the students will need for their presentations.

Have all of the presentation materials on hand, those completed and those in process, as well as the writing and art materials the students used in the last session.

Do Now! Sketchbook Ritual 9 **[5 minutes]**
Have each student look through their sketchbooks and select the one page they like the best. Have them show that page to the other students and explain why they chose that page.

Agenda Review **[5 minutes]**
Have the students take turns reading off agenda items and session skills objectives list; answer questions as needed.

Design Process Step 6: Evaluate the solution **[15 minutes]**
A "successful" design is one that solves its design problem. Have the group **critique** each project:

- Does my solution solve the design problem?
- How well does my solution solve the design problem?
- Does the design clearly communicate their ideas (is it understandable)?
- Should it be redesigned or modified?

Help the students to realize that they have been, by using the steps of the design process, "evaluating" throughout the process. The reason their projects come out so well is that they took the time and care to think the project through—that is what the process helps them do.

Activity: Practicing the presentations **[55 minutes w/ 5-minute break]**

Discuss the actual performance space; and the fact that your room has been arranged to resemble that space. Have the students responsible for making a final list of, and gathering, all of the presentation materials (presentation notes, microphone, other AV needs, presentation boards, and other display materials) they will need for their presentation.

To begin, model a good presentation (speaking slowly and articulately; keeping eye contact with the audience; knowing the information that you are sharing; no fidgeting). [Or model a not-so-good presentation and ask for suggestions for improvements; then model a good presentation.]

Next, have the students practice their parts individually. Then have the students run through their presentations in small groups. Encourage each student to introduce the next speaker once they've finished their presentation. After each presentation have group members kindly critique each presentation, and offer suggestions for improvements.

Finally, have the whole group run through the entire presentation process.

Review and Preview **[5 minutes]**

Preview the logistics for the WOW presentations.

Clean-up **[5 minutes]**

- Have a final clean-up, and pack the displays for travel to the presentation space.
- Give each student a copy of their oral presentation notes, and keep an extra set of copies, just in case.
- Send home student materials that will not be needed for the WOW
- And be sure each student knows what he or she will be taking home after the WOW.

Session 10: The WOW!
Total Time: 90 minutes

The Design Process Step 7: Present the Solution

The final step of the design process is the final activity of Citizen School apprenticeships. At the WOW! students use the presentation skills they practiced in session 9 to present their design ideas to clients and community. The audience will benefit by seeing the students' *products* (their project ideas communicated in various forms) and by learning about the *process* the students went through to define, develop and communicate those ideas. For preparation steps, see *Planning Your Wow Event Worksheet* in the appendix.

Do Now! Sketchbook Rituals List

1 Ask the students to visualize their favorite place in which to spend time. Next, have them each draw that space on a sketchbook page. Then have each student describe that space in one of three ways: 1. verbally; 2. physically (act out the structure of that space; act out being in that space); 3. Visually (hold up drawings; have others guess what and where the space is). Prompt the speaker with questions that introduce the idea that design ideas can be described by using the "5 W's:" "Who uses this space? "What is it made from? What does it feel like? When do you use it? Where is it? Why did you create it?"
Have the group leave their sketchbooks open on their desks, and ask them to do a brief "walk-around" to ensure that everyone has a chance to see everyone else's work.

2 Ask each student to visualize the space that most sticks in his mind from the field trip; or a place he would most want to go back to. Have him sketch one view of that building or landscape element, and write a few words describing how that space feels. Do a "walk-around" and a brief discussion to see what details each student chose to draw.

3 Go through the walking tour photographs, selecting photographs that show a fairly broad view or a streetscape [e.g. a sidewalk with a building behind it), or expanse of landscape or park -- views in which people could be doing things, as opposed to close-up images of architectural detail.]

Set the selected the photographs from the walking tour out on a large table. Have each student: 1). select one photograph; 2). tape that photograph onto a sketchbook page; 3). take a minute to imagine one person or a group of people using that space; and 4). write a few sentences that answer the questions: "Who might use this space? What might they be doing there? When? Why?" Do a "walk-around" and a brief discussion to share ideas.

4 Pre-select one photograph from the walking tour that shows one interesting close-up detail of a building (e.g. one window, a curved metal bracket, a porch railing.) Tape that photo onto the center of a piece of paper, and make one photocopy of that paper for each student (black and white copies are fine, if you've selected an image with enough contrast).

Ask each student to extend the lines of the photograph beyond its frame (out onto the blank area of their paper) and create a drawing of what they think really exists beyond that image (e.g. the building façade surrounding the window). Model the activity for them using another photograph. Do a "walk-around" and a brief discussion to share ideas.

5 Gather a collection of small and very small, plain boxes, cardboard tubes, and plastic packaging of various simple shapes. Have one sheet of easel-sized grid paper available. Arrange 6 to 8 of the above items on a table, as if to resemble a model of a building, buildings, and/or an outdoor space. Ask each student to a). Draw a view (plan, elevation, or perspective) of that arrangement, b). Write what type of places and spaces he imagines that model to represent; and c). Tell what size he imagines the building to be in real life. Do a "walk-around" and a brief discussion to share ideas.

6 Gather the same collection of boxes, etc, used in Session 6's Opening Ritual. Set the collection on a table. Ask the students to brainstorm a sketchbook activity using the boxes. Help the group to agree on one activity. Have the students do that activity. Do a "walk-around" and a brief discussion to share ideas.

7 Lay the walking tour photographs, or a collection of magazine clippings out on a large table. Ask the students to select one or two photographs that they would like to use as an inspiration for a part of their current design project. Have them tape the photos into their sketchbooks. Do a "walk-around" and a brief discussion to share ideas.

8 Have the students go through their "process pieces" in their folders (e.g. early trace paper sketches). Have them tape one early sketch (or a cut portion of that sketch) into their sketchbooks. Have them write in their sketchbooks: a). what the idea was they

were sketching at that point in the process; and b). where that idea is now (how that idea has evolved). Do a "walk-around" and a brief discussion to share ideas.

9 Have each student look through their sketchbooks and select the one page they like the best. Have them show that page to the other students and explain why they chose that page.

Resources for Teachers and Students

Many of these resources are available for use at the Boston Society of Architects' library, on the 4th floor of the Architects Building: 52 Broad Street, Boston, MA. To visit, call 617-951-1433.

General resources that cover many topics:

Architecture in Education (Foundation for Architecture, Philadelphia)
A compendium of sensible, specific activities to increase architectural awareness and understanding – chapters focus on vocabulary (with illustrations); design (shapes, pattern, scale, perspective); materials; structures; home; interiors; exteriors; neighborhoods and streets (mapping, walking tours); cities.

Architecture and Children Studio Design Model Curriculum (Anne Taylor, Ph.D)
The seventeen posters and accompanying chapters in the teacher's guide take educators and children all the way through the design process. Some chapters could be the basis for apprenticeships: entryways; preferences (classroom design); landscapes (schoolyard design). Other useful lessons focus on visual vocabulary; plans and perspectives; structure; you are architecture; colors and textures; design in nature; form in architectural history; bridges; super wall graphics; and city planning. A visual survey form is included for taking walking tours.

Architecture is Elementary (Winters)
Extend students' visual thinking through architecture. Concepts and activities from simple to complex. Clear text, fine graphics.

Architecture: Form, Space and Order (Ching)
How does an architect take space and fashion it into a beautiful building? What elements and principles of design are at work in the process? A sequenced all-graphics compendium--everything you ever wanted to know about architecture-and the visuals to explain it all.

Students, Structures, Spaces (Aaseng)
The lessons (including handouts) focus on: Tuning into the Environment; The Community Where you Live; People Spaces; Structure and Space; Useful Tools and Techniques. Specific activities cover: how spaces feel; drawing floor plans; community

surveys; cognitive mapping; school spaces; pace; scale; vocabulary. [Out of print, but look in a library system]

Round Buildings, Square Buildings and Buildings that Wiggle like a Fish (Phillip Isaacson)
Photos and text work perfectly together to convey the power and the beauty of architecture. A unique and valuable book, an award-winning children's book, sure to inspire educators and children alike.

A Changing American Cityscape (Renata Von Tscharner)
Seven 11"x33" color posters detail the changes in a fictional city, years 1875 to 1990. Guide included, but the wonderful posters speak for themselves.

To involve youth in community study, planning and design:

- Box City: an interdisciplinary experience in community planning (CUBE)
- Walk Around the Block (CUBE)
- Map-Making with Children (David Sobel)
- Picture This! (CUBE; curriculum with slides and/or video)
- Viewfinders and Viewfinders Too (Dunn Foundation; visual awareness curriculum, slides)
- Youth Planning Charrettes (APA – American Planning Association)

More great resources:

- Children's Special Places (David Sobel)
- American Architects (Joanne Guilfoil; curriculum and photo prints)
- Places and Space in Art (Joanne Guilfoil; interdisciplinary K-2 architecture projects)
- Frank Lloyd Wright for Children (K. Thorne-Thomsen)
- By Nature's Design (Murphy/Neill)
- American Shelter (Les Walker)
- Designing Playgrounds (Jan Ham)
- A Blueprint for Geometry (Lombard/Fulton)
- I Know that Building (Jane D'Alelio)
- Architects make Zigzags (Roxie Munro)
- Why Design? Projects from the National Building Museum (Slafer/Cahill)

Books on structures and model-making:

- The Art of Construction (Mario Salvadori)
- Exploratorium's Guide to Scale and Structure

- What if Feels like to be a Building (Wilson)
- Building Toothpick Bridges (J. Pollard)
- Block Building for Children (Les Walker)
- Model making; a Basic Guide (Martha Sutherland)

Web Sites:

- Learning By Design in Massachusetts / Boston Society of Architects www.architects.org/lbd
- CUBE (Center for Understanding the Built Environment) www.cubekc.org (Box city, walk around block, lesson plans)
- Architecture in Education (Philadelphia) www.aiaphila.org/aie (lesson plans)
- Salvadori Center www.salvadoricenter.com (all about structures)
- Design Education: www.designeducation.org
- Architectural Education Resource Center (resource catalog) www.architects.org/kidscatalog
- Great Buildings: www.greatbuildings.com

NOTES -- Handouts:

1 Making a scale figure

2 Identifying architecture (2 pgs.)
Elements & principles of design
Being a structure
Natural forms in architecture
Site analysis
Sample route map

3 none

4 Design Process checklists
Scale rulers
People spaces

Bubbles and trace

5 Sample floor plan
Sample site plan
Symbols and landscape symbols

6, 7 none

Architectural Design Education and the Massachusetts Curriculum Frameworks

The Massachusetts Curriculum Frameworks outline what specific academic skills students should have mastery over by a specific point of time. The Frameworks cut across all curricula units including math, English Language Arts and Visual Arts.

The Urban Design Apprenticeship provides students with authentic real world learning opportunities that can help students strengthen their understanding of these concepts by actively engaging them in the learning process.

MA Visual Arts Standards

Visual Arts Core Concepts & Guiding Principles – Students will:

- "Apply imagination and rational thinking to the making of Art;"
- "Understand the historical and cultural contexts of the Arts;"
- "Make connections among the Arts, with other disciplines, and with Arts resources in the community."

MA Visual Arts Standards -- Students will:

- "Demonstrate knowledge of the methods, materials and techniques unique to the visual arts." (Std. 1)
- "Demonstrate knowledge of the elements and principles of design." (Std. 2)
- "Demonstrate their powers of observation, abstraction, invention and expression." (Std. 3)
- "Demonstrate knowledge of the process of creating and exhibiting artwork: drafts, critique, self-
- "Assessment, refinement and exhibit preparation." (Std. 4)
- "Describe and analyze their own work and the works of others using visual arts vocabulary." (Std. 5)

MA Visual Arts – Connections Strands -- Students will:

- "Describe the purposes for which art and architecture was created;" (Strand 6)
- "Describe the role of artists/architects in communities;" (Strand 7)
- "Demonstrate understanding of concepts of style;" (Strand 8)

- "Analyze how artists/architects use materials, invention and technologies in their work;" (Strand 9)
- "Apply their knowledge of the arts/architecture to the study of language arts, history and social Science, mathematics, and science and technology/engineering." (Strand 10)

MA Science & Technology Frameworks

"Lifelong learners are able to understand and apply the design process and the use of technology in society. They use the design process to solve, justify and communicate solutions to problems. They:

- Identify a problem or design opportunity,
- Propose designs and choosing among solutions,
- Implement a solution that conforms to the design constraints,
- Evaluate the solution and its consequences against planned criteria,
- Redesign the solution as needed, and
- Communicate the problem, process, and solution."

(The Design Process; Understanding and Using Technology in Society)

"Students will develop a sense of stewardship and care – a sense of responsibility for protecting human beings and the environments that sustain them now and for generations to come."

(MA Science & Technology Frameworks: Habits of Mind)

MA Mathematics Frameworks

"Students will use:

- Problem solving [applying the process of mathematical modeling to real-world problem situations]
- Communicating and reasoning [interacting with others to solve problems and share strategies]
- And connection [apply mathematical thinking and modeling to solve problems in other disciplines].
  (MA Mathematics Standards – Core Concepts)
- "Students will use measurement, estimation and number sense in everyday problem situations."
- "Students will use geometry and spatial sense to: "visualize, represent and describe the physical world" and "interpret and draw three-dimensional objects; and solve problems."

(MA Mathematics Standards 3.2; 3.3; 3.5; 3.9)

Pathways to a Career in Architecture

What is architecture?
Architecture is the imaginative blend of art and science used in the design of environments for people. Problem-solving, decision-making, team leadership and creativity are key elements in making architecture and lead to the tremendous excitement that comes from seeing a design idea become a physical reality.

What is an architect?
Architects may design, draw, build scale models, write, supervise or manage. They also may teach, perform research or consult.

Most architects do not construct the buildings they design; that is usually done by construction firms. However, smaller projects such as houses are often built by the architect who designs them. Architects also may develop projects on their own, alone or in conjunction with financial advisors, real-estate developers or others.

Architects do more than design space: they serve as consultants on a broad range of clients' needs such as long-term business planning, relocation planning, human resources and space-use planning, facility maintenance programming and hundreds of other services. The practice of architecture is enriched by the cultural and ethnic diversity of the men and women who join the profession.

What other professionals work with architects?
Other professionals who work with architects include structural, civil, electrical and mechanical engineers, landscape architects, acoustics and lighting consultants, interior designers, exhibit designers, artists and photographers, city planners, facility managers, regional planners, developers, real-estate firms, sociologists, demographers and many more.

How do I become an architect?
To become a licensed architect, you must meet three standards: education, experience, and exam. First, you will need to gain a professional degree in architecture from an accredited higher-education architecture program; second, you will need to complete an internship (working under the supervision of a licensed architect); and third, you will need to pass the nine-part ARE (Architect Registration Exam). After completing the three "Es," you are a "licensed" architect. The entire path to licensure typically requires eight to ten years to complete.

At what point in high school should I take architecture-related classes?
If you are interested in a career as an architect, it is best to begin early. Your own environment — at home, in school, and in your community — is a good laboratory for study. By learning to "see" buildings, spaces, and their relationships, you will become sensitive to the things that concern architects. Notice the effects of color, texture, light, and shape — the "tools" of architecture — and consider how spaces and places "feel" when you are in them. Analyze your positive and negative reactions and see if you can connect them to design elements. Look for rhythm and pattern, simplicity and ornament, old and new in your environment, and notice the variety in your community. Think about the values expressed in the design of your house, school and city hall.

What kinds of skills should I have?
When in high school, you should plan a college preparatory program strong in English, history, social studies, mathematics, physics, and foreign languages. If you can, add courses in business and computer science. It may surprise you to know that freehand drawing skills will be more useful to you than drafting ability. Computer literacy is essential.

Perhaps the best attributes are to be able to listen, to speak and write (communicate) effectively and to be able to organize your thoughts and activities.

Must I go to a college that has an architectural program?
There are two different educational paths. One is a five- or six-year program that usually leads to a Bachelor of Architecture. The other is a four-year undergraduate program, not necessarily in architecture, followed by a two- to three-and-one-half-year graduate architecture program that leads to a Master of Architecture.

What kind of salary can I expect?
Entry-level jobs often pay in the range of $12-15/hour (with a professional degree; 1999 figures) and usually involve drafting and/or model-building. Obviously, this will depend on your skills and experience to date; summertime and part-time job experience are recommended as a way of starting at a higher level upon graduation.

Entry-level jobs for holders of Bachelor of Architecture or Master of Architecture degrees pay from $25,000 to $40,000 (1999 figures). Six to ten years out of graduate school, you may earn $45,000 (1999 figures). Generally, the only way to earn substantially more is to own your own firm or become a partner in a large firm. Even then, the average income range is from $70,000-100,000 (1999 figures).

What are related careers that architects may pursue?
In addition to "traditional" careers in architecture, an architectural education may lead to a number of other careers, such as:

Construction Managers — Although they hold a variety of job titles, construction managers plan direct construction processes including the selection, hiring, and oversight of specialty subcontractors.

Interior Designers — Interior designers plan, design, and furnish the interior of private homes, public buildings, and commercial establishments such as offices, restaurants, hospitals, hotels and theaters, either as new construction or renovation. With a client's tastes, needs and budget in mind, interior designers develop designs and prepare working drawings and specifications for interior construction, furnishings, lighting and finishes.

Landscape Architects — Landscape architects design residential areas, public parks and playgrounds, college campuses, shopping centers, golf courses, parkways and industrial parks. They plan the location of buildings, roads and walkways as well as the arrangement of flowers, shrubs and trees. They often collaborate with architects, surveyors, engineers, environmental scientists, foresters and other professionals.

What can I do to develop my interest in architecture?
You are encouraged to visit the design studios of a school of architecture, tour the offices of a local architecture firm and read books and magazines on architecture to gain a broad understanding of the nature of an architect's work and the values of the profession. Many schools of architecture offer summer programs for high-school students.

You may also be interested in attending The BSA's annual Career Day. It brings students, parents, guidance counselors and educators together to discuss college programs and career paths in architecture, interior design, landscape architecture and planning.

Adapted from Your Career in Architecture, prepared by the Boston Society of Architects with assistance from the Consortium for Design and Construction Careers.

DESIGN PROCESS CHECKLIST

❑ Step 1: DEFINE THE DESIGN PROBLEM: what problem do I need to solve?

Who?_____

_____

Where? _____

_____

When? _____

Why? [I/my client needs places and spaces to.....]	What? [So I will design.....]

What Else? (...and I want this place or space to....)

_____

❑ Step 2: INVESTIGATE: this is how I will research the design problem:

_____

❑ Step 3: GENERATE IDEAS: brainstorm, list, sketch, diagram

_____

_____

❑ Step 4: CHOOSE ONE SOLUTION. DESCRIBE THAT SOLUTION:

_____

_____

❑ Step 5: CREATE THE SOLUTION.

❑ Step 6: TEST or EVALUATE THE SOLUTION:

Does my solution solve the design problem? _____

How well does it solve it? _____

Should it be REDESIGNED or MODIFIED? _____

❑ Step 7: PRESENT THE SOLUTION.

Learning By Design in Massachusetts

A Boston Society of Architects design education program for children and teachers

SITE ANALYSIS

This site is (location, description):

It is next to / bordered by:

People use this site to:

Here is what I observed -- I am marking these features on my site map:
elements and principles of design / structural shapes / geometric shapes / surface textures

natural (landscape) features / changes in level: high spaces...low spaces... / slopes....elevations
wet spaces, water elements, wetlands / dry spaces / rock spaces, ledge
vegetation: tree spaces, bushes, plants, vines, garden spaces

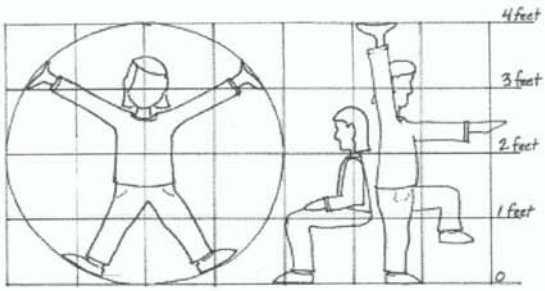
open spaces / enclosed spaces / noisy spaces, quiet spaces /animal spaces
sunny spaces, dark spaces / light and shadow / windy spaces, calm spaces

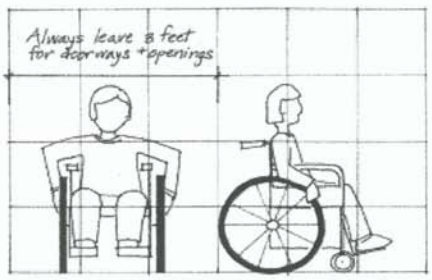
pathways: pedestrian pathways / walkways, ramps, stairs, crosswalks/
vehicle pathways / parking / handicap parking, ramps / bike paths

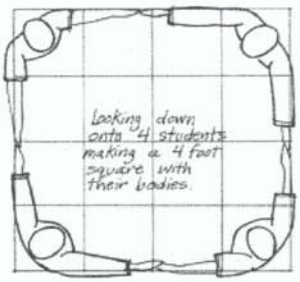
boundaries, fences that separate areas / connections between areas
focal points: places that draw ones attention
utilities – water, gas, electricity, sewer, oil tanks, storm drains, trash, lighting

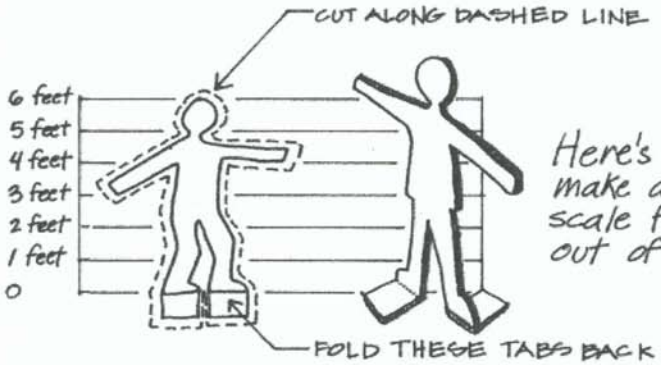
Learning By Design in Massachusetts
A Boston Society of Architects design education program for children and teachers

PEOPLE SPACES







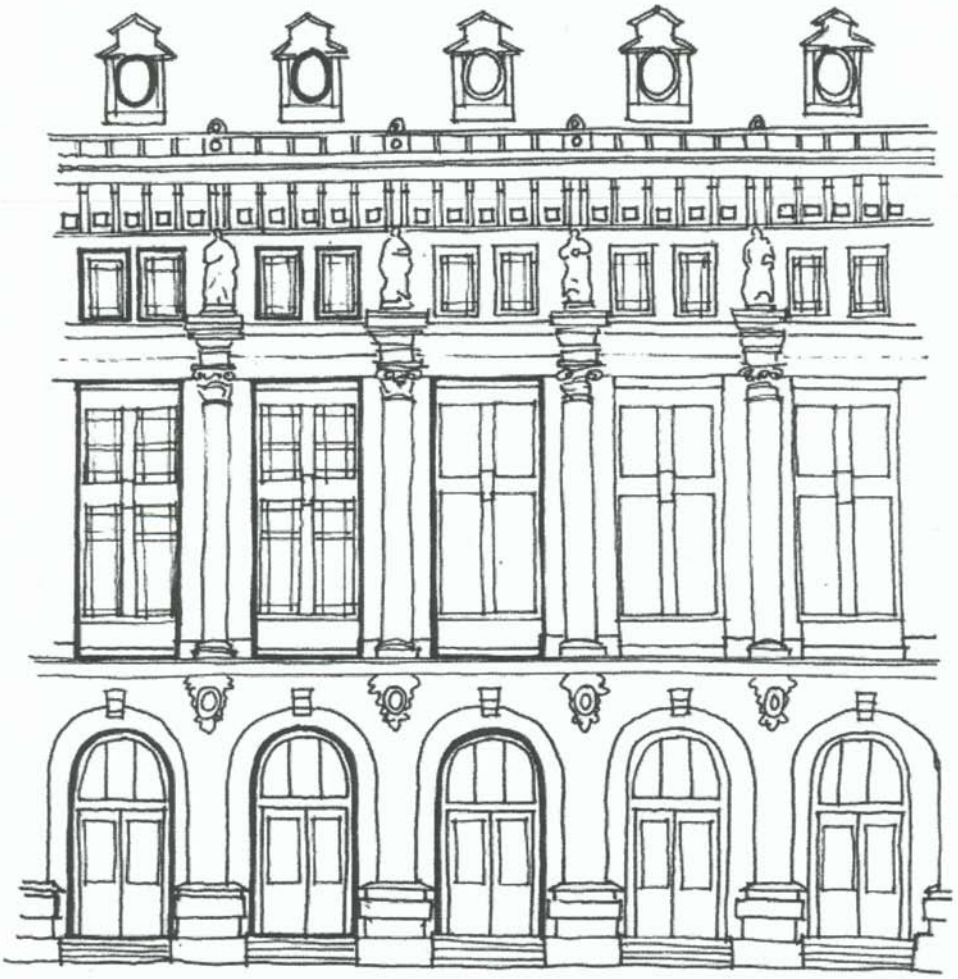


Here's how to make a quick scale figure out of oaktag.

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

Learning By Design in Massachusetts
A Boston Society of Architects design education program for children and teachers

FACADE TO TRACE



Le Sorbonne
Paris, France

Learning By Design in Massachusetts
A Boston Society of Architects design education program for children and teachers

DRAWING ARCHITECTURAL DETAILS

Draw close-up views of **6** architectural details.
Some examples include: a Geometric Shape, a Structural Element,
an Element or Principle of Design, a Natural Form, an Entryway, or something you like.

#1

#2

#3

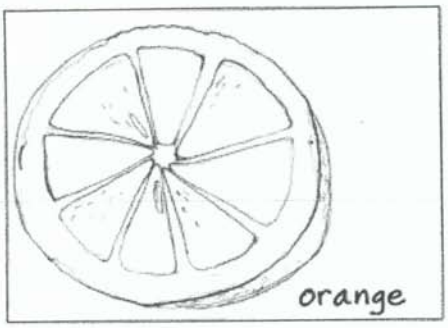
#4

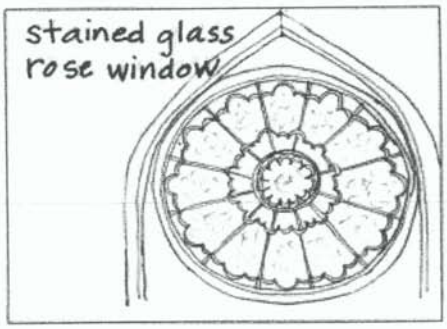
#5

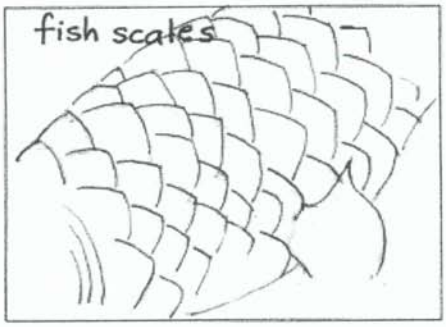
#6

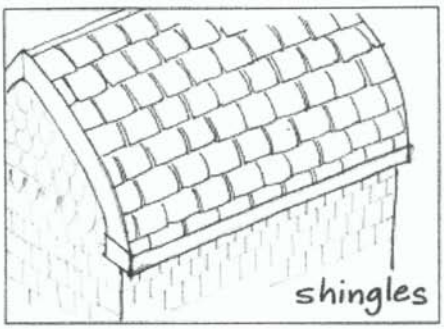
Learning By Design in Massachusetts
A Boston Society of Architects design education program for children and teachers

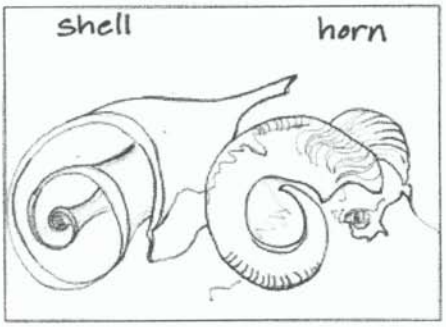
NATURAL FORMS IN ARCHITECTURE

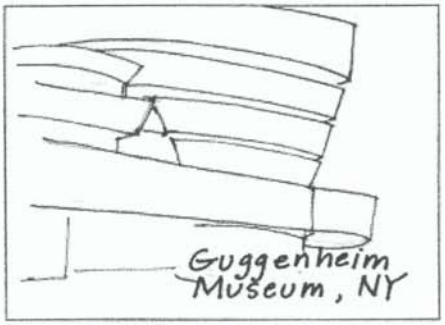






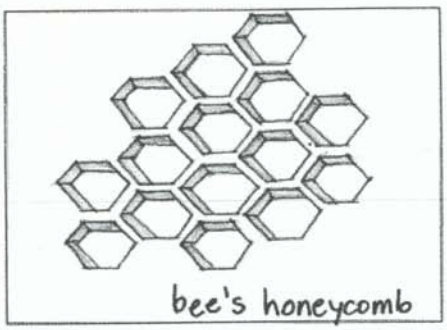


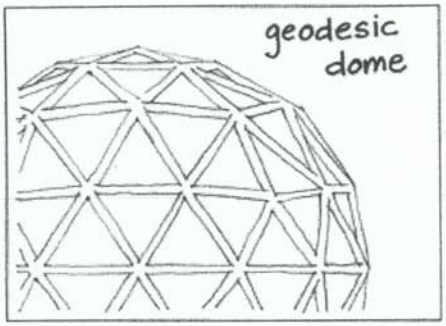


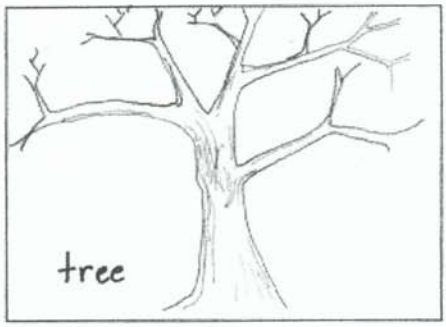


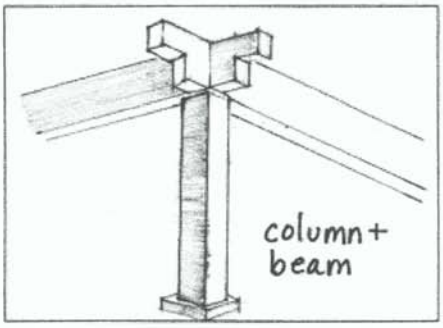
Learning By Design in Massachusetts
A Boston Society of Architects design education program for children and teachers

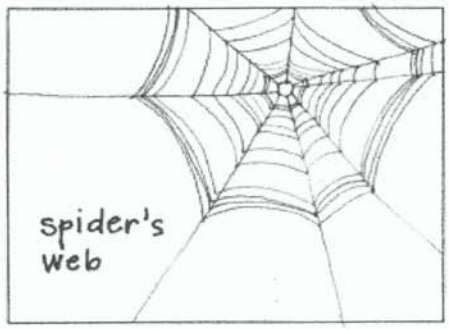
NATURAL FORMS IN ARCHITECTURE

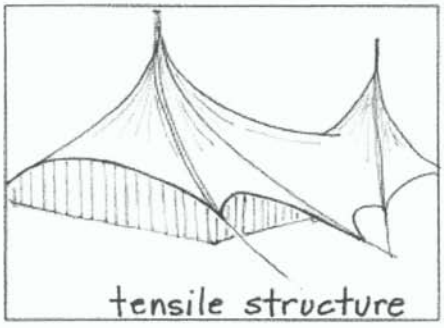






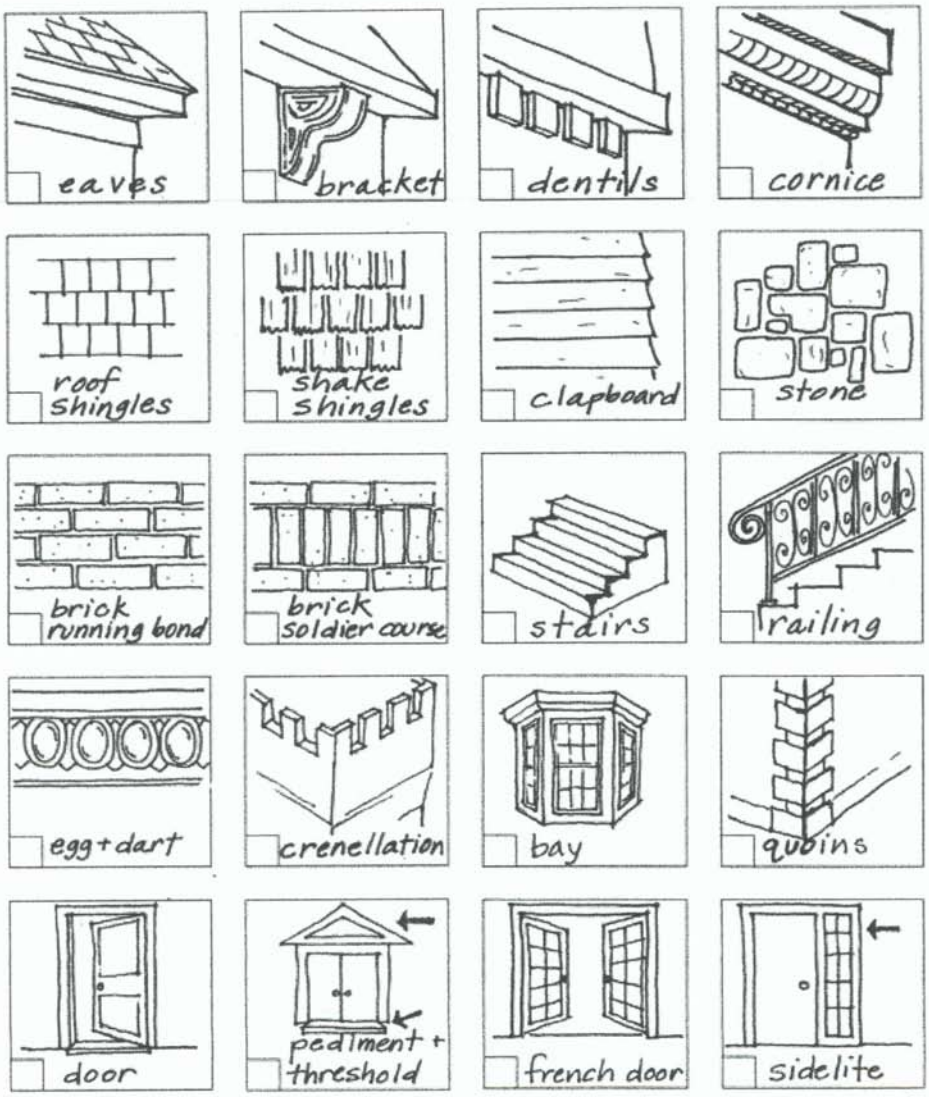






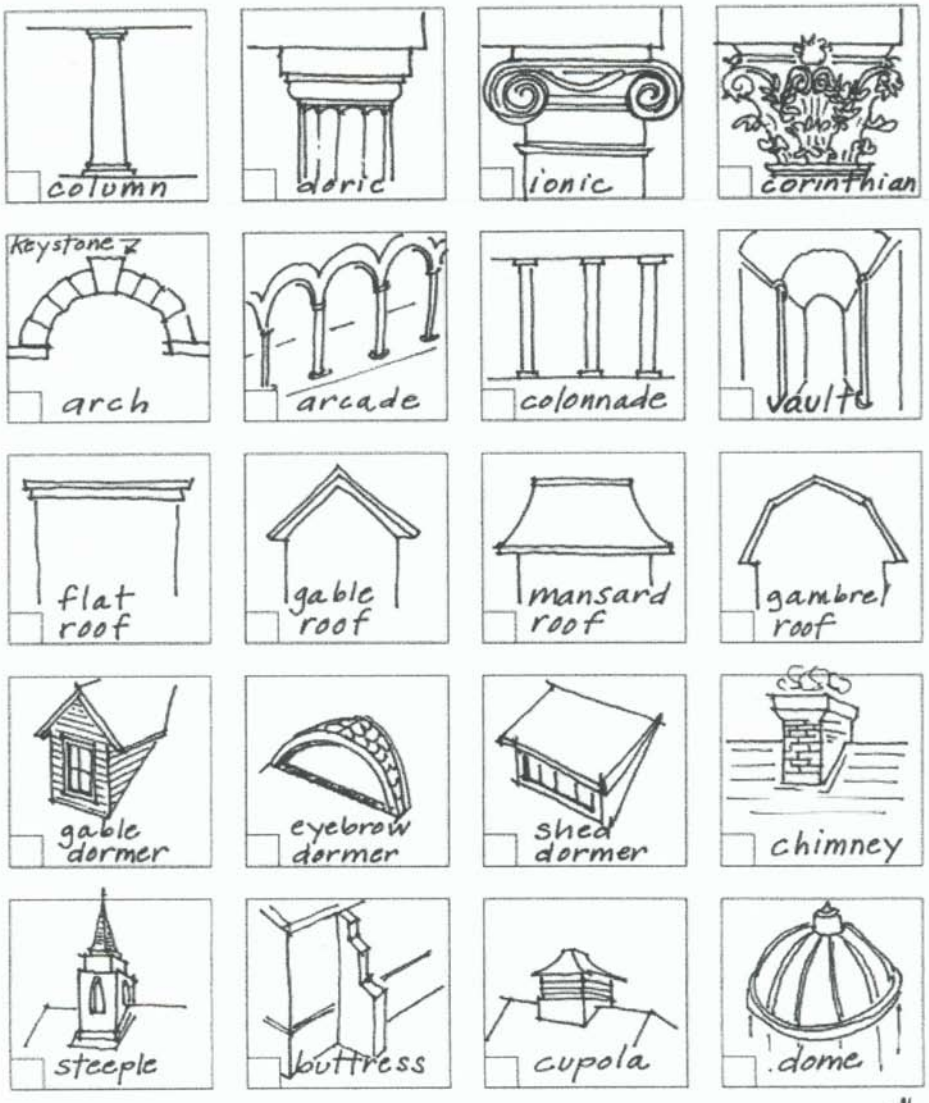
Learning By Design in Massachusetts
A Boston Society of Architects design education program for children and teachers

IDENTIFYING ARCHITECTURE



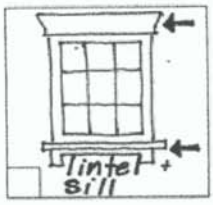
Learning By Design in Massachusetts
A Boston Society of Architects design education program for children and teachers

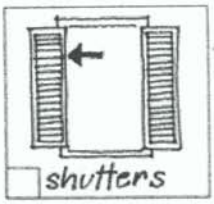
IDENTIFYING ARCHITECTURE

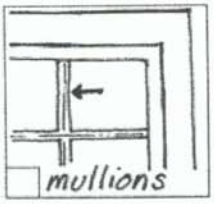


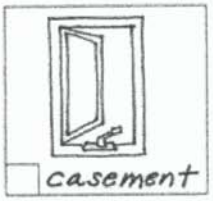
Learning By Design in Massachusetts
A Boston Society of Architects design education program for children and teachers

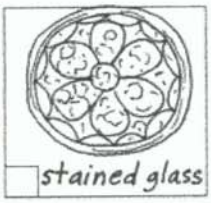
IDENTIFYING ARCHITECTURE

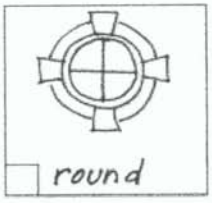


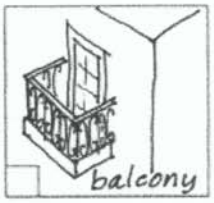


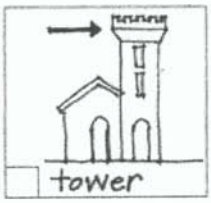


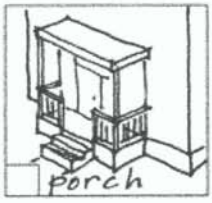


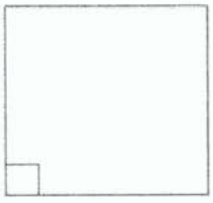


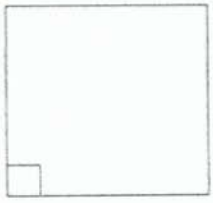


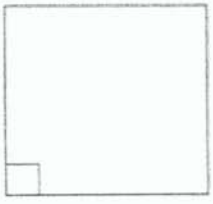


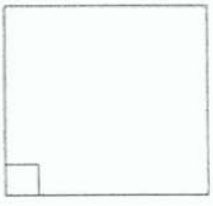


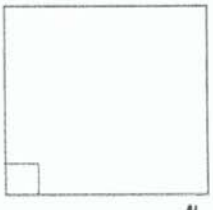






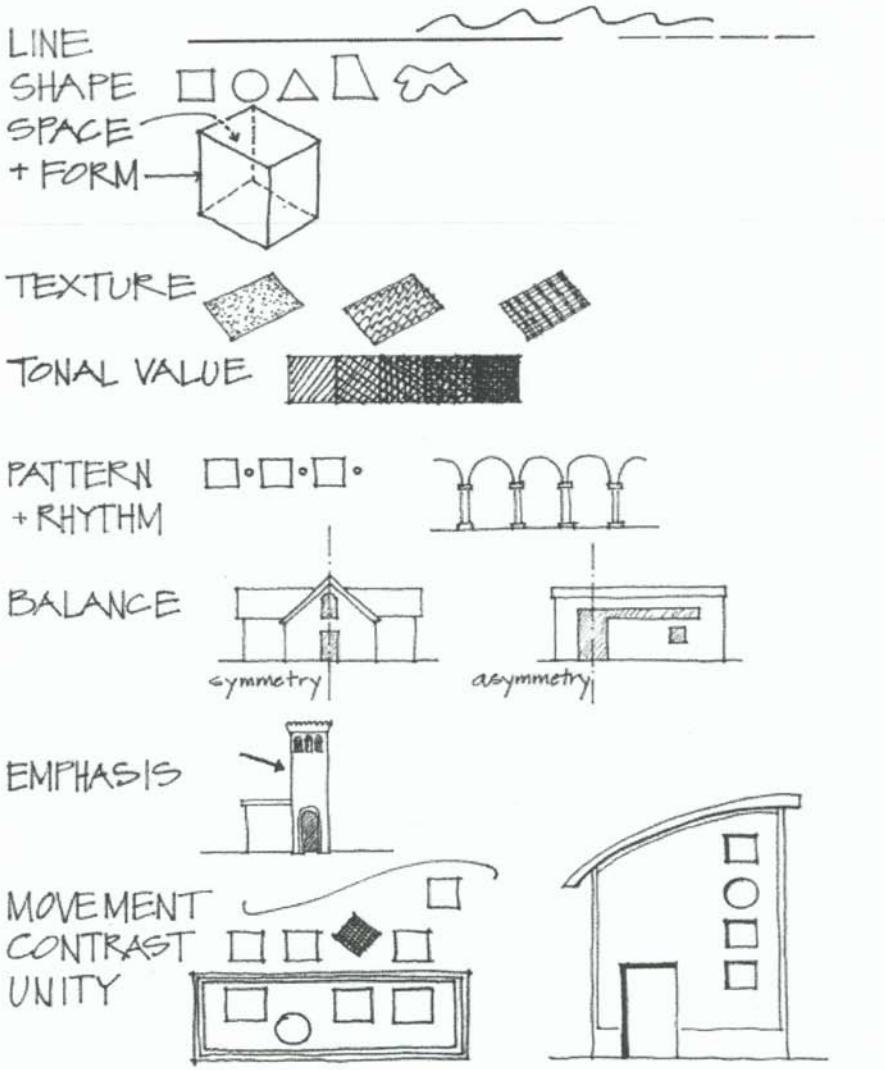






Learning By Design in Massachusetts
A Boston Society of Architects design education program for children and teachers

ELEMENTS & PRINCIPLES OF DESIGN



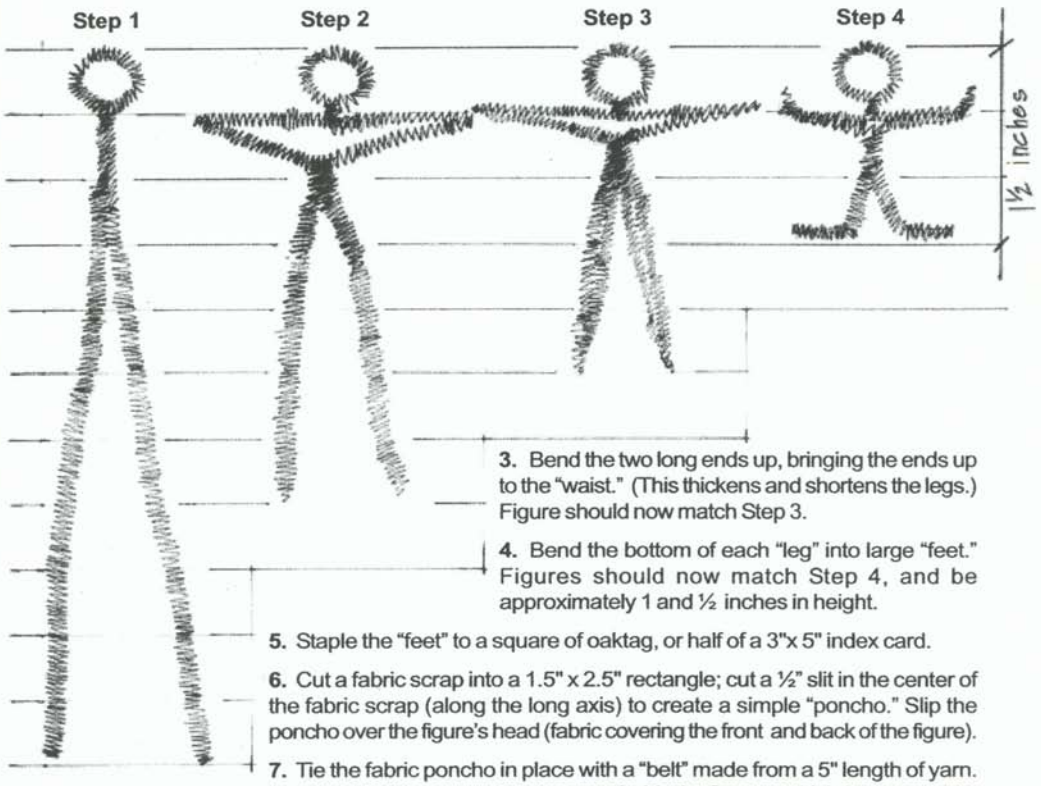
Learning By Design in Massachusetts
A Boston Society of Architects design education program for children and teachers

SCALE FIGURES

1. Bend a 12" pipe cleaner in half. Insert a pencil at the top bend, and twist twice just below the pencil to form the "head" and "neck." Figure should now match Step 1.

2. Raise the two long ends straight out, one to each side of the figure; then bend them back in at a point ½" out from the "neck," creating ½"- long arms as in Step 2. (hint: to help with this step, lay your figure right down on the Step 2 illustration.)

2a. Twist the "body" twice just below where the arms meet the body (to keep the body together). Figure should now match Step 2.



3. Bend the two long ends up, bringing the ends up to the "waist." (This thickens and shortens the legs.) Figure should now match Step 3.

4. Bend the bottom of each "leg" into large "feet." Figures should now match Step 4, and be approximately 1 and ½ inches in height.

5. Staple the "feet" to a square of oaktag, or half of a 3"x 5" index card.

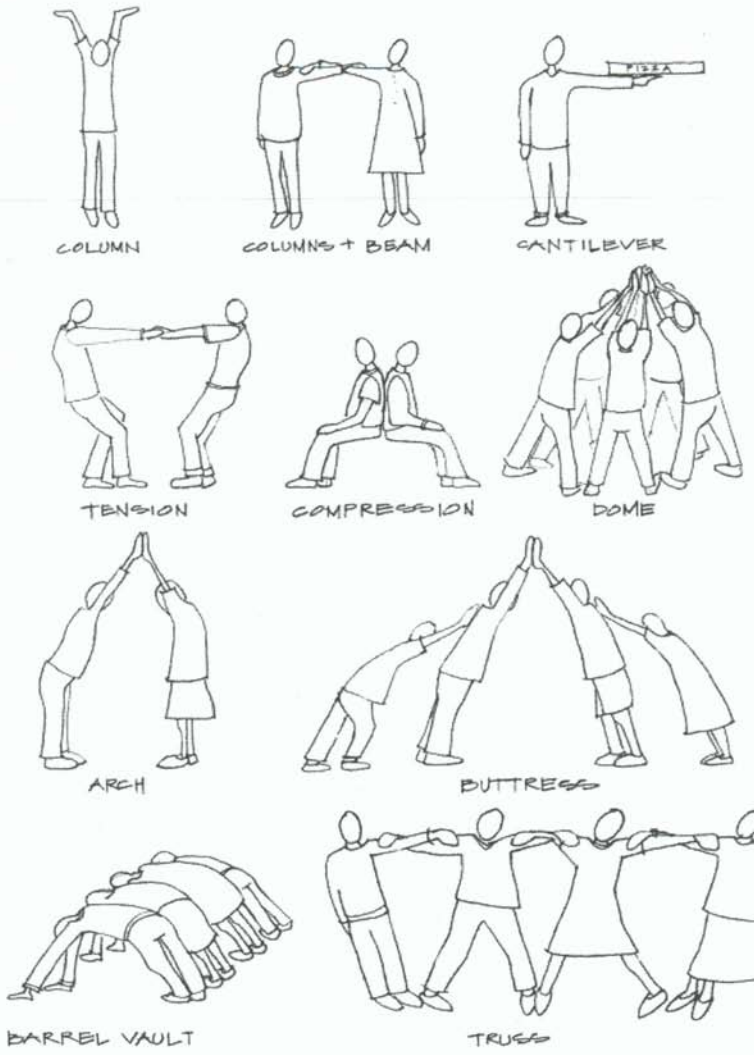
6. Cut a fabric scrap into a 1.5" x 2.5" rectangle; cut a ½" slit in the center of the fabric scrap (along the long axis) to create a simple "poncho." Slip the poncho over the figure's head (fabric covering the front and back of the figure).

7. Tie the fabric poncho in place with a "belt" made from a 5" length of yarn. (hint: work with a partner, one person holds the figure and fabric, one person ties the belt.)

8. Add details to personalize your figure: yarn for hair, a hat, a bag, stroller, pipe-cleaner pet, etc.

Learning By Design in Massachusetts
A Boston Society of Architects design education program for children and teachers

BEING A STRUCTURE



Adapted from Architecture in Education, Foundation for Architecture, Philadelphia

Learning By Design in Massachusetts
A Boston Society of Architects design education program for children and teachers

NATIONAL HEADQUARTERS:

Museum Wharf
308 Congress Street
Boston, MA 02210
Tel 617.695.2300
Fax 617.695.2367
www.citizenschools.org

Citizen Schools, a leading national nonprofit provider of out-of-school learning programs for students in the middle grades, uniquely mobilizes business, civic and community volunteers to participate in education by teaching hands-on apprenticeships. Our programs integrate these authentic learning projects with activities that build academic, leadership, and study skills, preparing adolescents for achievement in high school, college, the workforce and civic life.