Designing Our Community

A "Community Visioning" Process

These programs show that students in **grades 6-12** are fully capable of developing solutions for real-world community problems. Connecting the studies of Community, Mathematics and Design, a program could take place in a classroom over the course of **six 1.5-hour sessions.** In past LBD:MA programs, middle and high school students have designed improvements for community centers, museums, libraries and a nature center. In two "Designing Our River Heritage" classroom programs, students designed landscape and architectural improvements for underutilized areas along their city's rivers.

This **Community Visioning** program could also take place at a community site on Saturdays, vacation weeks, or during after-school hours. In this real-world setting, the process can be a part of *community design charrettes* in which adults and children envision uses for a given community site. Students learn to read and use planning tools such as aerial maps and scaled drawings, and then set them to work tackling a local design issue. When students and adults work together on detailed, large-scale models the process can energize on-going community design efforts.

During one summer week, 20 middle school students developed ideas for "A Gateway to Mission Hill," a 2-acre Boston site that is the focus of on-going city development charrettes. Their 1/8" scale concept model included a mixed-use development organized around a central park with an illuminated center fountain.

As they design for their community, the students work alongside professional architects; and explore design as a career path. They also use many skills and concepts from the **MA Curriculum Frameworks**, including:

<u>Mathematics:</u> geometry; estimation and measurement; scale and proportion,

<u>Science & Technology/Engineering</u>: the engineering design process; structure and materials; ecosystems, energy systems and sustainable design,

<u>Social Sciences</u>: community as a reflection of its people; local history and culture; reading, interpreting and creating maps; science and technology in the context of society, history and human affairs,

<u>Visual Arts</u>: materials, methods and techniques of schematic drawing, sketching and model-building; graphic design; drafting, revising and exhibiting; the elements and principles of design,

<u>English Language Arts</u>: research and surveys; developing a vocabulary of architecture and design; composition, oral presentation.

Here is a general outline of the **Designing Our Community** process:

Define the Design Problem

The students first define their design problem in writing: "Who are we designing for, what do we need to design, when, where, and why?" as well as "what else could our design be?" They are introduced to the concept of "universal design," design for people of all ages and abilities. Once they define their design problem they "take ownership," working long and hard to communicate their design ideas.

Investigate the Design Problem

How are Communities Designed? The students work together to learn more about their design problem:
  - conducting a **Site Visit** [a first-hand investigation of the design site that may include measuring, mapping, drawing, photographing and writing]
  - taking an **Architectural Walking Tour** to learn more about the buildings and landscapes of the area
  - finding and studying local planning maps and historic photos
  - interviewing community members.

To develop a common language of design, the students take part in Architectural Awareness Activities: viewing slides, identifying elements and principles of design; natural, structural and geometric design features. They draw a building façade; and take part in the *Being a Structure* activity.

Using the Changing American Cityscape poster set, students see how a city changes over time. They discuss how communities are a result of decisions people have made in response to their needs.

Generate Ideas: brainstorm, list, sketch, diagram…. and Choose the Best Solution

Creating Visioning Collages: To brainstorm ideas for their site the students begin working with real 'tools of the trade:' maps and plans that show the site at different scales. They make their own **2d concept collages:** Working on a 14" x 14" square of black foam core each student communicates his/her fledgling ideas for the site from construction paper shapes, magazine clippings, thin foam sheets and origami paper.

This 2d concept collage activity quickly engages the students in a successful design activity; and gives them practice working in scale and in 2d plan view. It helps the students to make abstract ideas visible; and helps them to begin to "take ownership" of their design ideas. Each collage becomes a visual reference – a way to share first ideas for the site; something to refer back to as ideas evolve; and a "process piece" to display as a part of a final presentation.

Creating Bubble Sketches: By sketching on layers of trace paper, the young designers develop more specific ideas for their community space. Ideas for spaces evolve over several drafts, from general, loosely-drawn shapes, to more specific areas. In design teams, they work together to decide which one design solution they will develop.

Describe the Solution through a Prototype (drawing or model)
Skills in Mathematics and the Visual Arts come into play as the students communicate their design ideas. After practicing the necessary skills, the students draw scale site plans and/or floor plans from the measured sketches they drew during their *site visit.*

Next, the students construct 3d scale models of their design ideas. In teams, students work from their site plan to build a 3-d site (on a cardboard base) for their model. Buildings are built from small boxes or foamcore pieces. Arts and craft materials are used to create other features of the built environment [e.g. benches fountains, sculptures] and park and landscape elements.

Redesigning the Solution as needed: Mini-evaluations and group design meetings during the drawing and model-building phases help students to improve their designs.

Evaluate the Solution
Reviewing their work — from initial writing, to site sketches, to scale drawings, to models — the students consider the success of their designs. In writing, they each consider: "Does my design solution solve my design problem?
How well does it solve my problem? Could the design be modified or improved?"

Present the Solution
To prepare for presentations before classmates, designers and community members, the students develop and practice oral presentations. Each group uses selected pieces from their portfolio of writings, photographs, and drawings to create a *design presentation board* – a graphic means of displaying design ideas. They may also choose to create a media presentation of their work.

Community members and designers are impressed by the quality of students' final presentations and by the reach of their ideas. When middle schoolers presented their 16' x 6' floor model of "A New Vision for Mattapan Square" at the Harvard Graduate School of Design, a chief architect of the Boston Redevelopment Authority noted that *"the model invites participation, since nothing is glued down and elements are meant to be moved."* The **Community Visioning** process gives young people the opportunity to take an active role in championing the remarkable potential of our neighborhoods.

Mathematics Standards

6.G.2   Identify 3d shapes based on their properties, such as edges and faces.
6.G.3   Identify relationships among *points, lines, and planes…*
6.N.4   Demonstrate an understanding of fractions as a ratio of whole numbers…

6.M.1   Apply the concepts and formulas of perimeter and area to the solution of problems.
6.M.2   Identify, measure, describe, classify, construct: angles, triangles, and quadrilaterals.
6.M.3   Solve problems involving *proportional relationships*… e.g. *scale models…*

6.G.7   Identify three-dimensional figures (e.g., prisms, pyramids) by their physical appearance, distinguishing attributes, and spatial relationships such as parallel faces.
8.G.8   Recognize and draw two-dimensional representations of three-dimensional objects, e.g., nets, projections, and perspective drawings.

8.N.3   Use ratios and proportions in the solution of problems involving… scale factors.
8.N.10   Estimate and compute with fractions, integers, decimals, and percents.
8.N.11   Determine when an estimate rather than an exact answer is appropriate and apply in problem situations.
8.N.12   Select and use appropriate operations—addition, subtraction, multiplication, division, and positive integer exponents—to solve problems with rational numbers.

8.M.1   Select, convert and use appropriate units of measurement or scale.
8.M.2   Given the formulas, convert from one system of measurement to another.
8.M.3   Demonstrate an understanding of the concepts and apply formulas and procedures for determining measures, including those of area and perimeter/circumference.
8.M.4   Use ratio and proportion (including scale factors) in the solution of problems.

8.P.4   Identify the slope of a line as a measure of its steepness… Apply the concept of slope to the solution of problems.

English Language Arts Standards

Standard 1:   Discussion
Standard 2:   Questioning, Listening, and Contributing. Gather relevant information for a research project or composition through interviews.
Standard 3:   Oral Presentation
Standard 4:   Vocabulary and Concept Development
Standard 9:   Making Connections: Relate a literary work to information about its *setting*.

Standard 19:   Composition
Standard 20:   Considering Audience and Purpose
Standard 21:   Revising
Standard 22:   Standard English Conventions;
Standard 23:   Organizing Ideas in Writing
Standard 24:   Research
Standard 25:   Evaluating Writing and Presentations
Standard 27:   Media Presentations

Visual Arts Standards

STANDARD 1 Methods, Materials, and Techniques: demonstrate knowledge of the methods, materials, and techniques unique to the visual arts.

STANDARD 2 Elements and Principles of Design: demonstrate knowledge of line, texture, shape, form, pattern, symmetry, space and composition [balance, repetition, rhythm, scale, proportion, unity, harmony, emphasis].

STANDARD 3 Observation, Abstraction, Invention, and Expression: demonstrate their powers of ob-servation, abstraction, invention, and expression.

STANDARD 4 Drafting, Revising, and Exhibiting: demonstrate the processes of creating and exhibiting: drafts, critique, self-assessment, refinement, exhibit preparation…

STANDARD 5 Critical Response: describe and analyze their own work and the work of others using appropriate visual arts vocabulary…

STANDARD 6 Purposes and Meanings in the Arts: describe the purposes for which works of … architec-ture were and are created…

STANDARD 7 Roles of Artists in Communities: describe the roles of artists, patrons, cultural and arts institutions in societies past and present.

STANDARD 8 Concepts of Style: demonstrate understanding of styles, stylistic influence, and stylistic change…

STANDARD 9 Inventions, Technologies and the Arts: describe, analyze how visual artists use and have used materials, inventions, and technologies;

STANDARD 10 Interdisciplinary Connections: apply knowledge of the arts to the study of other disci-plines; apply knowledge of other disciplines in learning in the arts.

Science and Engineering/Technology Standards
Engineering Design Gr 6-8
2.1 Identify and explain the steps of the engineering design process, i.e., identify the need, research, develop solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and redesign.
2.2 Demonstrate methods of representing solutions to design problems: sketches, projections, views… Describe and explain the purpose of a given prototype.