Program Details +
Learning Standards Alignments:

Learning By Design in Massachusetts
A K-12 architecture and design education program

Box City

A Community Building Project

Box City is a hands-on, interdisciplinary experience in community planning and design. For the past 35 years children of all ages have used *Box City* to show the world that children know what makes a good city, village or town. The *Box City* process was developed by CUBE, the Center for Understanding the Built Environment.

In CUBE programs worldwide, children learn to value the built environment while improving their problem-solving and social skills. CUBE brings together educators with community partners to effect change which will lead to a quality built and natural environment, one and interdependent. This means cities which work for adults and children; buildings and spaces which are healthy and aesthetically pleasing; streetscapes and landscapes which reach to the future while celebrating the past.

LBD:MA offers two types of **Box City** programs at schools and at community sites:
1. Small-scale Community-Building projects for **grades 1-6:** Programs involving one grade or one class run for **six 1.5 hour sessions.**

2. Whole-school Box City events for **grades K-8:** Depending on the size of the student population, a *Box City* can take **10-15 days** of LBD:MA consulting. Individual teachers can expect that **5 - 6 hours of class time** will be given to the project over the course of those 10-15 days.

In this program students work alongside professional architects and explore design as a career path. While working together to create a memorable scale-model community they connect many skills and concepts from the **MA Curriculum Frameworks:**

Social Sciences: community as a reflection of its people; local history and culture, reading, interpreting, and creating maps, defining a "sense of place";
Mathematics: geometry, measurement and estimation, scale and proportion;
Science & Technology/Engineering: the engineering design process, structures and materials, ecosystems, energy systems and sustainable design;
Visual Arts: the elements and principles of design, architecture in community, methods, materials and techniques;
English Language Arts: questioning, listening and contributing, developing a vocabulary of architecture and design, composition.

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1. Box City as a Community-Building Project

An excellent way to connect Community study with Mathematics and Design, in these program students in **grades 1-6** engage in a community-planning project based their village, city or town. In general, the **Box City** process goes like this:

What Makes a Community?

The students are introduced to their design project – to develop a scale-model community. As a group they consider "What makes a community?" and "How does the design of the built and natural environments contribute to the quality of life in that community?" They read or listen to books about community and architecture that convey a strong "sense of place."

People Make a Community: Students create 1" = 4' scale "citizens," givng their scale figures names, ages and occupations. They are introduced to the concept of Universal Design: design for people of all ages and abilities.

Architectural Awareness Activities

What do we See? Students find and discuss elements and principles of design; geometric shapes; natural forms, and structures in slides of Boston's built environment.

Tracing a Façade: Students view and trace a photo of a building façade; identifying design elements and structural shapes.

Changing American Cityscape: Students view and discuss posters depicting how a city can change over time.

Being a Structure: In this physical awareness activity students act out structural terms with their bodies.

Collage: Students create collages with architectural photos and with graphics from their walking tour handouts.

Walking Tour

Guided by a *walking tour packet* that includes a route map, photographs and handouts, students observe and discuss the built and natural environments of their community. They draw sketches, touch materials, do texture rubbings, estimate and measure spaces, take photographs and write about what they see. They search for elements and principles of design, cultural elements, structural elements and geometric shapes. They may also do activities such as *How do Spaces Feel; What are People Doing; and Mapping Connections and Pathways.*

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Box City Community-building Project

Students review the photographs and drawings made during their walking tour. They consider and write about: Who will use our community? [our scale-model citizens]
What landscapes and buildings would our community need?
When will these places and spaces be used?
Where is the site for our community? What is its geography, climate and topography?
Why do our people need community places?
What Else would give our community its own special sense of place?

Scale Activities: Each student is given a box that will be used in building the city model. They use scale rulers to determine: if every 1" of this box represents 4' (scale: 1" = 4'), then how large would this building be in real life? As a group, using paces, bodies and string, the students lay out the footprint of that building.

Building the Scale Model: After receiving their "building permits," students work in teams to design and construct simple models of the buildings for their city. Boxes are combined into a basic shape, construction paper "siding" is added, as are roofs, windows, doors and porches.

Arts and craft materials are used to create other features of the built environment [e.g. benches fountains, sculptures] and park and landscape elements.

Creating and Using our Box City Community

Urban Planning: the City is Set-up: A base map of the city space [showing roads, public spaces and landscape features] is set out on a large floor space. Students bring their scale models to the site. They discuss what layout of models would create a good community spaces for its people: what buildings should be next to what other buildings, transportation routes, and so on.

Using the Box City: in grade-level activities, students:
- write stories or news articles about the city
- draw pictures and take photos of the city
- use the community for math activities: measuring, mapping and graphing
- give guided tours of the city to community members.

Evaluating the City: Students consider and then write: "how well did our design solution [this city model] solve our design problem [to create a good community for our scale model citizens]? How could our community be improved?

Extension Ideas: Students may work from photographs of their Box City to create their own "Changing American Cityscape" murals; or create brochures or video tours of the city. Students' models, writings and drawings may be displayed at community site.

2. Box City as a Whole-school Event

In general, a **10 -15 day** school-wide *Box City* goes like this:

Prior to the Event:

LBD:MA master teachers/architects meet with administrators, teachers and parent volunteers, to plan the *Box City* process and to run short workshop sessions for teachers and parent volunteers. Teachers decide on the focus of the city (will it be based on their own town, or will students develop a new city from the ground up?); and select activities students will do before, during and after the program.

1. Planning the Town

Defining our Design Problem – What makes a good city? LBD:MA meets with students to introduce the program, and to engage the students in the planning process. The city will be based on the decisions the students make at these planning meetings.

Making Scale Box City Citizens: Each student creates a ¼" = 1' scale figure, a "citizen" for their Box City.

2. Solving our Design Problem: model-building and map-making

Each student or group of students is issued a "building permit" for a building or landscape feature *(public; commercial; residential; recreational; industrial/transportation; or green space).* Then, with help from LBD:MA master teachers and/or volunteer architects children construct their ¼" = 1' scale model buildings.

Older students map out the city – preparing the "base map" of landscape, roads, rivers, signs, etc. Student "planners" may also determine the layout of the town, i.e. which specific buildings will be placed where.

3. Setting up the City

First, students and volunteers set out the roadways and the landscape of the city in school gym. [Most schools keep the completed city set up in the gym for 2-3 days.] Next, each class brings their completed models to the gym, and sets them in the city.

4. Learning from the City: Box City Visits

Once the city is complete, all students visit the town and do grade-level activities, e.g. writing a *Box City News* article, drawing the city, doing math and mapping activities (measurement, scale and gridding), taking photos, developing brochures or video tours.

Students also evaluate their town: Did our design solution solve our design problem? How could our town be improved? At their teachers' discretion, students may spend additional time improving their design, creating and placing additional items in the city.

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Parents, community-members and media visit the city during an evening event. At the end of the *Box City* program, individual models are returned to students' classrooms, where they may be used in additional activities.

A Box City — whether built in a school setting or at a community site — teaches a myriad of skills and concepts, while bringing the members of a school community together. Visitors to the city appreciate that the youngest child has contributed just as much to the success of the city as an older child**.** As one visitor wrote: *"You could see the pride, the happiness, as each student placed their building in the city. What a marvelous integration of disciplines."* A gym filled with hundreds of carefully-crafted city buildings is a memorable sight, truly, *"more than a sum of its parts."*

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 25: Evaluating Writing and Presentations
Standard 27: Media Presentations

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Science and Engineering/Technology Standards

Engineering Design K-6

Engineering design requires creative thinking & strategies to solve practical problems generated by needs & wants.

2.1 Identify a problem that reflects the need for shelter, storage or convenience.
2.2 Describe different ways in which a problem can be represented (sketches, diagrams, graphic organizers, lists).
2.3 Identify relevant design features (size, shape, weight) for building a prototype of a solution to a given problem.

Engineering Design Gr 6-8

2.1 Identify and explain the steps of the engineering design process, i.e., identify the need or problem, research the problem, develop possible 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…
2.3 Describe and explain the purpose of a given prototype.

Mathematics Standards

2.M.3 Compare the length, weight, area, and volume of two or more objects…. :
2.M.4 Measure, compare objects using metric, English units of length measurement…. :

4.M.1 Demonstrate an understanding of such attributes as length, area, weight, and volume :
4.M.2 Carry out simple unit conversions within a system of measurement, e.g.feet to inches.

4.P.5 Solve problems involving proportional relationships: map interpretation (scale).

4.G.1 Compare and analyze attributes and other features of 2d and 3d geometric shapes. :
4.G.2 Describe, model, draw, compare, and classify 2d and 3d geometric shapes.
4.G.4 Identify angles as acute, right, or obtuse. :
4.G.5 Describe and draw intersecting, parallel, and perpendicular lines. :
4.G.8 Identify and describe line symmetry in two-dimensional shapes. s

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, quadrilaterals.
6.M.3 Solve problems involving *proportional relationships* , e.g. *scale models*….

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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 powers of observation, abstraction, invention, and expression…Create 2D and 3D artwork.

STANDARD 4 Drafting, Revising, and Exhibiting: demonstrate knowledge of the processes of creating and exhibiting artwork: drafts, critique, self-assessment, refinement, and 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 … architecture 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 disciplines; apply knowledge of other disciplines in learning in the arts.

History and Social Science Standards

K.3 Identify student's address, city or town…school and the city or town in which it is located.
K.4 Describe location and features of places in the neighborhood of home or school.

1.4 Describe a map as a representation of a space, such as the classroom, the school, the neighborhood, town, city, state, country, or world.

3.3 Observe and describe local or regional historic artifacts and sites and generate questions about their function, construction, and significance.
3.4 Use cardinal directions, map scales, legends, and titles to locate places on contemporary maps of New England, Massachusetts, and the local community.
3.9 Identify historic buildings, monuments, sites in the area; explain their purpose and significance.