**Program Details +
Learning Standards Alignments:**

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

Houses in Literature

Authors and illustrators communicate their ideas about buildings through words and pictures; architects communicate their ideas through scale plans and models — all are using the creative process of design. In this program, over the course of **four 1.5-hour sessions, K-6 students** use picture books and the houses therein as a springboard for creating and writing about homes, landscapes and neighborhoods.

This unit works well as a stand-alone project. It is an excellent and enjoyable way to connect learning in English Language Arts to hands-on activities in other subject areas as outlined in the **MA Curriculum Frameworks**:

Science & Technology/Engineering: the engineering design process, structures and materials

Mathematics: 2d and 3d shapes, estimation and measurement, patterns, scale and proportion

Social Sciences: community as a reflection of its people, developing a "sense of place"

Visual Arts: methods, materials and techniques, elements and principles of design

English Language Arts: reading, vocabulary, making connections, organizing ideas, composition.

This unit can also be combined with other student projects. For example, it can serve as a precursor for a major *Box City* design project; or students involved in a *History through Architecture* project can design, build, and write about homes for Early American colonists, or Roman citizens, and so on. The entire class' work may take center around one book; or, teams of students may select different books, creating different projects that can be combined into an interesting exhibition.

The sessions have the students following these *Steps of the Design Process:*

1. *Define the design problem* — Who? What? Where? When? Why? What Else?
2. *Investigate* — learn about houses and homes
3. *Brainstorm*
4. *Choose one solution*
5. *Describe the solution* through a prototype [drawing or model]; and redesign as needed
6. *Evaluate the solution*
7. *Present the solution*
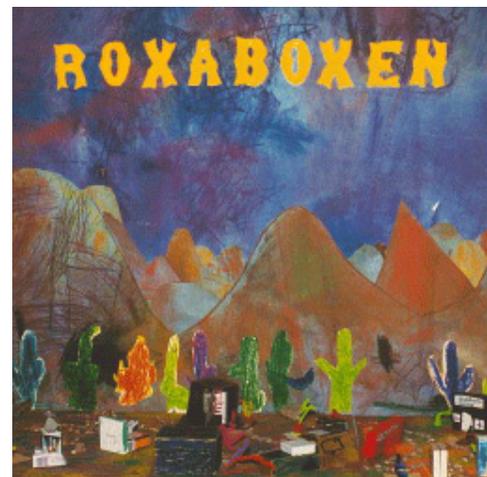
To begin, the students *define their design problem:* "We will be creating people and places, and telling stories about these people and places." They define *who, what, when, where, why and what else:* "Who will live in this house? Where is the house? What spaces do I need to design for them, and Why? When will they use these spaces? What Else could my house be?"

The students practice working in scale by creating the ¼" = 1' scale figures that will become the "characters" for their stories. They are introduced to the concept of Universal Design: design for people of all ages and abilities.

To *investigate their design problem* the students read and/or listen to stories with good descriptions of houses and a strong sense of place [see *Houses in Books* list].

They view and discuss photographs of houses and/or take a *Neighborhood Walking Tour*, observing, drawing, photographing and writing about architectural features, geometric shapes, and structures.

Next, they *brainstorm* ["What kind of houses could I design?"] and *choose one solution* ["This is the house I will design."]
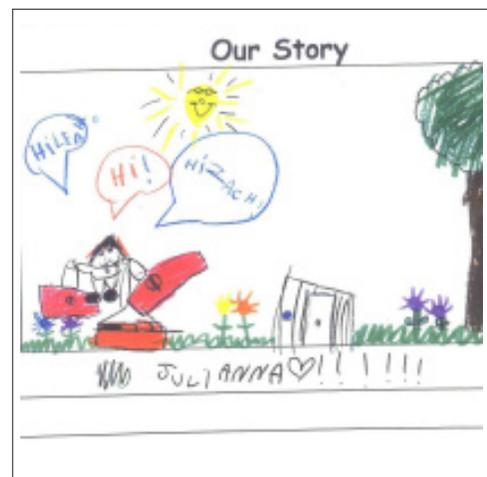
After practicing some building techniques, the students *describe their solution* by building a simple scale-model house from boxes [shoeboxes or gable style take-out boxes] and construction paper. With the teachers' help they estimate what size house their box represents in ¼" = 1' scale; their scale figures help them to accurately visualize the size of that scale space.

The students cover the outside of their box with paper "siding," and add a construction-paper roof. They may additionally create a floor plan for the inside of their box house: graph paper and scale handouts of furniture and architectural symbols help them to develop simple floor plans. Windows and doors are carefully drawn on the "siding," or cut-and-pasted from handouts.

Designing and building a site [or yard] for their house comes next. After planning "what will be on our site, and why?" common art and craft materials are used to create landscape features. Each of these model-building steps can become times to share design ideas through group discussions, practice math skills of estimating and measuring, and relating scale space to real space.

Mini-evaluations and group design meetings during this building phase encourages the students to *redesign their projects as needed.*

As a culminating activity each student writes and illustrates a story about the people, places and spaces they have designed. This writing is a natural extension of the process, for as soon as the students have created their scale figures in session one, they are inventing stories about these people.

During a final gathering, the students informally *evaluate their work* ["Does my design solution solve my design problem? How well does it solve my problem? Could the design be modified or improved?"] and describe their house and tell their stories during oral presentations.

Extension Activity
Young children's imaginations center on thoughts of self and home. As older students expand their world to include neighborhood and school, so too do their stories. Thus a logical way to extend this project is to allow the students to set all of their people and houses together on a tabletop or floor. In another process of design the group may discuss how to create a neighborhood, where to place the houses and streets, the parks and landscapes. Once this neighborhood is built, in a second-round of writing and storytelling, the students write "neighborhood stories," stories in which young characters have adventures in the houses and yards of their small community.

Houses in Literature gives teachers a comfortable way to introduce the design process to their students. It starts in the realm of story, moves through the hands-on world of 3d design, and then ends back in the realm of story. The first page of Tolkien's The Hobbit is a detailed description of what it feels like to open a hobbit's front door, walk through his rooms and look out of his windows. One could do worse than to start a student session on house-building with a read-aloud from a good piece of fiction.

Mathematics Standards:

2.G.1   Describe attributes, parts of 2- and 3-d (length, corners, edges, faces, sides).

2.G.2   Identify, describe, draw and compare 2-d shapes….

2.G.5   Identify symmetry in two-dimensional shapes.

2.G.6   Predict the results of putting shapes together and taking them apart.

4.G.1   Compare and analyze attributes and other features (e.g. number of sides, faces, corners, right angles, diagonals, and symmetry) of 2d and 3d geometric shapes.

4.G.2   Describe, model, draw, compare, and classify 2d and 3d shapes: circles, polygons [triangles and quadrilaterals] cubes, spheres, and pyramids.

4.G.3   Recognize similar figures.

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.

6.G.2   Identify three-dimensional shapes based on their properties, such as edges and faces.

6.G.3   Identify relationships among *points, lines, and planes….*

2.N.3   Identify and represent common fractions as parts of wholes and parts of groups….

4.N.4   Select, use, and explain models to relate common fractions and mixed numbers, equivalent fractions, mixed numbers, and decimals, and order fractions.

6.N.4   Demonstrate an understanding of fractions as a ratio of whole numbers….

2.P.1   Identify, reproduce, describe, extend, create simple rhythmic, shape, size, number, color, and letter repeating patterns.

4.P.5   Solve problems involving proportional relationships, including unit pricing and map interpretation (e.g., one inch represents five miles, so two inches represent ten miles).

2.M.4   Measure, common objects using metric and English units of length measurement….

2.M.5   Select and correctly use the appropriate measurement tools, e.g., ruler….

2.M.6   Make and use estimates of measurement, including time, volume, weight, and area.

4.M.1   Demonstrate an understanding of such attributes as length, area, weight, and volume, and select the appropriate type of unit for measuring each attribute.

4.M.2   Carry out simple unit conversions within a system of measurement, e.g. feet or inches.

4.M.4   Estimate and find area and perimeter of a rectangle, triangle, or irregular shape using diagrams, models, and grids or by measuring.

4.M.5   Identify, use appropriate metric and English units and tools (ruler, angle ruler…) to estimate, measure, solve problems involving length, area… angle size…..

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* and units of measurement, e.g.,same system unit conversions, *scale models*, maps, and speed.

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 the elements and principles of design: color, line, texture, shape, form, pattern, symmetry ….

STANDARD 3 Observation, Abstraction, Invention, and Expression
Demonstrate powers of observation, abstraction, invention, and expression…

STANDARD 4 Drafting, Revising, and Exhibiting
Demonstrate the processes of creating and exhibiting artwork: 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 dance, music, theatre, visual arts, and architecture were and are created, and, when appropriate, interpret their meanings. When viewing examples of … architecture … ask: "What is the artist trying to say?" "Who made this, and why?" "How does this work make me feel?"

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 and 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 English language arts… mathematics, and science and technology/engineering.

English Language Arts Standards:

Standard 4:   Vocabulary and Concept Development
Standard 5:   Structure and Origins of Modern English
Standard 7:   Beginning Reading
Standard 8:   Understanding a Text
Standard 9:   Making Connections: Relate a literary work to information about its setting.
Standard 12:   Fiction
Standard 19:   Writing;   Standard 21: Revising
Standard 22:   Standard English Conventions
Standard 23:   Organizing Ideas in Writing

Science and Engineering Technology Standards:

Engineering Design, Grades K -6: Engineering design requires creative thinking and strategies to solve practical problems generated by needs and 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, and lists.

Engineering Design, Grades 6-8: Engineering design is an iterative process involving modeling and optimizing for developing technological solutions to problems within given constraints.
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, evaluate, communicate the solution(s), and redesign.
2.2   Demonstrate methods of representing solutions to a design problem: sketches, orthographic projections, multiview drawings.
2.3   Describe and explain the purpose of a given prototype.