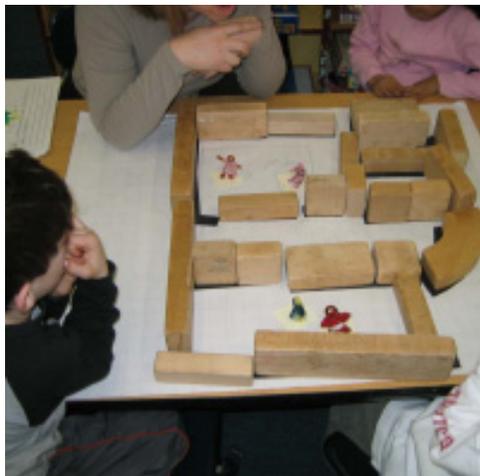# Block Design

What do young children know about places and spaces; about their built and natural environments? When building with wood blocks, what are children thinking — are they imagining details of interior and exterior spaces that wood blocks cannot reveal? Are they imagining people using those places and spaces?

In **four 1-hour sessions** this interdisciplinary design project for **grades K-2** extends block play into the realms of drawing, writing, scale model-building and storytelling. It enables children to develop their ideas about a place over time; and to use the *design process* to communicate their ideas about that place.

This curriculum was first developed by teachers at a workshop looking to deepen the experiences their Kindergarten students had during block time; and piloted in collaboration with an elementary school principal eager to prove that young students use the design process in their learning and in their play.

Some of the skills and concepts from the **MA Curriculum Frameworks** put to use in these sessions include:

Science & Engineering/Technology: the engineering design process; materials and tools
Mathematics: sorting and using 2d and 3d shapes; recognizing symmetry; measuring and estimating
Social Sciences: exploring and mapping places in the neighborhood, home and school
Visual Arts: elements and principles of design; materials, methods & techniques
Language Arts: discussion; beginning reading; composition; oral presentation.

While wholly engaged in their play, the students are following these *Steps of the Design Process:*
  1. Define the design problem — Who? What? Where? When? Why?
  2. Investigate — learn about houses and homes
  3. Brainstorm
  4. Choose one solution
  5. Describe that solution — through words, drawings and models [and redesign as needed]
  6. Evaluate the solution
  7. Present the solution.

Although at this age students are not expected to demonstrate a good understanding how a 2d floor plan can represent 3d spaces, they have no trouble creating and using their floor plans. They are also not expected to be fluent in the concept of scale, yet they do successfully use their scale people to estimate sizes of furniture, rooms, walls, windows and doors.

The students come to realize that they are designing—much like designers do everywhere; that they are using Mathematics and Engineering skills as they design a house; and that the stories of people and places that they think up while they are building can be shared with others by creating storybooks.

In general the **Block Design** process goes like this:

Prior to Session 1:
The students discuss what architects do; and what it means to design. With help, they make 2" tall scale people from pipe cleaners, fabric and yarn; and read picture books with a strong sense of place [see *Houses in Books* list].

Session 1
Each child sets his scale person in front of him and draws and writes about his person on the **WHO** page of his *Block Design Booklet.*

Next, each group of students sets their scale people on a sheet of easel-sized 1" grid paper. They brainstorm and collaboratively decide: "Where will this place to live be?" [e.g. "on a beach, in the mountains, in a big city, near a park....."] Each child fills in his **WHERE** sheet, drawing and writing about that place.

Block-building Time
Layout: The group cooperatively lay out their wood blocks, one level high, on their grid paper, then move their scale people through the indoor and outdoor spaces that they have created.

Floor Plan: The group creates a floor plan: 1). Matching pre-cut black paper strips to the length of each block; then placing a black strip under each wood block; 2). removing the blocks; and 3). gluing the black paper strips in place.

Session 2
Using their *Block Design Booklets,* each group reviews their design problem. They then rebuild their block building, following the black paper strips on their floor plan. Rebuilding the walls by following the lines of the floor plan reinforces the purpose of a floor plan.

Together each group decides: "Why are we designing these spaces?" In his booklet, each child fills in: "**WHY? We need places and spaces to… "** [e.g. "sleep, eat, draw, read, play…"]

Next the group discusses: " What place or space will we design and build?" In his booklet each child fills in "**WHAT? So we will design…** [e.g. "a bedroom, kitchen, art corner, loft, playground… "]
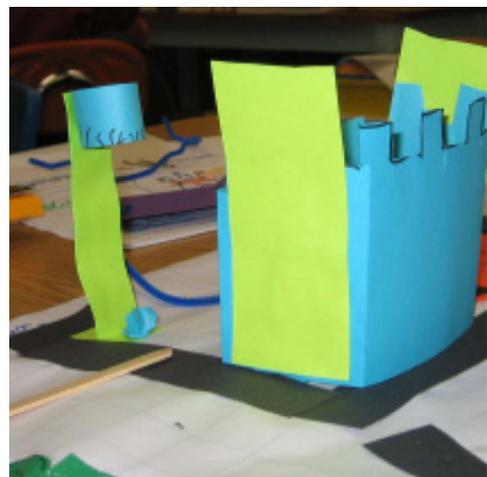
The students label each area on their floor plan, indoors and out; and remove the wood blocks. Next, using estimation and measurement [and still following the black floor plan lines] they cut and install 3d construction paper walls to enclose their rooms.

Session 3

Each group reviews their design problem, and what they have built, written and drawn to date. The group members discuss: "Do we have any new ideas about some details to add to our place to live? In his booklet, through words and drawings, each child describes "**WHAT ELSE? Here are 3 details I will add to my house design…"**   [e.g. "a bed so I can sleep…. a sink so I can wash dishes….   a garden so I can grow things…."]

The students then use construction paper and common craft materials to create their three details. As they explore their house with their scale people, the students are encouraged to share the stories they are spontaneously inventing about their people and their place to live.

Session 4

The students move their scale people through the spaces of their completed model. They are asked to think up a story about what their people are doing inside and outside of their place to live. With young students, each group dictates one story; with each student drawing his/her own picture illustrating the story. With older students, each child creates, writes and illustrates his own story about the people and their place to live. The teacher later combines these pages into bound storybooks.

As the program comes to a close, all groups gather together to share their projects. They show their models, and tell their stories. They informally evaluate: "How well did our design solution (our model) solve our design problem (to design a place for our people to live)?

They reflect on the process: did our ideas for a place to live develop or change over the four sessions?   How did each activity (drawing building and writing) help us to develop our ideas?

Extension Activities

Streetscapes and Neighborhoods: The groups arrange their models along a created streetscape, and expand the storytelling to include a neighborhood of people and places.

"House Design" Workstation: To continue the process, create a house design workstation near the block corner. Make available: sheets of grid paper, pencils, samples of real floor plans, booklets to encourage the writing and illustrating of stories, and construction paper for model-building.
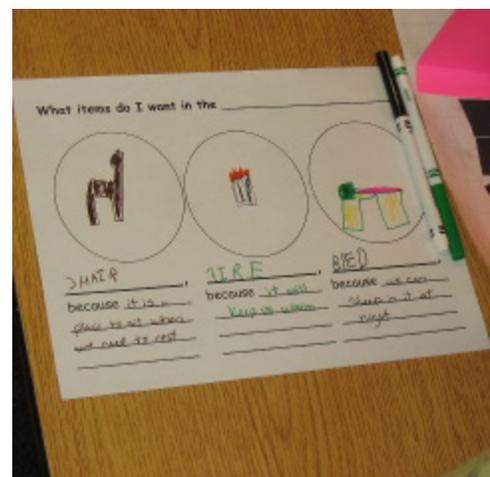
It is a pleasure to watch young children collaborate and problem-solve their way through this **Block Design** activity. As teacher evaluations have noted:

> *"It was a great to see how the children developed their ideas over the four sessions. They were challenged throughout, but not overwhelmed."*

> *"You could see that having an idea and being allowed to make that idea happen kept the children engaged and taught them that their ideas DO have value."*

> *"Some groups not only told their stories, but spontaneously acted them out as well. When I step back and let them design, I am amazed at what they can do!"*

Science and Technology / Engineering Standards
1. Materials and Tools
1.3   Identify and describe the safe and proper use of tools and materials (e.g., glue, scissors, tape, ruler, paper, toothpicks, straws, spools) to construct simple structures.

2. Engineering Design
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.

English Language Arts Standards
Standard 1:   Discussion
Standard 5:   Oral Presentation
Standard 7:   Beginning Reading
Standard 19:   Writing

Social Sciences Standards
K.4   Describe location and features of places in immediate 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.

Mathematics Standards

K.G.1 Name, describe, sort, and draw simple two-dimensional shapes.
K.G.2 Describe attributes of 2d shapes e.g., number of sides, number of corners.
K.G.3 Name and compare 3d shapes.

2.G.1 Describe attributes, parts of 2 and 3-d shapes (length, corners, edges, faces, sides).
2.G.2 Identify, describe, draw and compare 2-d shapes.
2.G.3 Recognize congruent shapes.
2.G.5 Identify symmetry in 2d shapes.
2.G.6 Predict the results of putting shapes together and taking them apart.

2.M.4 Measure and compare objects using metric and English units of length measurement.
2.M.5 Select and correctly use the appropriate measurement tools, e.g., ruler…

K.P.1 Identify the attributes of objects as a foundation for sorting and classifying.
K.P.2 Sort and classify objects by color, shape, size, number, and other properties.

4.P.5 Solve problems involving proportional relationships.

Visual ArtsStandards

Standard 1: Materials, Methods,, Techniques: drawing and model-building
Standard 2: Elements and Principles of Design [color, shape, form; pattern…]
Standard 7: Role of Artists in Community
Standard 10: Interdisciplinary Connections