**PROJECT DESCRIPTION**

Architecture: Learning By Design is a comprehensive two-year immersion into Art and STEM (Science, Technology/Engineering and Mathematics) created by Learning By Design in Massachusetts and funded principally by the National Endowment for the Arts with additional funding from Boston Scientific and the Boston Society of Architects. Schools in three Massachusetts cities (Boston, Holyoke and New Bedford) will participate in the program which uses the power of local architecture as a catalyst for learning in critical academic subject areas.

**PROFESSIONAL DEVELOPMENT**

Teachers at three Massachusetts schools (one school each in Boston, Holyoke and New Bedford) will gain skills and knowledge in methods of “teaching by design,” expanding their abilities to teach the core curricula that they need to teach through hands-on architecture and design projects.

The teachers, alongside LBD:MA teachers and local volunteer architects, will first take part in LBD:MA professional development workshops. In these workshops teacher/architect teams will follow the steps of the engineering design process as they will later ask their students to do. By developing architectural sketches, scale drawings, writings, models and design boards the teachers will come to understand that teaching architecture is teaching mathematics, science, technology, history and art; and that they are fully capable of engaging their students in hands-on design projects.

**CLASSROOM RESIDENCIES**

Then, with LBD:MA support, teacher/architect teams will co-teach student design residencies. In these residencies (six 1.5-hour student sessions) students will apply Art and STEM skills to solve architectural design problems; and use local architecture as case study sites.

**RESIDENCY EXAMPLES INCLUDE:**

**Architecture: Art and Mathematics** – Students connect learning in Art and Mathematics as they do hands-on Archi-Math activities and a residential design project.

**Architecture: Art and Science/Engineering** – Students study a green building and complete a Kids Design a Sustainable Future project (activities on Site, Sun, Wind, Water and Materials and/or an Eco Center Design project)

**Architecture: Art, History and Story** – Students read good stories about spaces and places, tour historic city buildings, design and build a Box City, and write stories about their community and architecture.

The student activities will:

- enable students to connect skills and knowledge across disciplines
- provide opportunities for investigation, collaborative learning and problem-solving
- give students hands-on, real-world practice with the processes of designing, creating and communicating
- increase student knowledge of green/sustainable architecture and design
- increase student understanding of the connections between people, places and nature
Architecture: Learning by Design

LEARNING FROM ARCHITECTURE

LBD:MA will work with each school to select a high-quality piece of local architecture as a case study. Boston, Holyoke and New Bedford are replete with architecture for students to study, draw, measure and be inspired by.

New Bedford is an 18th century whaling port with its own Whaling National Historical Park and sites listed on the National Register of Historic Places.

Reuse and restoration could be Holyoke’s architectural theme. Highlights include a contemporary gallery housed in a 19th century mill; the Wistariahurst mansion; and Open Square, mixed-use buildings in the Historic Canal District powered by modern-day water power.

In Boston architectural diversity abounds. From the steps of the classical Boston Public Library one can see robust Trinity Church alongside the sleek Hancock Tower. Not far from the rolling textures of an Olmsted park system is greenness of another kind -- the Genzyme Center, bright, beautiful and awarded the highest of ratings from the U.S. Green Building Council.

OUTCOMES

By the end of the two-year Architecture: Learning by Design partnership (June 2010 - June 2012), 60 K-8 teachers and 25 architects will have demonstrated increased skills and knowledge in design-based teaching that connects Visual Arts and STEM (Science, Technology/Engineering, Mathematics) concepts; and 700 K-8 students will have engaged in hands-on learning through design projects based on the architecture of their city.

LBD:MA will use an outcome-based model to measure and document the program’s success. Pre- and post-tests, rubrics, observations and surveys will provide data. Teachers will demonstrate their learning by successfully leading their students through design activities. Students will demonstrate their learning through critiques, projects and portfolios.

Two grades in each school will be annually participating in an architecture and design project connected to their core curricula; teachers will be sharing best practices and mentoring other teachers in how to effectively use design as a catalyst for student learning; and students will be exhibiting their work in their community.

PLANS FOR SHARING THE WORK

Each school site will assist in publicizing programs to local media. The reach of LBD:MA’s website, connections to teachers through A+DEN (Architecture + Design Education Network), NAEA (National Art Education Association) and MAEA (MA Art Education Association), and connections to architects through AIA groups will enable project results, curriculum and best practices to reach a wide audience. Students will share work through a project website. Exhibitions and conference presentations will promote the project and increase public awareness of the value of design-based arts education.
June - October 2010: Project team plans and coordinates programs. Professional development workshops offered for teachers and architects at each school site.

November 2010 - March 2011: Teacher/architect teams teach student residency sessions in first of two grades, document programs and assess student learning.

April - June 2011: Participants meet for evaluative sessions; project team distributes reports, posts best teaching practices and student work on website. Participants exhibit best practices and student work at design education conference.

June - October 2011: Professional Development expands to involve teacher/architect teams in second of two grade levels; experienced teachers and architects serve as mentors.


April - June 2012: Project team and participants meet for evaluative sessions and to plan for continuation of program beyond two-year time frame. Project team compiles and distributes final reports and assessments, posts best teaching practices and student work on website.

LBD:MA MISSION

Learning By Design in Massachusetts draws on the power of architecture and design to build within each child an essential structure for learning and creating that will inform every endeavor in their lives. Today’s children are the designers of a better tomorrow.

We will fulfill this mission by:
• bringing design activities focusing on people, places and spaces into the heart of K-12 learning
• enabling students, teachers and architects to design and learn together
• building a strong community dedicated to K-12 Architecture and Design Education

As a proponent of project-based learning, LBD:MA knows that children have the curiosity to form their own design questions, the creative ability to find their own solutions, and the higher-level thinking skills to communicate their ideas about those solutions. When we give our future designers, engineers, builders, decision-makers, and members of the global community the opportunity to communicate their ideas about their built and natural environments, we all benefit.
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MA CURRICULUM FRAMEWORKS ALIGNMENTS

LBD:MA programs align with Massachusetts learning standards in Mathematics, Science & Technology/Engineering, the Visual Arts, Social Sciences and English Language Arts. The Architecture: Learning by Design program is focused on improving student achievement and evaluating student progress in these Curriculum Areas:

Mathematics
Numeracy/Number Sense & Operations: Fractions, decimals, percents; Ratio and proportion; Estimation
Geometry: Relationships among points, lines and planes; 3d objects and 2d representations; Polygons; Angles; Symmetry
Measurement: Area, perimeter; slope; Proportional relationships and scale factors; Angles, triangles and quadrilaterals

Science & Technology/Engineering
Technology/Engineering: Engineering design process; Drafting; Orthographic drawings; Constructing prototypes
Construction Technologies: Structures; Materials; Tools; Measurement systems
Energy and Power Systems; Earth and Space Science: Properties of materials; Heat transfer and energy systems in the earth system
Life Science: Energy and living things; Living things and their environment; Ecosystems

Social Sciences
Mapping; Research; Geography (location, place, human interaction with the environment, climate and region); Political, economic, and social systems; Community as a reflection of its people

English Language Arts
Vocabulary and concept development; Reading for understanding; Making connections; Relating a literary work of fiction to information about its setting; Questioning, listening and contributing; Oral presentation; Writing and revising; Standard English conventions; Organizing ideas in writing; Research

21st century Learning & Innovation Skills
Creativity & innovation; Critical thinking & problem-solving; Communication & collaboration

21st century Life & Career Skills
Initiative and self-direction; Flexibility and adaptability; Leadership and responsibility; Productivity and accountability; Social and cross-cultural skills; Empathy and global understanding

For more programs and information visit www.architects.org/LBD or contact: Jan Ham at 508-528-4517 or LBD@architects.org