Design Thinking: Art, Architecture, and Engineering Tour

Applying a problem-solving lens to artworks and structures at the NBMAA

Tour Preparation Packet for Teachers
Grade Level: 6-8
Content Areas: Art, Architecture, Engineering, Design

NEW BRITAIN MUSEUM OF AMERICAN ART
56 Lexington St. | New Britain, CT | 06052 | nbmaa.org

About this Resource

This resource has been designed to help teachers and students in grades 6-8 to discover connections and distinctions between artists, engineers, and architects in approaching a design problem by viewing artworks in the NBMAA's collection.

The self-guided format allows students to move through the presentation by following questions that guide looking and discovery at their own pace.

How to use this Resource

- Use it to prepare students before a visit to the NBMAA.
- Use it as a post-visit review.
- Use it as a virtual visit in place of a visit to the NBMAA.
- Go directly to page 5 to start the tour!
- Or review terms and definitions on page 30.

What's in this Resource Packet?

- Tour objectives are on page 3.
- Selected artworks are on page 4.
- Three essential questions are on page 5.
- Tour of artworks is on pages 5-21
- An art activity to make in classroom or at home is on pages 22-27.
- Terms and definitions are on page 29.
- Related Connecticut Standards are on page 30.

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What are the objectives of this tour?

Students will explore the connections between the artistic process and architecture, engineering, and design using selected three-dimensional works of art in the NBMAA Collections.

Essential Question: How do artists use problem-solving to innovate and create unique works of art for a specific site?

Students will have the opportunity to:

- **Examine** works of three-dimensional art designed for specific sites in the Museum.
- **Identify** the design problems each artist might have faced in creating the site-specific work.
- **Analyze** the connections and distinctions between artists and engineers or architects, in approaching a design problem.
- **Consider** the impact of an artistic work on themselves or others.
- **Apply** their knowledge about problem-solving to create, design and develop their own prototype for a simple chandelier using pipe cleaners.

Here are the three "structures" we'll examine on this tour.
A building, a sculpture, and a bench.

The New Britain Museum of American Art
Ann Beha Architects, Boston
The Chase Family Building, 2006
Landers House Renovation, 2007
Art and Education Wing, 2015

Dale Chihuly (American, b. 1941)
Blue and Beyond Blue, 2000
107x82x77 inches
Medium: Blown Glass, Steel

Karol Kawiaka (American, b. 1966)
Cantilevered Bench, 2005-2006
Vermont maple top, sandblasted aluminum base
Gift of Justine Bacon Melson and J. Edward Melson, 2014.44

You can learn more about each artist and artwork and see other artworks by visiting our eMuseum Tour
http://ink.nbmaa.org/collections/46854/design-thinking-art-engineering-and-design-at-the-nbmaa

Let’s begin!

We will explore three essential questions:

1. How did these artists, architects and engineers use problem-solving to innovate and create unique structures or works of art for the Museum?

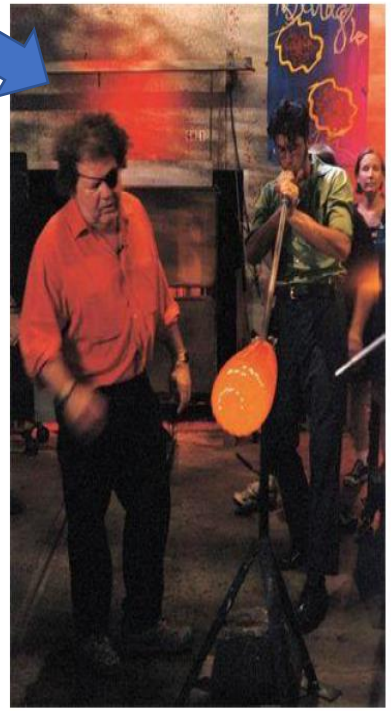
2. What design problems do you think each person or team might have faced in creating these site-specific works?

3. What connections and distinctions do you see between artists, engineers, and architects, in approaching these design problems?

About Dale Chihuly

Dale Chihuly is an American sculptor who pioneered a new way of working…letting molten glass find its shape in its own organic way. His glass sculptures are asymmetrical, irregular and unlike that of traditional glass.

Chihuly was commissioned by the NBMAA to design and assemble this glass sculpture to hang from the ceiling of this gallery.



Artist Dale Chihuly working with his team of artists blowing glass to make sculptures.

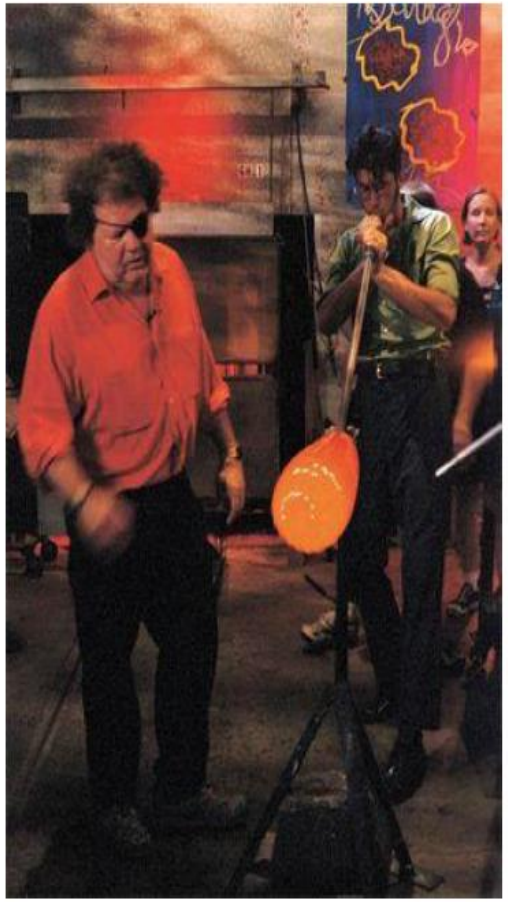
The sculpture is made of 257 pieces of blown glass and weighs more than 600 pounds!

Hang that sculpture up there! (This was the first location for the sculpture. Now it's in a different location.)

Here's a glimpse into how Chihuly might have approached this problem.

Sketch out the idea with a lot of details.

Make blown-glass shapes.



Number and organize glass pieces.

Build the armature.

Install the sculpture.

Enjoy the sculpture!

What is the first step you would take if the Museum asked you to create a sculpture that hangs from the ceiling? (Oh, you could use any materials you like to make your sculpture!)

Let’s examine this design problem a little more.

1. What are the design problems that Chihuly might have faced when creating this sculpture for this location?
2. What might have been going on in Chihuly’s mind when he created this?
3. What are the mechanical factors that the museum would face in hanging this work?
4. What role do you think gravity plays here?
5. What does this work remind you of?

Take a break and sketch Blue and Beyond Blue in the frame below.

You can print this page, use a stylus,
draw on a piece of paper,
or just trace the outline with your finger.

Stay loose and keep moving!

Now let’s examine a bench!

About Karolina Kawiaka

Karolina Kawiaka specializes in sustainable architecture and design. She is a registered architect, member of the American Institute of Architects, and the principal of the Karolina Kawiaka Studio in Vermont. Her firm's work includes building, landscape and furniture design focusing on sustainable design and infrastructure, as well as digital drawings and installations.

Did you know that a person can be an architect, an artist, an engineer, and a furniture designer?

The NBMAA asked artists, architects, engineers and furniture makers to submit designs for benches that would be installed in the galleries for people to sit and relax while looking at art. Karolina submitted her design and the NBMAA commissioned her to make this bench.

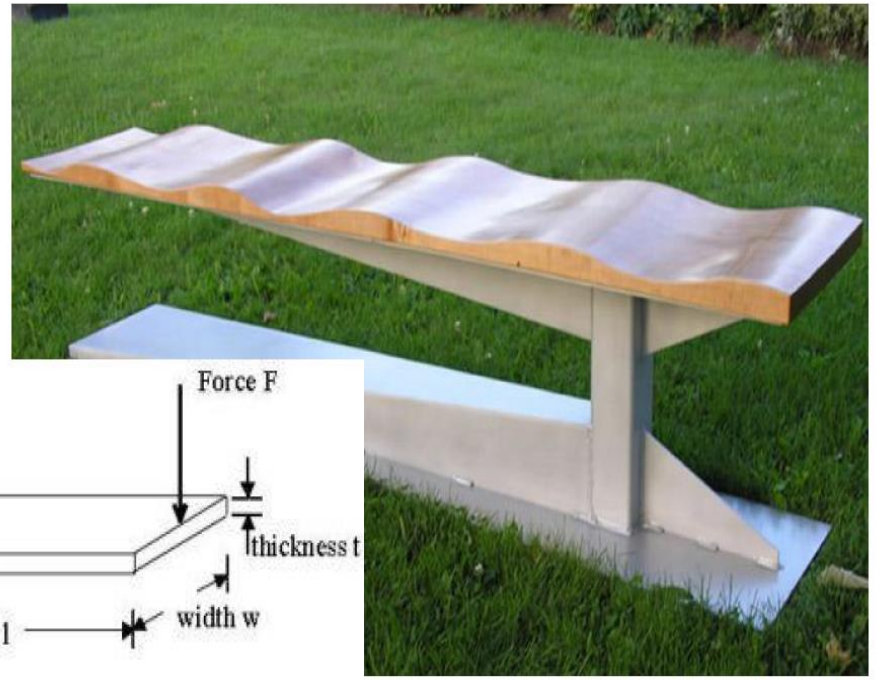
Karol Kawiaka (American, b. 1966)
Cantilevered Bench, 2005-2006
Vermont maple top, sandblasted aluminum base
Gift of Justine Bacon Melson and J. Edward Melson, 2014.44

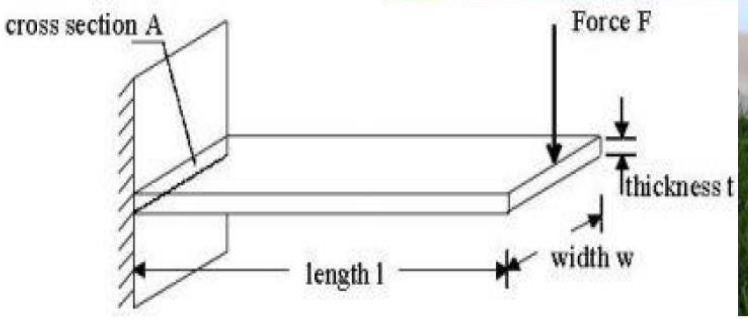
Here's what Karolina Kawiaka has said about *Cantilevered Bench:*

"I made a model and drawings and submitted it as part of the design competition. I had to make it twice because it didn't work the first time with the metal fabricator. I hand made the wood part in the design workshop at Dartmouth College where I teach art, architecture and design and engineering.

I wanted to make something fun that would make people feel like they are floating. So I used the cantilever and metal to do that. The wave form of the wood is also meant to evoke water and floating, and I thought it would be fun for kids and adults to slide along the waves and maybe bounce a little at the end of the cantilever, and more than one person can sit on it at once."

I am pretty happy with it, but I wish I lived closer. One of my favorite things is to spy on people using the things I make and watch how they interact with them."





How was it made?

Cantilevered Bench is composed of Vermont Maple and sandblasted aluminum. The bench's seat is carved in a delicate wave shape, providing comfort as well as style.

A metal bar stretches along the bench, but only one end is actually supported all the way to the ground. This design is often used in construction and is called a "**cantilever.**"

Let’s examine this a little more.

1. How is the design problem here different from the problem Chihuly faced?

2. What seem to be the materials used in the construction of this bench?

3. How is this bench similar to a diving board?

4. What images come to mind when you look at this bench? (We’ve already mentioned a diving board.)

5. How would you explain the idea of the cantilevered bench to someone else?

Take another sketching break and draw the outline of *Cantilevered Bench* in the frame below.

You can print this page, use a stylus, draw on a piece of paper or just trace the outline with your finger.

Stay loose and keep moving!

Now let’s examine the building!

Ann Beha Architects

Ann Beha Architects says that “their expertise is in marrying historic sites with contemporary architecture. They want to “conserve and maximize material, energy, and cultural significance, achieve high standards for technical and operational performance, and meet the needs of the museum now and into the future.”

The New Britain Museum of American Art
Ann Beha Architects, Boston
The Chase Family Building, 2006
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Ann Beha Architects Designed two Additions to the NBMAA

NBMAA commissioned Ann Beha Architects to design two additions to the NBMAA.
Imagine how many factors the architects had to address as they planned to connect a historic house with a modern facility that respected the environment, showcased art, and was the most welcoming museum to its visitors.

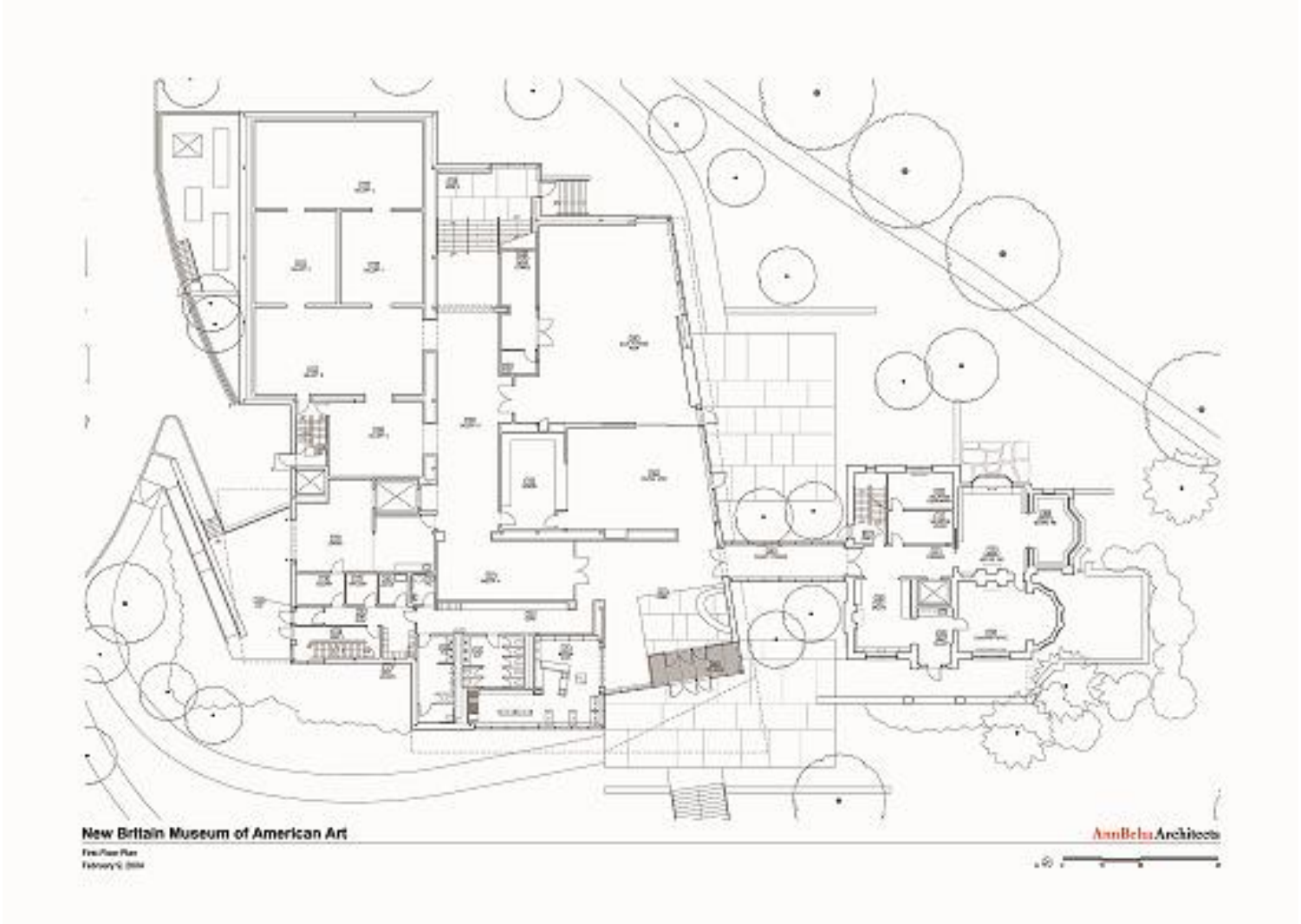
The 1911 Landers House pictured above was the NBMAA's home from 1937-2005. Beha Architects designed two additions to the historic building; one in 2006, and another in 2015, for a total of 75,000 square feet. The house was the home of Grace Judd Landers who gave it to the New Britain Institute to start an art museum.

Read about some of the challenges the NBMAA director faced during the expansion: https://www.courant.com/ctnow/arts-theater/hc-doug-hyland-1102-20141102-story.html

Here’s one of many architectural drawings Beha made before building the wing that opened in 2006.

Can you locate the historic Landers House in the drawing?

What strikes you most about the scale of the house to the scale of the new building?



Here’s how the NBMAA looks today.



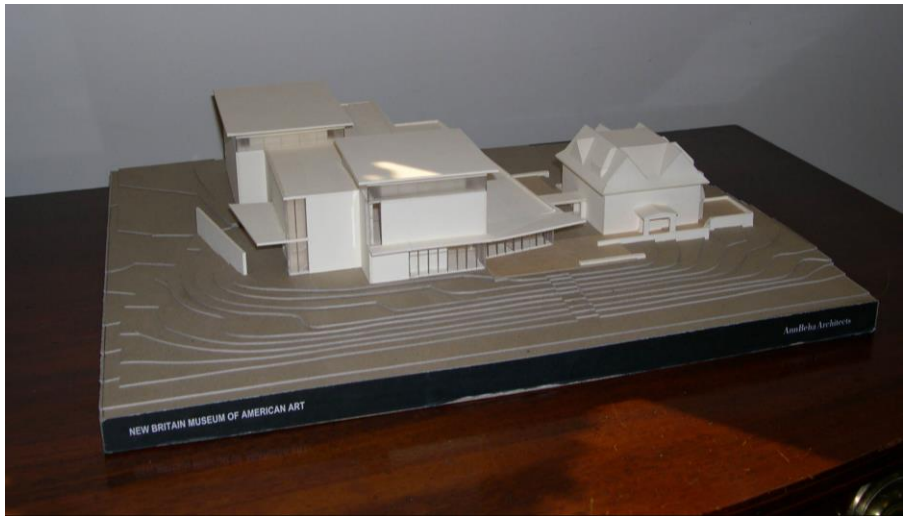

1. The Museum wanted the architects to create a sense of welcome for visitors to the museum. Look at the building and share one element that you feel is welcoming.

2. What materials did the architects use to design the new additions?

3. Beha says that their expertise is in marrying historic sites with contemporary architecture. Do you think they were successful with the NBMAA? Why or why not?

4. What do you think the biggest design problems might have been for Ann Beha Architects?

Become an architect!



These are two of many renderings and models created by Ann Beha Architects.

Practice sketching the NBMAA below or draw your favorite building.

Now, it’s your turn to create your own prototype inspired by Chihuly’s sculpture *Blue and Beyond Blue*!

Materials:

- Pipe Cleaners, various sizes and colors
- Pencil or pen

If you don't have pipe cleaners, use other materials that you can twist, bend and suspend!

Try twisting wires, foil, curly ribbons, even twigs or things you might find outdoors.

1) Wrap the pipe cleaners around a pen or pencil (or even your finger) to make a curly shape. Combine as many as you would like. The fuller the better.

2) Grab all of the ends and squeeze them together.

3) Attach the pipe cleaners together by wrapping another pipe cleaner around the squeezed end. Only wrap half the connecting pipe cleaner around the squeezed end.
(You'll use the other half to hang the sculpture.)

4) Bend the other half of the connecting pipe cleaner in a circle, leaving a little extra. Wrap the extra around the base of the pipe cleaner to close the circle.

5) The sculpture may also stand freely without hanging, as long as it's balanced.

Terms and Definitions

Terms and definitions

Architecture: n.	The process and the product of planning, designing, and constructing buildings or any other structures. Architectural works, in the material form of buildings, are often perceived as cultural symbols and as works of art. Historical civilizations are often identified with their surviving architectural achievements.
Art: n.	The expression or application of human creative skill and imagination, typically in a visual form, such as painting or sculpture, producing works to be appreciated primarily for their beauty or emotional power; a skill at doing a specified thing, typically one acquired through practice.
Balance: n.	An even distribution of weight enabling someone or something to remain upright and steady.
Blueprint: n.	A design plan or other technical drawing.
Cantilevered: adj.	Fixed or supported at only one end (of a projecting beam or structure).
Design: n.	A plan or drawing produced to show the look and function or workings of a building, garment, or other object before it is built or made.
Engineering: n.	The branch of science and technology concerned with the design, building, and use of engines, machines, and structures; the work done by, or the occupation of, an engineer; v. the action of working artfully to bring something about.
Inertia: n.	A tendency to do nothing or to remain unchanged; physics a property of matter by which it continues in its existing state of rest or uniform motion in a straight line, unless that state is changed by an external force.
Innovation: n.	A new method, idea, product, etc.
Molten, adj.	The description of an object that's reduced to liquid form by heating.
Prototype: n	A first, typical or preliminary model of something, especially a machine, from which other forms are developed or copied.
Sculpture: n.	The art of making two- or three-dimensional representative or abstract forms, especially by carving stone or wood or by casting metal or plaster.
Site-specific art: n.	Site-specific art is artwork created to exist in a certain place. Typically, the artist takes the location into account while planning and creating the artwork. Site-specific art is produced both by commercial artists, and independently, and can include some instances of work such as sculpture, stencil graffiti, rock balancing, and other art forms. Installations can be in urban areas, remote natural settings, or underwater.

Connecticut State Art Standards: 6th-8th grade

VA:Cr2.1.6a Demonstrate openness in trying new ideas, materials, methods, and approaches in making works of art and design.

VA:Cr2.1.7a Demonstrate persistence in developing skills with various materials, methods, and approaches in creating works of art or design.

VA:Cr2.1.8a Demonstrate willingness to experiment, innovate, and take risks to pursue ideas, forms, and meanings that emerge in the process of art- making or designing.

VA:Pr6.1.6a Assess, explain, and provide evidence of how museums or other venues reflect history and values of a community.

VA:Pr6.1.7a Compare and contrast viewing and experiencing collections and exhibitions in different venues.

VA:Pr6.1.8a Analyze why and how an exhibition or collection may influence ideas, beliefs, and experiences.