STEAM: Science, Technology, Engineering, Art, and Math
Workshop Lesson Plan for Elementary School Students

What’s the Big Idea?
Creative Problem Solving

STEAM Tour and Workshop Purpose
Students will use the High’s collections as evidence of creative problem solving, looking at the objects to draw conclusions about how artists create innovative solutions to complex problems.

Essential Questions
Use the following as guiding questions as you lead students through the workshop:
• How is an artist similar to a designer, explorer, or scientist?
• How do artists use science, technology, engineering, and math?
• How do art and design affect people?
• What is a prototype?

Objectives
Students will …
• make connections between works in the permanent collection and how the artists used creative problem solving to create their art
• use creative-problem solving techniques to solve a design challenge
• consider how art and design affect people in their community
• create various prototypes to test solutions to a problem

Procedures
1. Introduction: Use artist Joris Laarman to highlight how artists are creative problem solvers. While designing his sculptural radiator called Heatwave, Laarman created a prototype. A prototype is a model that is used to brainstorm an idea and test out how it works. Show photos of the prototype and the final product.

   Show additional images of chairs in the permanent collection, explaining how designers, like scientists, have to conduct experiments to come up with solutions.

2. Connections: Ask students if they can think of other objects that might require preliminary designs or prototypes. Show images of different kinds of prototypes and models (i.e., cars and buildings).

3. Design Challenge: Introduce the design challenge for the day. Students will create a prototype of a chair or a bench using the materials on the table. Discuss the following questions as a group to help students generate ideas:
- Who might sit in your chair or bench? What are the needs of a person (or animal) sitting in the chair or bench (i.e., comfort, support, etc.)
- Where might your chair or bench be located? How would a chair in one location be different from a chair located in another location?

Explain to students that the chair should be functional, so that someone could use it, but also well designed, meaning that students should make decisions about how it looks.

4. **Project Logistics:** Each student will have 20 minutes to experiment with the materials on the table and create a design. Explain that their first design should not be their final design. It is important that, as artists and scientists, they try multiple things and see how they can improve upon their ideas. Explain to students that they will deconstruct their prototypes at the end of the class session.

5. **Reflection:** When students have completed a three-dimensional design, they will be given the attached worksheet to draw their final prototypes. During this time, students will reflect upon the following questions:
   - Whom is your chair or bench intended for?
   - Where would your chair or bench be located?
   - What do you like about your design?
   - What would you change if you could make it again or if you had additional materials?

6. **Closing and Presentations:** Revisit the definition of a prototype. What challenges did the students encounter during this process? Allow students to share their designs.

7. **Cleanup:** Leave time for students to deconstruct their prototypes and return materials to designated containers.

**Vocabulary**
Prototype
Design

**Materials**
Timer (for instructor)
Clear Legos
Transparency sheets (cut into smaller rectangles)
Popsicle sticks
Coffee stirrers
Aluminum foil (cut into two-inch strips)
Magnets
Clothespins
Toilet-paper rolls
Index cards
Rubber bands
Paper clips
Cotton balls