



**STEAM: Science, Technology, Engineering, Art, and Math
Workshop Lesson Plan for Middle School Students
2019-2020 School Year**

What’s the Big Idea?

Empathy, Creative Problem Solving, and Design Thinking

STEAM Tour and Workshop Purpose

Students will use the High’s collections as evidence of creative problem solving, learning directly from the spaces how artists, architects, and engineers create innovative solutions to complex problems.

Essential Questions

Use the following guiding questions as you lead your students through the workshop:

- How is empathy used in developing everyday spaces?
- How is an artist like a designer, explorer, or scientist?
- How do artists use science, technology, engineering, and math?
- How are art and design important to our communities?
- What is a prototype?

Objectives

Students will ...

- discover how artists, architects, and designers employ empathy to develop creative solutions to problems
- use creative problem-solving techniques to create a design
- consider how art and design affect people in their community
- create a prototype to test solutions to a problem

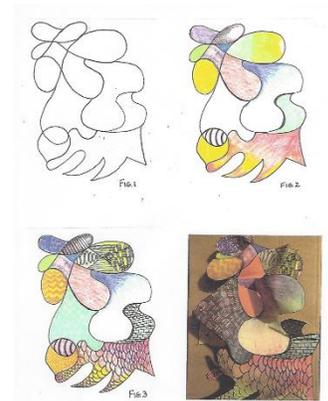
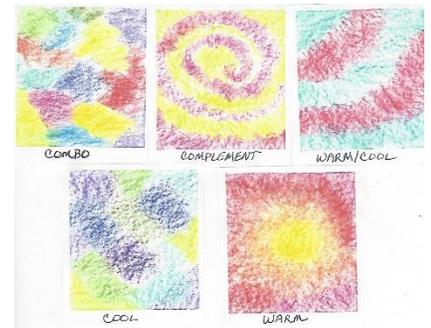
Procedures

Warm-up (10 minutes): Welcome to the HMA Design Studio. We’re going to get our design brains warmed up by experimenting with shape, texture, and color for the first 5-10 minutes. TA to demonstrate at each step.

First, invite students to fill their entire paper with color using art stix. Invite them to experiment with different color combinations (warm, cool, complementary, etc.)

Next, use a black Sharpie marker to make a continuous contour line design, including looping sections and intersecting lines. Try not to lift the marker from the surface of the paper. Keep sections large.

Next, place pattern sheets on each table for inspiration. Fill in each section using different kinds of lines with color Sharpies. Vary line density, width and type of line. Explore pattern, shape. Set your papers aside.



Design Thinking Challenge Introduction (5 minutes):

Today, you're going to be using the Design Thinking Process to develop a plan with a partner for a multi-purpose space. The first step in this process is EMPATHIZE.

Use the following quotes to help set the tone, especially if students need support in defining the word, empathy.

“Design empathy is an approach that draws upon people's real-world experiences to address modern challenges.” (Empathy on the Edge: Scaling and Sustaining a Human-Centered Approach in the Evolving Practice of Design, IDEO)

“Empathy is the first step in design thinking because it is a skill that allows us to understand and share the same feelings that others feel. Through empathy, we are able to put ourselves in other people's shoes and connect with how they might be feeling about their problem, circumstance, or situation.” (Teaching Empathy Through Design Thinking, Edutopia)

Discuss 1 or 2 architectural examples of DESIGN from the High Museum of Art to begin. Discuss more examples, if needed.

Example 1:

The School Programs Entrance ramp to the Stent Building

- What's going on with this space? What do you see that makes you say that?
- How did you feel or what did you think when entering this space?
- What do you think this architect had in mind when designing this space?
- How has the architect considered their audience in creating this space?



Discuss the ramp, the windows, and other features of the school programs entrance, noting that the architect and designers took into account that many differently abled people would be using this building. Ramps are more accessible than stairs for some, etc.

Example 2:

The Atrium Ceiling

- What's going on in this space? What do you see that makes you say that?
- How did you feel or what did you think when entering this space?
- What do you think this architect had in mind when designing this space?
- How has the architect considered their audience in creating this space?

The High Museum Atrium space is a multi-purpose venue – It protects and houses artwork, and it also serves as an event space for weddings, school field trips, dinners, concerts, and more. Fill in information about light mitigation from the beams and window coverings in order to protect the artwork.



Next, you're each going to turn and talk with a partner to develop ideas for a new multi-purpose space. You're going to follow a process that artists, scientists, architects, and designers use all the time: The Design Thinking Process.

EMPATHIZE, DEFINE, BRAINSTORM, PROTOTYPE, AND TEST!

EMPATHIZE: Interview a partner (5 minutes)

First step: Empathize – find out some things about your partner that you'll later take into account when developing a design for your space.

Model this discussion quickly with teacher or chaperone partner.

1. What interests do you have? What do you like to do? What activities do you participate in?
2. What do you hope to change or improve?

Invite students to use scratch paper to write or sketch answers as they listen closely to their partner. After 2 minutes, partners switch.

BRAINSTORM/BLUEPRINT: Discuss and sketch (10 minutes)

Remember our warm-up activity? Now, imagine that this is like a blueprint, or a 2-dimensional design plan, for your new space. Take a look and imagine how these sections could transform into 3-dimensional spaces to accommodate you and your partners' interests and hopes.

Model this discussion quickly with teacher or chaperone partner.

How can we accommodate both of our interests, curiosities, and hopes into one very cool new architectural space?

Additional example prompts if students need support:

- What's the same about [my interest] and [your interest]? What's different about them?
- What types of spaces do we need for both of our interests? How can one space accommodate both?
- What types of spaces can we imagine from our blueprints?
- How can we thoughtfully incorporate our hopes to change or improve something in our design?

PROTOTYPE: Build from your Blueprint (15-20 minutes):

Once students have begun generating ideas, demonstrate the next step. Invite students to either choose one of the blueprints of the pair to work on together, or if time allows, to try out two different ideas by building a prototype from both blueprints. OR combine both blueprints into one mega-design.

Cut out the shape on the outside-most outline. Cut into some of the inner sections, without separating any sections from the whole. These cuts will allow the figure to be folded, bent, and twisted to make it 3-dimensional. TA to demonstrate.

How can you manipulate your blueprint to accommodate your design, interests, and hopes? What's missing? Encourage students to use various examples of architectural design for inspiration.

Use leftover scraps of paper and other scrap materials to add to the main building and to create architectural features that are needed for the design: doors, windows, ramps, stairs, etc.

Mount final design on colored paper to display the sculpture/prototype.

TEST: Share and Reflect (5-10 minutes):

Allow volunteers to share their prototype and solicit feedback from their partner and other groups. Lead a class discussion and reflection. Emphasize that we're back at step 1: LISTEN! Encourage pairs to take constructive advice from partners and other classmates to think about ways they can alter and refine their design.

- Did your design work well for both partners?
- What do you like most about your design?
- What would you change if you could do it again?
- What are some potential problems with your design? How might you test it?
- Are there groups of people who may have trouble accessing your space? How might you adjust to accommodate?

To reflect on process, use these questions, if time allows:

- In what ways are artists like scientists or designers?
- What surprised you during the activity today?
- What was the most challenging aspect of the activity today?

Cleanup (5 minutes):

Allow 5 minutes for students to clean up materials and collect their final designs.

Vocabulary

Purpose/Dual-Purpose/Multi-Purpose

Prototype

Blueprint

Design

Sketch

Empathy

Materials

9x12 white tagboard

Pencils

Black sharpies

art stix

sketching paper

colored construction paper

cardboard

scissors

masking tape

glue sticks

pipe cleaners/straws

cardboard tubes

scrap materials

Materials for the Instructor

Visual Schedule

Timer

Laminated large images architectural spaces