HIGH MUSEUM OF ART ATLANTA

STEAM
2025–2026 School Year
Grades: 6–8

Lesson Overview

Students will explore the intersection of art, design, science, and engineering by designing prototypes for a sustainable community using the design thinking process. Inspired by works in the High Museum of Art's collection, students will analyze how artists and architects use materials, structure, and creativity to imagine sustainable and inclusive spaces.

Learning Objectives

Essential Questions

- How do science, technology, engineering, art, and math intersect in the creation of sustainable communities?
- How do artists and architects use design thinking to solve real-world problems?
- In what ways can design reflect values such as sustainability, accessibility, and community connection?

Students will be able to . . .

- Identify components and systems that contribute to a sustainable community (e.g., renewable energy, green spaces, transportation, resource management).
- Analyze how artists and designers address environmental and social issues through form, material, and structure.
- Collaborate to design and prototype a sustainable community sector using the design thinking process (empathize, define, ideate, prototype, test).
- Communicate how their design incorporates STEAM principles and artistic thinking.

Performance Tasks

- Discussion-based observation
- Collaborative design and art making
- Presentation and reflection

Vocabulary

- Biomimicry
- Collaboration
- Design thinking process
- Engineering
- Prototype
- Renewable energy
- Scale
- Sustainability

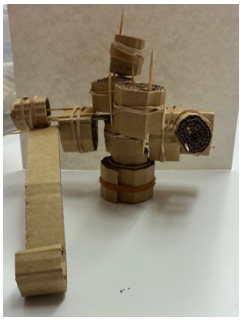
Materials

- Particle board
- Cardboard
- Color cardstock
- Pencils
- Tape
- Toothpicks
- Rubber bands
- Popsicle Sticks
- Images of works of art from the High's collection

High Museum of Art Collection Connections and STEAM Links

- Erwan and Ronan Bouroullec, *Clouds*–Explore modular design and organic forms; discuss biomimicry in engineering and sustainability
- SO – IL, *Murmuration (model)*–Investigate how contemporary designers merge art and function
- Frank O. Gehry, *Easy Edges*
- Artist once known, *Bottle Cap Basket*
- Tejo Remy, *You Can't Lay Down Your Memory Chest of Drawers*
- Minnie Evans, *Untitled (Three Faces Surmounting Landscape)*

Sample Prototype of Community Sector–Neighborhood Skate Park



Introduction (10 minutes)

Begin with a brief visual exploration of the selected works from the High's collection.

- Ask: *How do artists and designers use materials to communicate ideas about community, environment, or structure?*
- Highlight the STEAM overlap–geometry in design, chemistry in materials, physics in structure, and empathy in planning for human needs.

Discuss: *What makes a community sustainable?* Brainstorm essential systems (energy, waste, water, transportation, housing, culture).

Introduce the design thinking process–empathize, define, ideate, prototype, test–and relate each phase to an artist's practice.

Design Challenge (10 minutes)
Assign the students community sectors: housing, cultural centers, parks, renewable energy systems, waste management, and agriculture.

Each team will brainstorm their sector using sketches and quick notes: What needs do people have in this sector? How can art, design, and technology address those needs? Would there be solar power? Is geometry used in the design? What are ideal elevations to create a sustainable design?

Art Making and Prototyping (30 minutes)
Students will construct prototypes using provided materials.

Prompt connections to art and engineering: How can they use pattern, repetition, or balance to make their design more effective? How does the structure reflect sustainability principles? What can they learn from artists like the Bouroullec brothers about modular design?

Circulate the room and support students with guided questions that connect aesthetic choices to functional outcomes.

Presentation and Reflection (10 minutes)
Student teams will combine their sectors into a collaborative city model. Each team will present what problem their design solves; how they incorporated STEAM thinking and artistic design; which artwork from the High inspired them; and how they incorporated that artwork in their design?

Lead a concluding discussion: *How do art and science work together to shape a better world? If you could redesign your area, what would you change after seeing others' work?*

Extensions
- Math connection: Calculate scale, area, or structural load based on prototype dimensions.
- Science connection: Research renewable energy sources or green materials used in modern architecture.
- Art connection: Create a 2D plan or collage inspired by the prototype, incorporating color theory and spatial design.
- Digital extension: Use Tinkercad or SketchUp to turn prototypes into digital 3D models.

Cleanup (5 minutes)
Student teams will disassemble and clean up. Reinforce the theme of sustainability by asking them to recycle materials where possible.

Georgia Standards of Excellence (GSE) Alignment

Visual Arts
VA6.CR.1–VA8.CR.1: Engage in creative exploration and self-expression through artmaking.
VA6.CR.2–VA8.CR.2: Create works of art based on personal experience and observation.
VA6.CN.2–VA8.CN.2: Develop connections between visual arts, other disciplines, and life.
VA7.RE.1: Reflect on and interpret works of art, connecting them to social and environmental contexts.
VA8.CR.4: Organize ideas using design principles and processes to plan and produce a work of art.

Science
S6E6: Analyze the impact of humans on the environment and explore sustainable solutions.
S7L4: Examine how biological and physical systems interact in ecosystems.
S8P3: Investigate how energy is transformed and conserved in physical systems (relevant to renewable energy systems in community design).
S8P1: Explore properties of matter—connects to material choices in sustainable design.

Engineering & Technology (STEAM/Computer Science)
ETS1-1 to ETS1-3 (Middle School Engineering Design Standards):
- Define design problems with criteria and constraints.
- Generate and compare solutions through modeling.
- Test and refine prototypes to improve performance.
CSM8-1.2: Develop solutions that integrate creativity and technology for real-world problems.

Mathematics
MGSE6.G.1–MGSE8.G.9: Apply geometric concepts to model real-world structures (e.g., scale, symmetry, surface area, volume).
MGSE6.RP.3: Use ratio and proportion reasoning to build scaled models.
MGSE7.EE.4: Use equations and inequalities to represent and analyze situations in design.

English Language Arts
ELAGSE6–8SL1: Engage effectively in collaborative discussions and share ideas

clearly.
ELAGSE6–8W7: Conduct short research projects to answer questions and explore design problems.
ELAGSE6–8W4: Produce clear, coherent writing or presentations appropriate to task and audience.
ELAGSE6–8L6: Acquire and use domain-specific vocabulary related to design and sustainability.