

# Public Sculpture Lesson Series: “Structure, Systems, and Perception”

## Framework for Grades 6-8

Based on *Twist* by Howard Russo



*This project is supported by:*



ART+DESIGN

# Objectives

- Observe how line and structure create form
- Investigate how **open systems** can remain stable
- **Connect** sculpture to concepts in science, mathematics, and language arts
- **Explore** how perception changes depending on movement and viewpoint
- Use observation to support creative and analytical thinking
- Analyze how **form, space, and structure** communicate ideas
- Explore **abstraction** as means to represent concepts rather than objects
- Develop and articulate personal interpretations
- Create a sculpture with **intentional meaning**

# Key Vocabulary

- **Abstraction** — art that does not represent reality directly
- **Positive space** — the material (the lines/structure)
- **Negative space** — the empty space around and inside
- **Structure** — how something is built
- **Interpretation** — what something means to the viewer
- **Concept** — the main idea or message behind an artwork
- **Sci-fi** — imaginative ideas about the future, technology, or space
- **Speculative** — based on imagining possibilities or “what if” ideas
- **Philosophy** — thinking deeply about ideas, meaning, and existence
- **Integration** — combining different ideas, materials, or subjects into one work
- **System** — a set of connected parts that work together or interact to form a whole (can include materials, ideas, processes in art-making)

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## Central Questions

- How can a sculpture feel solid even when much of it is empty?
  - Why do humans recognize incomplete forms?
  - How do structures in art resemble systems found in science and nature?
  - How can abstract forms communicate ideas or emotions?
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## Outdoor Observation Activity

### “Walking the Structure”

Students move around the sculpture and observe from multiple viewpoints.

#### **Prompts:**

- Where does the sculpture appear most open?
- Does the sculpture feel balanced or unstable?
- Which lines seem to hold the structure together?
- Does the form change as you move?
- What shapes or systems does it remind you of?

#### **Students sketch:**

- one close-up detail
- one full-view outline
- one imagined “invisible line” completing the sphere
- rudimentary one page comic-like sketch with at least four squares with a progression or narrative story featuring a sphere
- one environmental placement sketch showing the sphere in a specific context (city, nature, space, or imagined world)
- one scale shift sketch comparing a small sphere in hand to a large, imagined version in the environment

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# Interdisciplinary Connections

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## Science / Engineering “Strong Shapes”

### Tangible Examples

Students compare *Twist* to:

- bicycle wheel spokes
- climbing domes on playgrounds
- roller coaster frameworks
- stadium roofs
- EPCOT’s Spaceship Earth structure at Spaceship Earth
- geodesic domes used in science fiction films and video games

### You can introduce:

- [Scientific American: Build Your Own Geodesic Dome](#)
- [Science Buddies: Dome Sweet Dome Engineering Project](#)

These work because students immediately recognize:

“Oh, this is the same logic used in structures I already know.”

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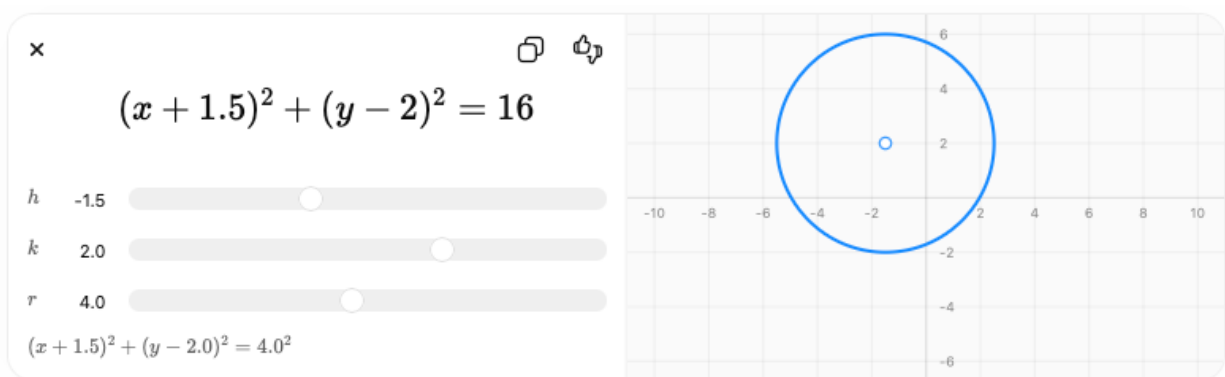
# Mathematics

## “Patterns and Geometry in Space”

Students explore how algebra and geometry connect by seeing how a mathematical equation creates a shape on the graph.

### Build a graph

[Interactive Graph Instructions](#)



### Learning Connection

Students identify:

- circles
- symmetry/asymmetry
- repetition
- geometric systems

### Activity

Students map repeated lines and intersections within the sculpture.

### Tangible Examples

Compare the sculpture to:

- globes
- sports balls
- planetary orbits
- wireframe digital models

### Discussion

- Is the sculpture perfectly symmetrical?
- How does repetition create rhythm?

# Biology / Environmental Science

## “Systems in Nature”

### Learning Connection:

Students explore:

- natural structures
- adaptation
- cellular organization
- growth patterns
- [Fibonacci sequence and patterns in nature](#)

### Tangible Examples

Compare *Twist* to:

- seed pods
- fungi networks
- spider webs
- microscopic organisms
- tree branching systems

### Outdoor Extension

Students photograph or sketch natural structures around campus that resemble the sculpture.

**Prompt:** Why do similar shapes appear repeatedly in nature?

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# Language Arts / Creative Writing

## “The Shape of Memory”

### Learning Connection

Students use observation to support:

- descriptive writing
- metaphor
- narrative development

### Writing Prompts

1. “If this structure could speak, what would it say?”
2. “What does this object protect?”
3. “What is missing from this structure?”
4. “What would happen if the sculpture began moving?”

### Optional Extension

Students write a short poem, speculative fiction, or a dialogue between the sculpture and the viewer.

Alternately, this option offers students to engage with speculative and sci-fi references.

### Writing Prompts

The sculpture becomes:

- an abandoned alien satellite
- a portal device
- a futuristic sports arena
- a floating drone network
- the remains of an ancient civilization
- a machine discovered 500 years in the future

#### Prompt:

- “Who built this?”
- “What was it designed to do?”
- “What happened to it?”

## References

### The Artifact / Psychological Sphere

Most associated with Michael Crichton's 1987 novel and the 1998 film adaptation directed by Barry Levinson, the "Sphere" is a massive, liquid-metallic extraterrestrial object discovered deep underwater. [1, 2, 3]

### The Dyson Sphere (Megastructure)

In hard sci-fi, "spheres" are almost always **Dyson Spheres**—hypothetical megastructures originally proposed by physicist Freeman Dyson that encompass an entire star to capture nearly 100% of its solar output. [1, 2]



- **Science to Fiction:** Dyson was inspired by the 1937 sci-fi novel *Star Maker* by Olaf Stapledon.
- **Tropes:** In space operas, these structures are often ancient, abandoned, or used by Type II civilizations. The trope usually implies that if protagonists run into an inhabited sphere, they will be vastly outmatched by the builders' hyper-advanced technology.
- **Examples:** You can find Dyson spheres serving as major plot devices or locations in series like *Star Trek* (e.g., the TNG episode "Relics") and various sci-fi video games like *Halo* (the *Shield Worlds*) and *Stellaris*. [1, 2]
- [What is the Dyson Sphere?](#)

### Other Notable Sci-Fi Spheres

- **The Death Star (*Star Wars*):** The ultimate weapon sphere, operating as an artificial, planet-killing moon.
- **The Ego the Living Planet (*Marvel*):** While technically a planet, it acts as a sentient, spherical cosmic entity that is heavily featured in space-faring sci-fi lore.
- **Krell Devices (*Forbidden Planet*):** The ancient alien race built a vast, planet-wide subterranean sphere that powered their ancient machinery and manifested their subconscious nightmares (a direct predecessor to concepts used in *Sphere*).
- **The Monoliths (*2001: A Space Odyssey*):** While technically rectangular, they are frequently misremembered or adapted into various "perfect shape" alien artifacts (including spherical variations in the sequels). [1, 2]

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# Visual Art Connection

## “Drawing Space”

### Learning Connection

Explore how sphere appears as a theme in sculpture and why: [Visual examples](#)

Students examine:

- positive and negative space
- line
- movement
- abstraction

### Activity

Students draw only the empty spaces inside the sculpture rather than the structure itself.

### Discussion

Which is more important: the material or the space?

### Object construction

Materials: Inflatable balloon, string, and white glue (Elmer’s Glue)

1. Inflate a balloon to the size you want your sphere and tie it closed securely.
2. Dip pieces of string into white glue so the string is fully coated.
3. Wrap the glue-covered string around the balloon in many different directions to form a web pattern.
4. Leave small gaps between the strings and keep adding layers until the shape feels strong.
5. Let the glue dry completely for several hours or overnight until the string becomes stiff.
6. Pop the balloon carefully and remove it from inside, leaving a hollow string sphere.

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## Group Discussion / Reflection

Students rotate through inquiry stations:

Lens	Guiding Question
Art	How does line create movement?
Science	Why does the structure remain stable?
Math	What patterns repeat throughout the form?
Biology	What natural systems resemble this sculpture?
Writing	What story exists inside this structure?

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## Closing Reflection

Students respond:

- “I used to think sculpture was \_\_\_\_\_. Now I think sculpture can \_\_\_\_\_.”
- “One thing that surprised me about sculpture was \_\_\_\_\_. It made me think differently because \_\_\_\_\_.”
- “A sculpture that inspired me today was \_\_\_\_\_ because it showed me that art can be seen \_\_\_\_\_.”
- “After creating and learning about sculpture, I feel more confident about \_\_\_\_\_ and curious about \_\_\_\_\_.”