

Creating Optical Illusions

Art Meets Science · Grades 5–8 · Art · 30 minutes

Students explore the intersection of art and neuroscience by studying famous optical illusion artists and creating their own illusion artwork using perspective, color theory, and pattern techniques.

THE 30 MINUTES

5 min
HOOK

10 min
DIRECT INSTRUCTION

12 min
ACTIVITY

3 min
CLOSING

LEARNING OBJECTIVE

Students will analyze how artists use perspective, color theory, and pattern to create optical illusions, study examples from the Op Art movement and M.C. Escher, and create their own optical illusion artwork.

STANDARDS ALIGNMENT

- **National Core Arts Standards:** VA:Cr1.1 (Generate and conceptualize artistic ideas), VA:Re7.1 (Perceive and analyze artistic work), VA:Cn11.1 (Relate artistic ideas with societal, cultural, and historical context)

MATERIALS NEEDED

- White drawing paper, rulers, compasses, pencils, erasers
- Colored pencils, markers, or fine-tip pens
- Examples: M.C. Escher works (*Waterfall*, *Ascending and Descending*, *Relativity*)
- Examples: Op Art (Bridget Riley, Victor Vasarely)
- Mini Museum Perception Lab: minimuseumproject.org/exhibitions/seeing-is-deceiving/illusions
- Recommended from Perception Lab: Impossible Trident (#15), Café Wall (#6), Fraser Spiral (#5), Bulging Grid (#7)

HOOK · 5 MINUTES

The art that tricks your brain

Display M.C. Escher's *Waterfall* (water appears to flow uphill in an impossible loop).

"At first glance, this looks normal. But trace the path of the water with your finger. Where does it go?" Let students discover the impossibility. *"This is an 'impossible object'—something that can exist in 2D but never in real life. Dutch artist M.C. Escher was a master at these."*

Show a Bridget Riley Op Art piece (black and white patterns that appear to move).

"This painting isn't moving—but your brain thinks it is! This is Op Art, short for 'optical art.' Artists in the 1960s deliberately created works that trick your visual system."

Three illusion techniques

01

Impossible objects

What: Shapes that look 3D but violate geometry

How: Local parts look correct, but whole is impossible

Artists: M.C. Escher, Oscar Reutersvärd (invented impossible triangle, 1934)

02

Op Art patterns

What: Geometric patterns creating movement, depth, vibration

How: High-contrast repetitive patterns overwhelm visual processing

Artists: Bridget Riley, Victor Vasarely, Jesús Rafael Soto

03

Ambiguous figures

What: Images interpreted two or more ways

How: Brain can only hold one interpretation, so it “flips”

Artists: Salvador Dalí, Octavio Ocampo, Sandro del Prete

Examples: Young/old woman, vase/faces, duck/rabbit

ACTIVITY · 12 MINUTES

Create your own optical illusion

Option A: Impossible Triangle (Recommended for beginners) — Walk through step-by-step on board.

Option B: Op Art Pattern — Draw grid, systematically distort, fill alternating sections black.

Option C: Ambiguous Figure — Design image that can be seen two ways (advanced).

Circulate and assist. Encourage students to test illusions on classmates: *“Does it trick their eyes?”*

CLOSING · 3 MINUTES

The science behind the art

“Every optical illusion you created today works because you understand something about how the brain processes visual information. Artists like Escher and Riley weren’t just making pretty pictures—they were exploring the limits of human perception.”

Reflection questions: *“Which technique was most challenging? Why?” / “What did you learn about how your brain sees?” / “How might you use these techniques in other artwork?”*

MINI MUSEUM CONNECTION

Option 1 — Visit the Mini Museum: The Victorian optical illusion cards use similar techniques—transformation cards revealing hidden images, patterns that seem to move. The stereoscope creates depth from flat images.

Option 2 — Virtual Visit: Show the exhibition online at minimuseumproject.org/exhibitions/seeing-is-deceiving or view artifacts at minimuseumproject.org/exhibitions/seeing-is-deceiving/artifacts

ASSESSMENT

- **Formative:** During creation, check that students can explain which technique they’re using and how it tricks the eye.
- **Completed artwork:** Assess: (1) Correct application of technique, (2) Neatness and precision, (3) Effectiveness—does it work?
- **Exit ticket:** *“Name one technique we learned today and explain how it tricks the brain.”*

DIFFERENTIATED STUDENT HANDOUTS

Three levels of student handouts are provided as separate files. Students self-select their challenge level:

GREEN LEVEL MORE SUPPORT

"I want more support" — Guided impossible-figure drawing, following the step-by-step board demonstration

YELLOW LEVEL GRADE LEVEL

"I'm ready for a challenge" — Create original illusion using one technique

RED LEVEL GO DEEPER

"I want to go deeper" — Combine multiple techniques, write artist statement

ARTIST BACKGROUND (FOR TEACHER REFERENCE)

M.C. Escher (1898–1972)

Dutch graphic artist known for mathematically-inspired woodcuts, lithographs, and mezzotints featuring impossible constructions and explorations of infinity.

Bridget Riley (b. 1931)

British painter, one of the foremost Op Art practitioners, known for black-and-white paintings that produce sensations of movement.

Victor Vasarely (1906–1997)

Hungarian-French artist, widely accepted as the "grandfather of Op Art," pioneered geometric abstract art.

Oscar Reutersvärd (1915–2002)

Swedish graphic artist, "father of impossible figures," created first impossible triangle in 1934.

EXTENSION IDEAS

- Research Roger Penrose and his collaboration with Escher on impossible figures
- Explore anamorphic art (distorted images that appear correct from one viewpoint)
- Create a class gallery of student optical illusions
- Compare historical optical toys (thaumatropes, zoetropes) to modern VR/3D technology