

**Project Title:** Visual Perception: See it! Believe it?

**Project Type:** Demonstration

**Target Museum:** MSI- World Theatre, Live!

**Target Audience:** All ages

**Big Idea:** *What you see is not always the way it is!*

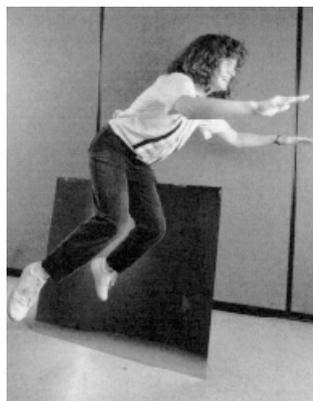
Your eyes really can play tricks on you. Vision is based on the information the eye shares with the brain. Sometimes the information can be incomplete, contradictory, or just confusing, so what we see is an “illusion”.

### **Description of Project:**

The demonstration project seeks to explore the irregularities of the visual system, often experienced as visual illusions. “Illusion” seems to suggest a malfunction of the visual system, but really these phenomena bring out particularly good adaptations of our visual system to *standard* viewing situations. “These adaptations are “hard-wired” into our brains, and thus under some artificial manipulations can cause inappropriate interpretations of the visual scene” (michaelbach.de/ot/). The proposed demonstration will consist of a ten-minute floor show and a standing media room of different visual illusions. The desired setting is the World Theatre, Live! which contains three media units. Each unit is made up of four television sets and one large projection screen.

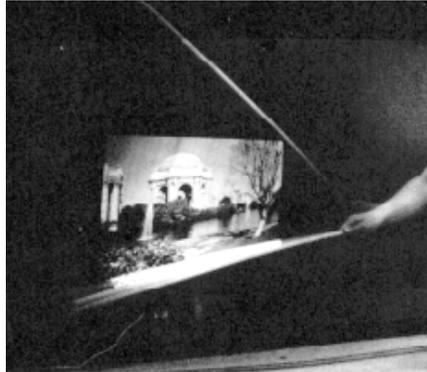
The floor show will be a traditional scripted demonstration focusing on the visual’s system ability to complete an image and retain an image, emphasizing the complexity and flexibility of everyday sight. The proposed script will involve two illustrations:

The “Anti-Gravity Mirror” will show the ability to complete an image. Here the demonstrator appears to fly by straddling a large mirror and raising their leg. This simple demonstration has the potential for the theatrical when orchestrated with audience participation.



Next, a simple projector will be used to explain the ability to retain an image. A single image is projected onto a removable white poster board. The board is taken down and the demonstrator quickly waves a dowel rod or meter stick in place of the board. The image is reflected off the surface of this “magic wand” and displays in small strips.

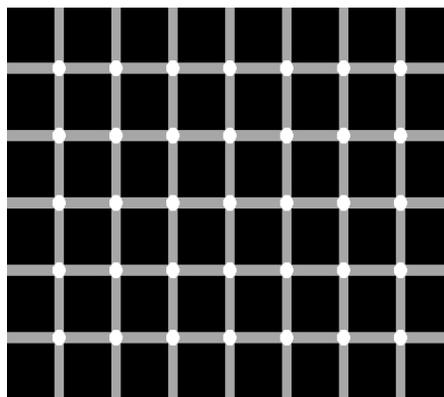
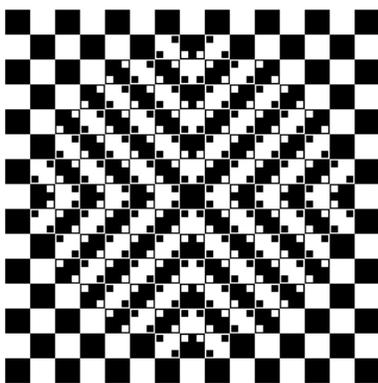
However, if waved with quick enough motion, the entire image will appear to the view, seemingly in thin air!



Each of these illustrations will be accompanied with simple explanations and anecdotes of people's real experiences with visual illusion. Once again, the goal of this floor show portion is to explain how important these irregularities are to day-to-day vision.

In conjunction with the short floor show, a wider array of visual illusions will be exhibited as a standing feature of the demonstration space. The intended theatre can display four images at a given moment, reserving the large screens for explanations of the seen phenomena. (It may be possible to record the explanations since the space has audio capabilities as well, allowing the larger screen to host another loop of images.) Most visual illusions can be observed in approximately thirty seconds. Therefore, a rotating loop of three images per screen will allow for a wider diversity of images (12) while still permitting the visitor to experience a single phenomenon in its entirety. (This number, of course, can always be expanded or contracted as need arises.)

Examples of potential visual illusions:



Right Image- the bulging is an illusion, the image consists of only squares

Left Image- there are no black dots at the intersections

### Science:

#### Demonstration A: Anti-Gravity Mirror

This illustration is based on the visual system completing an image based on key information.

This information about any given object is transferred to the visual cortex "where your brain then

creates a perception of the object from the partial information” (Pinel, John: Biopsychology 5<sup>th</sup> Edition 2003). The person looks whole because the human body is symmetrical. The observer's brain is tricked into believing that an image of your right side is really your left side (Exploratorium: Science Snacks.)

#### Demonstration B: Magic Wand [retaining an image]

This illustration is based on the ability for the brain to retain an image even after it is gone. The projector focuses the image in the air, though a surface is necessary to reflect the light in order for the image to be seen. The screen, or a moving wand, provides the needed surface for the demonstration, though the wand only reflects the image piecemeal. “When this reflected light enters your eyes, it makes an image on your retina. Your eyes retain each piece of the image for about 1/30th of a second - long enough to let you put the pieces together to make a composite picture” (Exploratorium: Science Snacks). This is called persistence of vision

#### **Evaluation Plan:**

The project will facilitate two levels of evaluation. First, front end evaluation will be a study on the universality of designated visual illusions intended as standing media on the screens of the theatre. In consideration of the probability that certain visual illusions could either be unintelligible or displeasing for the individual, this study will aim at comparing the effectiveness of the proposed illusions. The goal of this study is to select the twelve visuals (this number based on above remarks) that best communicate the nuances of the visual system in a manner that is fun and stimulating for the viewer. The study will be conducted amongst staff, colleagues, and possibly a random sample of museum visitors.

The second form of evaluation will cover the demonstration itself. A preliminary, scripted version of the demonstration will be tested on the museum floor. A short, but formal survey will be conducted after visitors attend the demonstration. These surveys, along with informal conversations with visitors, will influence the dynamics of the script to its “finalized” form. Furthermore, ongoing evaluation, even after a “final” script, is always desirable and will be considered as vital to the success of the demonstration.

#### **Connections to Museum:**

This project directly relates to the Body Human exhibit the Museum of Science and Industry is currently developing. Visual perception is one area of the Body Human topic that will be covered. Also, museum staff has expressed interest in a revitalization of the World Theatre, Live! Thus this project answers specific goals of the museum by incorporating the use of this space.

This project is designed to target all audiences by fusing science principles with a high level of awe and entertainment. It specifically meets educational standards outlined in State Goals 12.A.1a, 12.A.3c, 12.B.2b, 12.B.3b, 12.B.4a- covering educational development from elementary to high school. These standards relate to the demonstration’s potential to explain how living things (in this case, humans) function, adapt, and interact.

#### **Visualizations:**

The visualizations needed are the animations for the standard visual illusions.