

Please note that all references to gallery installations reflect locations of the objects as of March 2018.

One-Point Perspective

Subway Acrobats, 1959, Jacob Lawrence, tempera on board. L2014.234.55 (Kunin) **G360**

Off the Coast (Lake Superior), 1886, Alexis Jean Fournier, Oil on canvas, 2012.45, **G302**

Canyon Portal, 1935, Edgar Payne, oil on canvas, 2006.84, **G301**

Promenades of Euclid, Rene Magritt, 68.3, **G376**

Eseias van de Velde I – **Courtly Procession** – 83.122

Two-Point Perspective (could also make a case for Three Point Perspective)

Temple of Nettuno, Paestum, XVI, 2015, Vera Lutter, Gelatin silver prints, 2017.12A-C, **G242**

The Twins, 1946, Dale Nichols, oil on canvas, 98.247, **G302**

The Appointed Room, 1940, Marvin Cone, oil on canvas, L2014.234.550 (Kunin Collection), **G376**.

*Compare with the style used by Edward Hopper, particularly in **Rooms by the Sea**.*

G 203 - Chinese Landscapes/Perspective

- The Immortal Hanshan – 99.123.1

G 210 Chinese Landscapes/ Perspective

- Jiang Xun – Zhang Kui Traveling – 2013.58.3
- Luo Jianwu – Cypress at jade mountain – 2010.20

G 222 – Japanese Landscapes/Perspective

- Kano Sansetsu – Moonlit Scene – 2013.29.35
- Kano School – Landscape of the Four Seasons – 77.50.1-2

G 307 – Landscapes/Perspective

- Vernet – Imaginary Landscape - 66.61.2
- Marlow – View of the Saône and the Château Pierre-Scize - 39.9
- Marlow – Castle on the Rhone River - 39.8

G 309 – Dutch Landscapes

- Lingelbach The Piazza del Popolo, Rome – 60.34

G 311 – Dutch Landscapes

- Ruysdael – River Landscape with a Ferry - 45.9
- Jan Both – Wooded Hillside with a Vista - 65.1
- Wouwermaris – Merry and Rowdy Peasants at an Inn - 81.107

Aerial/ Atmospheric Perspective

The Four Days Battle, 1666, Abraham Storck, Netherlands, oil on canvas, 84.31, **G309**

Fishing Vessels Offshore in a Heavy Sea, 1684, Ludolph Backhuysen, Oil on canvas, 82.84, **G309**

Virgin and Child in Landscape, c. 1492-1498, Artist: Possibly Master of the Embroidered Foliage, oil on panel, 90.7, **G342**

The Destroyer, 1911-13, Arthur Wesley Dove, oil on canvas, 2009.62, **G301**

Bird's Eye View (like a blueprint or map)

Yamantaka Mandala, 1991, Monks of the Gyuto Tantric University, Colored silicate and adhesive on wood, 92.44, **G212**

Worm's Eye View

City Night, 1926, Georgia O'Keeffe, Oil on canvas, 80.28, **G377**

Geometric Symmetry and Shapes

Tahkt-I-Sulayman Variation II, 1969, Frank Stella, **Acrylic on canvas, 69.132, G374**

Part of "Protractor" series; using a drafting tool for measuring and making angles. As Stella searched for ways to make paintings without emotion or drama, he found himself drawn to patterns and to repetition. Geometric Symmetry was helpful to him because, as he put it, "it forces illusionistic space out of the painting at constant intervals by using a regulated pattern."

Door Panel, 14th century, Unknown artist, Egypt, Wood and ivory, 83.79, **G243**

This door panel required complex calculations in order to depict symmetry in geometric compositions. Three major zones evolve from an 8-pointed star; with unity being a prime attribute of Allah.

G 204 – Spirals, Circles on Chinese Ceramics

- (Neolithic) Basin – 2003.200.1
- Storage Vessel – 2003.200.6
- Storage Jar – 2003.203

G 243 Geometric Shapes

- Jali with Pointed Arch Frame – 2000.78
- Storage Chest – 2004.54

G 312 – Geometry and Symmetry

- Hans D Sommer - Center Table – 80.55

G361 – Kunin Geometry

- Burgoyne Diller – Second Theme – 2015.55.2 (harmony, stability and order)
- Pavel Tchelitcheus – Inacheve – L2014.234.256 (interweaving geometric forms)
- Charles Green Shaw – Untitled (Conflicting Forces) L2014.234.382 (parabolas)

G 360 – Kunin Portraits

- Morris Kantor – Untitled (Posthumous Portrait of the Artist's Mother) L2014.234.53

Geometric Abstraction

Characterized by its use of simple geometric forms such as squares, rectangles, and circles in a limited color palette.

About Two Squares: A Suprematist Tale in Six Constructions, 1922, El Lissitzky (Lazar Markovich Lissitzky); Publisher: Verlag Skythen, Berlin; Printer: E. Haberland, Leipzig, Lithographs and typography, B.89.3, **Not on View**

Composition with Blue, Red, Yellow, and Black, 1922, Piet Mondrian, Oil on canvas, 65.5, **G377**

Line, Form and Pattern Within a Circle

***Skijoring**, Lill Tschudi P.95.16, **NOT ON VIEW**

The artist captured the speed and spirit of skijoring by skillfully weaving line, form and pattern within the compressed space of a circle.

Proportion

Proportion refers to the relative size of parts of a whole; elements within an object. We often think of proportion in terms of size relationships within the human body; can also be applied to animals.

The Great Horse, 1505, Albrecht Durer P. 68.153.315 – NOT ON VIEW
(Dramatic perspectival foreshortening of the horse's body)

Nautilus shell cup, c. 1660-1680, Unknown, Nautilus shell, silver, parcel-gilt, 2011.28, G350
(Perfect Proportion - The Golden Ratio; The Golden mean; Fibonacci's Spiral)

The Doryphoros, 120–50 BCE, Unknown Roman, Pentelic marble, 86.6, G230
(Ideal in Proportion)

Man of Sorrows, 62.24
(long hands; length of hand to longest finger is longer than forearm from wrist to elbow)

Woman by the Sea, Pablo Picasso, 61.36.24
(small head; foreshortening of the figure and compressing space and depth; massiveness as compared to Venus de Milo).

Christ Driving the Money Changers from the Temple, 1570, El Greco, oil on canvas, 24.1, **G341**
Note the relative height and proportion of the seated woman in the lower left corner of the composition.

Madonna and Child Enthroned, c. 1490, Nicola di Maestro Antonio, tempera and oil on panel, 75.53, **G343**
Note the exaggerated length of the Madonna's hands and fingers.

Cycladic Figure and Four-Part Canon of Proportions (2500-2400 BCE)

Female Figure, c. 2500-2400 BCE, Cycladic, Marble, 62.52, **G241**

Arms, legs, and torsos were more for differentiating humans from animals and other geometrical shapes. The artisans are thought to have used a four-part Canon of Proportions, with divisions at the shoulders, pubic triangle, and knees. Long, angular heads with a prominent arching nose and rounded chin; curving incisions; small wide-spaced breasts; and a clearly marked pubic triangle.

Egyptian Canon of Proportions

False Door, about 2400 BCE, Ancient Egyptian, **Limestone, 52.22**, G250

To create the proportions of human form in artwork, Egyptians used the canon of proportions, a set of guidelines, to give order to their art. This system was based on a grid of 19 squares high (including one square from the hairline to the top of the head, usually hidden under a crown). These proportions were not just a way to scale figures larger or smaller; Egyptians used this grid to correctly represent ideal proportions of the human figure, even if it was not realistic

The Tibetan Book of Proportions

Written in Newari script with Tibetan numerals, The Tibetan Book of Proportions was apparently produced in Nepal for use in Tibet. The concept of the “ideal image” of the Buddha emerged between the 4th and the 6th century, and as well as the proportions, other aspects of the depiction (such as number of teeth, the direction of the hair and the exact placement of the fingers) are taken into consideration.

The thankas, which are the tapestries or Buddhist paintings that follow these specifications of proportions, are not just valuable in terms of their iconography, but also seen as multi-dimensional and multi-sensorial devices designed to assist the evolution of consciousness.

* Mia Thanka

Shakyamuni Buddha, 1440-1470, Unknown artist, Central Tibet, Opaque watercolor and gold on cotton, 2000.31.5, **G212**

In addition to virtually guaranteeing a correct representation of the fundamental figures of Buddhism, the book also proves the importance of certain variables within this tradition, for example numerical precision, graphic organization of symbols, chromatic relationships and, in sum, it channels aesthetics for the benefit of spiritual development.

Scale

Scale refers to the size of an object (a whole) in relationship to another object (another whole). In art, the size relationship between an object and the human body is significant. In experiencing the scale of an artwork we tend to compare its size to the size of our own bodies.

Equestrian Figure, (Djenne, possibly Soninke), Mali, Africa, c. 1450, Wood, 83.168, **G250**

Moving, 2016, Aziz, Osman (born 1948), Somali, oil on canvas, L.2017.140.6

Somalia has the world's largest population of camels. Camels are depicted larger than life (in relation to humans) to represent their importance in society. Dromedary 5.9-6.6 feet tall; a full-grown adult camel stands 1.85 m (6 ft 1 in) at the shoulder and 2.15 m (7 ft 1 in) at the hump.

Red-and-blue-laced Suit of Armor from the Kii Tokugawa Family, early 17th century, Unknown Japanese; Artist: Helmet by Saotome Iechika, Iron, leather, lacquer, silk, wood, gold leaf and powder, bear fur, 2009.60A-S, **G340**

The praying mantis species vary in size from 2-5 inches (the Chinese Praying Mantis is often the longest). The praying mantis on this helmet has the tail or lower half of the insect behind the head, thorax and abdomen; making it even larger).

The Scale of Humans in the Natural World

Jade Mountain Illustrating the Gathering of Scholars at the Lanting Pavilion, 1790, Unknown, Light green jade, 92.103.13

Under the Wave off Kangawa, 1831-34, Hokusai Katsushika, Japanese, color woodblock print, **Not on View**

Larger than Life Scale

Frank, 1969, Chuck Close, Acrylic on canvas, 69.137, **G280**

Realism on an unreal scale. And artist's method – using a grid and expanding imagedddddddddd.

Scale Comparison - Lobsters

Aphrodisiac Telephone, 1938, Salvador Dali, Plastic, metal, 96.2, **G376**

Fantasy Coffin, 1993, Sowah Kwei, Wood, plaster, acrylic paint, 2010.72, **G250**

Lobster aphrodisiac telephone Dali 96.2 **G376** ~12 ¼ inches (length): 120 inches (length) **Fantasy Coffin**.

Scale of these two objects is approximately 1:23 (i.e. it would take 23 of the normal size lobsters to = the length of the larger than life lobster shape of the coffin)

Scale Comparison of Two Native American Objects: Native American Miniature Basket and Large Gathering Basket

Miniature Basket, 1900-1942, Akimel O'odham (Pima), Plant fibers, 42.18.42, **G259**
7/8" x 7/8"

Gathering Basket, 20th century, Pomo, Willow, sedge root, redbud, 96.23, **G259**
16 ½" x 23 ½"

Scale of these two baskets is approximately 1: 23

(Miniature basket ~1":~23" Pomo Basket)

(i.e. 23 miniature baskets, side by side, would equal the width of the large Pomo Gathering Basket).

Scale Comparison of Man and Chair in Two Large Portraits

Portrait of John Langston, Esquire, of Sarsden, 1787, Thomas Gainsborough R.A., Oil on canvas, 63.8, **G306**

(The chair is very low; the back height is below the man's hip; the seat is well below his knee, necessitating almost a crouching position if he were to actually sit in the chair; the artist likely intended to depict the man with greater height, more power, and grandeur).

Compare to:

Portrait of George Washington, c. 1820, Thomas Sully, Oil on canvas, 32.12, **G332**

(Large chair with tall back and higher seat); almost like a throne (possible reference to a Roman emperor).

Architectural Models (Scale)

http://www.architectural-models.info/scale_guide.asp

*Excellent charts (click on link and scroll down to see both charts) regarding architectural scales and scale selection (the second chart shows scales for museums, exhibits and architectural presentations).

Model of Original Scheme for the Minneapolis Society of Fine Arts, c. 1912, McKim, Mead, and White, Wood, plaster, and paint, 99.159A-D, G303

As built in 1915, Mia was one-seventh of this plan: the monumental entrance and adjacent sections facing 24th Street.

Francis Little House

Architectural model, 1998-1999, Construct Studios (David Swanson); Architect: Frank Lloyd Wright, Maple, maple veneer, plexi-glass, nylon screen, 2000.22, **G300**

Dimension (of entire house model)

8 1/2 x 72 11/16 x 41 13/16 in. (21.59 x 184.63 x 106.2 cm)

The actual hallway in the model is about 2 inches long. Scale of hallway (model) length to actual hallway length is 2:216 inches (or ~ 1:100)

Francis Little Hallway (actual hallway : compare to model above)

Frank Lloyd Wright Hallway, c. 1912-1914, Frank Lloyd Wright; Maker: Temple Art Glass Company, Oak, pine, glass, copper-coated zinc caning, porcelain, brass hardware, metal screens, cotton canvas upholstery, fabric shades, 72.11, G300

Dimension

216 x 72 in. (548.64 x 182.88 cm)

George Elmsie House

Architectural model, 1997, Construct Studios; Architect: William Gray Purcell; Architect: George Grant Elmslie, Maple, maple veneer, plexiglas, nylon screen, 97.53, G300

Dimension (of model)

13 5/8 x 15 5/8 x 47 5/8 in. (34.61 x 39.69 x 120.97 cm)

(The actual lot is 50 x 150 feet; no other house measurements/specifications available)

Mary Griggs Burke Doll House

12 –room dollhouse with dolls and furniture, early 20th century, United States, wood, paint, fabric, L2013.87

The large dollhouse has electric lighting and running water in the kitchen and bathroom. With its high Palladian windows, the dollhouse may have been based on the Italianate style of the Burbank-Livingston-Griggs House on St. Paul's Summit Avenue.

The dollhouses of the 19th and early 20th centuries rarely had uniform scales, even for the features or contents of any one individual house. Children's play dollhouses from most of the 20th and 21st centuries are **1:18 or two third inch scale (where 1 foot is represented by 2/3 of an inch)**. A few brands use 1:16 or 3/4" scale.

The largest common size for dollhouses is 1:6, which is proportionate for Barbie, Ken, and other dolls 11-12 inches tall, and furniture accessories. Contemporary children's dollhouses are mostly 1:18 scale (or 2/3") scale, while 1:12 (or 1") scale is common for dollhouses made for adult collectors, where one foot is represented by one inch.

Architectural Model in Form of Inkstand and Case

Case for Inkstand 69.80.2a-c (form of a fortified medieval town)

The Coaci Inkstand, 1792, 69.80. 1a, b Piazz di Monte Cavallo o del Grinnale, Rome, painted by Ippolito Caffio (1809-1866)

View of Saint Peter's Square and Basilica in Rome, c. 1846, Attributed to Ippolito Caffi, Watercolor over black and red chalk, 2010.47.4, **Not on View**

Frankfurt Kitchen, 1926-1930, Margarete Schütte-Lihotzky, Kitchen cabinetry and stove, 2004.195, G378

Full size kitchen on view at Mia; 1 meter = 3.28 feet

Conceived to meet the requirements of a working couple with three children, the standard version measured a mere 6 square meters and took up no more than 3% of the basic construction costs for a three-room apartment at 41 square meters. To quote one of the many descriptions of the Frankfurt kitchen:

Using a railroad dining car kitchen as her model, [Schütte-Lihotsky] designed a kitchen that was just 1.90 meters (about 6'3") wide and 3.44 meters (11'4") long [...]. Schütte-Lihotzky included a sliding door so that the mother could talk to and watch over her children in the living/dining area while working in the kitchen. The distance from the stove to the dining table was just three meters (10 feet).

International and Historical Units of Measurement in Art/Architecture at Mia

Ethiopia

Healing Scroll, early 20th century, Ethiopian (artist unknown), hide, pigment, L2014.274

Length of scroll is almost 6 feet; it equals the height of the patient for which it was made, so that he or she would be protected from head to toe.

Japan – Tatami Mats

Tatami mat (Tea House, Japanese Audience Hall)

The Zenshin-an Teahouse, Yasuimoku Komuten Company, Ltd., 2001 (constructed), Japan, Various natural materials, 2001.204.1

The Zenshin-an Teahouse replicates the Sa-an, an 18th century teahouse in the Gyokurin-in, a temple complex within the famous Zenmonastery of Daitoku-ji in Kyoto.

The Tatami mat is the only type of flooring for a traditional Chashitsu (Japanese Style Tea Room). In Japan, the size of a room, and that of a house is typically measured by the number of Tatami mats or Jō. Tatami are made in standard sizes, with the length exactly twice the width (aspect ratio of 2:1). The traditional dimensions of the mats were fixed at 90 cm by 180 cm by 5 cm (1.62 square meters) (35.5 inch by 71 inch by 2 inch). Half mats, 90 cm by 90 cm (35.5 inch by 35.5 inch) are also made.

The size of tatami differs between different regions in Japan

Kyoto – within this area, tatami generally measure 0.955 m by 1.91 m. Tatami of this size are referred to as **Kyōma** tatami. As noted above; The Zenshin-an Teahouse (at Mia) replicates the Sa-an, an 18th century teahouse in the Gyokurin-in, a temple complex within the famous Zenmonastery of Daitoku-ji in Kyoto.

Nagoya -- In this region generally measure 0.91 m by 1.82 m, and are referred to as **ainoma** ("in-between" size) tatami.

Tokyo --here tatami generally measure 0.88 m by 1.76 m. Tatami of this size are referred to as **Edoma** or **Kantōma** tatami.

Formal Audience Hall, constructed 2001, Yasuimoku Komuten Company Ltd, 2001.204.2, **G222**

The Audience Hall has been modeled after a formal 17th century shoin at the Konchi-in, a temple within the vast Zen monastery of Nanzenji in eastern Kyoto. Although shoin means "study," or "writing hall," Japanese aristocrats have used such elegantly proportioned and decorated rooms as reception halls for visiting guests and official messengers since the mid-16th century.

In Japan, the size of a room, and that of a house is typically measured by the number of Tatami mats or Jō. In the Formal Japanese Audience Hall, there are 10 tatami mats. The size is expected to correlate with the measures for tatami mats made in **Kyoto** (see above regarding size and different regions of Japan).

Reference for Japanese Units of Measurement

https://ipfs.io/ipfs/QmXoypizjW3WknFiJnKLwHCnL72vedxjQkDDP1mXWo6uco/wiki/Japanese_units_of_measurement.html

Egypt and Mesopotamia

Before there were standard units such as inches and feet, people used body measures. The ancient Egyptians (and others) used cubits, palms, and digits to measure length.

• A cubit is the length from your elbow to the tips of your fingers. • A palm is the width of your hand. • A digit is the width of your finger. These measures would vary depending on the individual; the ancient pyramids are said to have been built based on 1 cubit= 8 palms (20 inches).

1 cubit = 7 palms (about 18 inches); 1 palm = 4 digits

Balance

- Alexander Calder – Ahab – 83.77 G100

Shifting Perspective

Piranesi Prisons – Shifting Perspective, stairs, arches all imaginary **G344**

- Includes p.11,325 – p.11, 340
- Plate VI – 2010.87 G 344

Cubism Shifting Perspectives and Geometric Shapes

- Cubism **G 367**
- Ivan Klium – The Clockmaker – 2007.85 – numbers and shapes
- R. Belking – Sculpture 23 – L2007.24 (compare these two forms)
- Leger – Table and Fruit – 47.8
- Miro – The Spanish Playing Cards – 62.73.2 (multiple perspectives in these)
- Lyonel Feininger – Gross-Kromsdorf I – 61.36.4 (prism-is based upon the principle of monumentality)

- Lyonel Feininger – Hopfgarten – 55.2
- Alexandra Exter – Italian City by the Sea – 2008.83

Astronomy and Math

- **Martin Wong** – Polaris – 2017.35 **G373**
- **Vasari** – Six Tuscan Poets – 71.24, **G341**

ADDITIONAL REFERENCES AND RESOURCES:

Kemp, Martin, The Science of Art, Yale University Press, 1990. This book can be found in both the docent library as well as the Mia library.

Group Majoongmul, Math at the Art Museum, Tan Tan Publishing Company, U.S. edition, 2015. This book is available through the Hennepin County Library.

Mathematical Techniques in Astronomy <http://www.sites.hps.cam.ac.uk/starry/mathematics.html>

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Symmetry: the Ordering Principle by David Wade, Wooden Books