

# 2

## The Structure of Art

### Form and Design

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### 2.1 LEARNING OUTCOMES

After completing this chapter, you should be able to:

- Distinguish between various materials, processes, and methods in the production of art objects.
- Identify the characteristics of different art forms and distinguish one from another.
- Explain the roles of elements and principles of design in creating forms and compositions.

### 2.2 INTRODUCTION

When we look at the art objects that people have made over the centuries and around the world, we find they share some basic elements. They exist; they have substance; they are either flat or “in the round”; they use (or do not use) perspective, line, shape, mass, value, color, texture, and so on. Over time, both artists and art critics have developed a set of terms to describe art objects and their design. In this chapter, we will develop an art-specific vocabulary to use in identifying different types of art forms, discerning the materials and processes used to create them, understanding how the elements and principles of design are used by artists, and recognizing how they convey meaning in visual art.

The possible combinations in visual art are infinite, but the visual arts have traditionally been practiced and categorized in only a few broadly termed ways. The primary distinction in the visual arts is dimension. Two-dimensional art consists of **drawing, painting, and printmaking**; three-dimensional art consists of **sculpture, including installation, and kinetic art**. In addition to these traditional types of art, new technologies and new ideas about art have given us four-dimensional **or** time-based art, such as **video and performance**. Such art depends on the use of technology and the passage of time for its effect. Most recently, time-based art has grown to encompass a category known as new media art, which includes digital art, computer animation, interactive art, video games, virtual reality, robotics, and 3D printing.

Today the separate categories of space and time are becoming blurred as artists seek ways to combine disparate approaches into a single, encompassing, and rich art experience. An important lesson from the modern approach to visual art for both artists and viewers is to recognize that each formal element and each approach to design has unique expressive power.

## 2.3 ART SPECIFIC VOCABULARY

Every discipline has its “jargon,” and the visual arts are no different. Visual artists use a variety of materials and processes to produce their work and art critics use specialized terms to describe that work. It is unavoidable that terms must be invented to serve the purposes of criticism and/or description. Many art terms are in common use and widely understood, some are less so. Some terms come from languages other than English. In the course of describing the different forms that visual art takes, this text will introduce terms by using a bold font, following them with explanations and definitions. As with any discipline, the goal in using specialized art terms here is to make things more clear and direct.

## 2.4 ART FORMS

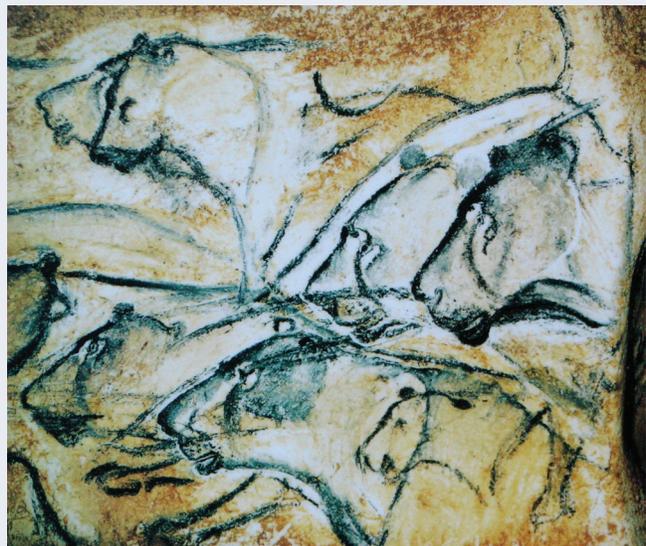
Because of the limits of nature, art objects are limited to the dimensions of space—and time. For this reason, art objects fall into three categories: **two-dimensional art**, **three-dimensional art**, and **four-dimensional art**. Each category has divisions deriving primarily from differences between the materials and approaches used. Throughout history, art objects generally fit clearly into a discrete classification. In the nineteenth century, however, artists began exploring the limits of new materials as well as the boundaries of the categories into which they fell to see if they were real or arbitrary.

### 2.4.1 Two-Dimensional Art

**Two-dimensional art** occurs on flat surfaces, like paper, canvas, or even cave walls. This art can be further divided into three main categories: drawing, painting, and printmaking. All art that occurs on a flat surface is one or a combination of these three activities.

#### 2.4.1.1 Drawing

The term **drawing** describes both a visual object and an activity. At first glance, drawing appears to consist of making contrasting marks on a flat surface. The term



**Figure 2.1 | Replication of Chauvet Cave Lion Wall**

Author: User “HTO”

Source: Wikimedia Commons

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implies something more, however. One can “draw” water from a well or be “drawn” to a charismatic person. There is something in the word “draw” that is related to extracting or delineating, the “pulling out” of an essence. To draw an object is to observe its appearance and transfer that observation to a set of marks. Ancient cave painters truly “drew” the animals they saw around them based on their deep familiarity with their essential nature. (Figure 2.1) So in this context, drawing is a combination of observation and mark making.

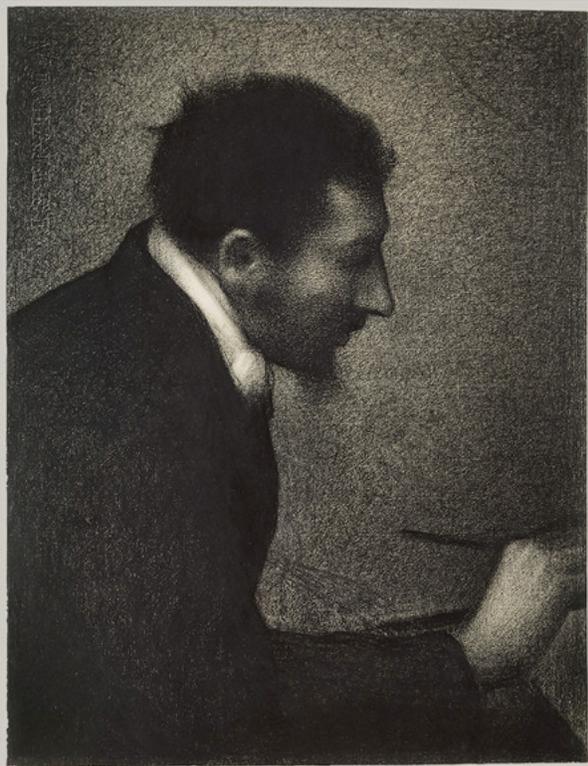
Drawing is usually—but not always—done with **monochromatic** media, that is, with dry materials of a single color such as **charcoal**, **conté crayon**, **metalpoint**, or graphite. Color can be introduced using pastels. In addition to these dry materials, free-flowing ink can also be used to make drawings. These materials have been highly refined over centuries to serve specific artistic purposes.

**Charcoal** is made from wood or other organic material that has been burned in the absence of oxygen. This process leaves a relatively pure black carbon powder. Artists compress this dry powder, or **pigment**, with a **binder**, a sticky substance like pine resin or glue made from the collagen of animal hides, to make hand-held charcoal blocks of various strengths and degrees of hardness. This compressed charcoal is used to make very dark marks, usually on paper. Compressed charcoal is challenging to erase.

Charcoal also comes in a form called **willow** or **vine charcoal**. This form of drawing charcoal leaves a very light mark as it is simply burned twigs. It is generally used for impermanent sketches because it does not readily stick to paper or canvas and is easily erased. Both compressed and vine charcoal drawings are easily smudged and should be protected by a fixative that adheres the charcoal to the drawing surface and creates a barrier resistant to smudging.

**Conté crayon** is a hand-held drawing material similar to compressed charcoal. Conté crayons are sticks of graphite or charcoal combined with wax or clay that come in a variety of colors, from white to sanguine (deep red) to black, as well as a range of hardness. Harder conté is used for details and softer varieties for broad areas. This portrait by Georges-Pierre Seurat (1859-1891, France) was drawn in black conté crayon on textured paper in order to break the image into discrete marks. (Figure 2.2)

**Metalpoint** is the use of malleable metals like silver, pewter, and gold to make drawing



**Figure 2.2 | Edmond Aman-Jean**

Artist: Georges-Pierre Seurat  
 Author: User “Pimbrils”  
 Source: Wikimedia Commons  
 License: Public Domain



**Figure 2.3 | Head of a Girl**

Artist: Leonardo da Vinci

Source: Wikiart

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marks on prepared surfaces. (Figure 2.3) The surface must have a “tooth” or roughness to hold the marks. Any pure silver or gold object can be used for this, though artists today favor silver and gold wire held in mechanical pencils for the process.

**Graphite** is a crystalline form of carbon. In the sixteenth century, a large deposit of pure graphite was discovered in England, and it became the primary source for this drawing material. Because of its silvery color, it was originally thought to be a form of lead, though there is no actual lead in pencils. Today powdered graphite is mixed with clay to control hardness.

**Pastels** are similar to compressed charcoal but, instead of finely powdered carbon, finely ground colored pigment and a binder are used to create handheld colored blocks. (Figure 2.4) The powdery pigments smudge easily, so the image created must be displayed under glass or covered with a fixative. Edgar Degas (1834-1917, France) is famous for the subtle yet distinct layering of color he was able to achieve in his pastel drawings. (Figure 2.5)



**Figure 2.4 | Pastels**

Author: User “Tau1012”

Source: Wikimedia Commons

License: Public Domain



**Figure 2.5 | *Nach dem Bade sich abtrocknende Frau (After the Bath, Woman drying herself)***

Artist: Edgar Degas

Author: User “Crisco”

Source: Wikimedia Commons

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Oil pastels are semi-solid sticks of high pigment oil paint that are used like crayons. They were originally invented to mark livestock, but artists quickly realized their aesthetic potential. Oil pastels are a convenient way to apply and blend heavily textured oil-based pigment onto any surface without using traditional brushes. The colors are vibrant, and the marks are gestural and immediate so oil pastel drawings can show the “hand” of the artist in a direct way, as can be seen here in *East Palatka Onions*, a 1983 oil pastel drawing by Mary Ann Currier (b. 1927, USA). (*East Palatka Onions*, Mary Ann Currier: <https://www.ket.org/content/uploads/2016/07/currier-ep-onions1100px.jpg>)

**Ink** is the combination of a colored pigment, usually black carbon or graphite, and a binder suspended in a liquid and applied with a pen or brush. A wide range of substances have been used over time to make ink, including lamp black or soot, burned animal bones, gallnuts, and iron oxide. The pigment must be finely ground and held

together with a binder. There is a long tradition of fine art ink

drawings. Although the example given dates to the fourteenth century, the oldest ink drawings come from China in the third century BCE and are done on silk and paper. (Figure 2.6)



**Figure 2.7 | Mona Lisa**

Artist: Leonardo da Vinci  
 Author: User “Dcoetzee”  
 Source: Wikimedia Commons  
 License: Public Domain



**Figure 2.6 | Spring Dawn Over the Elixir Terrace**

Artist: Lu Guang  
 Source: Met Museum  
 License: OASC

#### 2.4.1.2 Painting

Painting is a specialized form of drawing that refers to using **brushes** to apply colored liquids to a **support**, usually canvas or paper, but sometimes wooden panels, metal plates, and walls. For example, Leonardo da Vinci painted *Mona Lisa* on a wood panel. (Figure 2.7) Paint is composed of three main ingredients: pigments, binders, and solvents. The colored pigments are suspended in a sticky binder in order to apply them and make them adhere to the support. **Solvents** dissolve the binder in order to remove it but can also be used in smaller quantities to make paint more fluid.

As with drawing, different kinds of painting have mostly to do with the material that is being used. Oil, acrylic,

watercolor, encaustic, fresco, and tempera are some of the different kinds of painting. For the most part, the pigments or coloring agents in paints remain the same. The thing that distinguishes one kind of painting from another is the binder.

**Oil** painting was discovered in the fifteenth century and uses vegetable oils, primarily linseed oil and walnut oil, as the binding agent. Linseed oil was chosen for its clear color and its ability to dry slowly and evenly. Turpentine is generally used as the solvent in oil painting. The medium has strict rules of application to avoid cracking or delamination (dividing into layers). Additionally, oil paint can oxidize and darken or yellow over time if not properly crafted. Some pigments have been found to be **fugitive**, meaning they lose their color over time, especially when exposed to direct sunlight. This can be seen in a detail of Leonardo’s *Mona Lisa* where the figure’s eyebrows and eye lashes are now “missing.” (Figure 2.8)

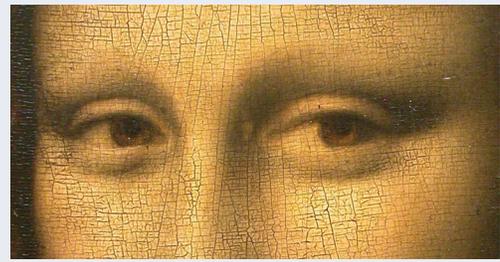
**Acrylic** painting is relatively modern and uses water-soluble acrylic polymer as the binding agent. Water is the solvent. Acrylic dries very quickly and can be used to build up thick layers of paint in a short time. One problem with acrylic is that the colors can subtly change as it dries, making this medium less suitable for portraiture or other projects where accurate color is vital. Nevertheless, acrylic paint is preferred over oil paint by many artists today, in part due to its greater ease of use and clean up, and because its rapid drying time allows the artist to work at a faster pace.

**Watercolor** painting suspends colored pigments in water-soluble **gum arabic** distilled from



**Figure 2.9 | *The Sponge Diver***

Artist: Winslow Homer  
 Author: User “Botaurus”  
 Source: Wikimedia Commons  
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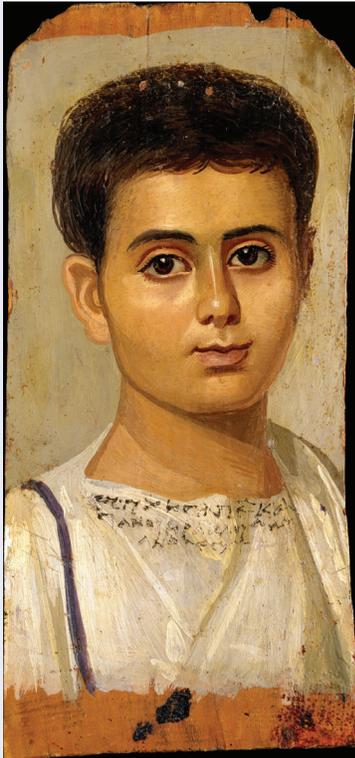


**Figure 2.8 | Detail of the eyes of *Mona Lisa***

Artist: Leonardo da Vinci  
 Author: User “Cantus”  
 Source: Wikimedia Commons  
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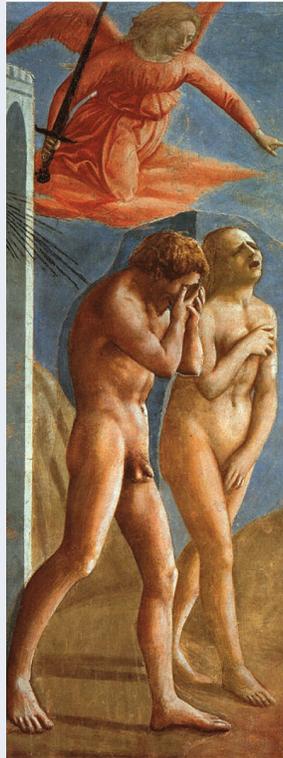
the Acacia tree **as the binder**. Watercolor paints are mixed with water and brushed onto an absorbent surface, usually paper. Before the industrial era, watercolor was used as an outdoor sketching medium because it was more portable than oil paint, which had to be prepared for use and could not be preserved for long periods or easily transported. (Figure 2.9) Today, however, many artists use watercolor as their primary medium.

**Encaustic** uses melted beeswax as the binder and must be applied to rigid supports like wood with heated brushes. The advantage of encaustic is that it remains fresh and vi-



**Figure 2.10 | Portrait of the Boy Eutyches**

Source: Met Museum  
License: OASC



**Figure 2.11 | The Expulsion of Adam and Eve from Eden**

Artist: Masaccio  
Source: Wikimedia Commons  
License: Public Domain

brant over centuries. Encaustic paintings from ancient Egypt dating to the period of Roman occupation (late first century BCE-third century CE) are as brilliantly colored as when they were first painted. (Figure 2.10)

**Fresco** is the process of painting onto plaster; it is a long-lasting technique. There are two kinds of fresco: **buon fresco**, or “good” fresco, is painting on wet plaster, and **fresco secco**, or dry fresco, is done after the plaster has dried. Paintings made using the buon fresco technique become part of the wall because the wet plaster absorbs the pigment as it is applied. (Figure 2.11) The only way to correct a buon fresco painting is to chip it off the wall and start over. Buon fresco must be done in sections. Each section is called a **giornate**, which is Italian for “a day’s work.” Because it is done on dry plaster, fresco secco is more forgiving, but also less permanent as changes in moisture levels or damage to the wall can harm the painting. Due

to the dry air and stable weather, there are fresco secco murals created as early as 3,000 BCE in ancient Egyptian tombs that remain largely intact. (Figure 2.12)

**Tempera** painting has been around for centuries. The most popular version of painting during the Middle Ages was **egg tempera**, in which dry colored pigments were mixed with egg yolk and applied quickly to a stable surface in layers of short brushstrokes. Egg tempera is a difficult medium to master because the egg yolk mixture dries very quickly, and mistakes cannot be corrected



**Figure 2.12 | Nebamun Tomb Fresco Dancers and Musicians**

Author: User “Fordmadoxfraud”  
Source: Wikimedia Commons  
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without damaging the surface of the painting. *The Birth of Venus* by Sandro Botticelli (1445-1510, Italy) is an egg tempera painting. (Figure 2.13)

### 2.4.1.3 Printmaking

A **print** is an image made by transferring pigment from a **matrix** to a final surface, often but not always paper. Printing allows multiple copies of an artwork to be made. Multiple copies of an individual artwork are called an **edition**.

There are four main types of printmaking: relief, intaglio, planographic, and stencil. **Relief** prints are made by removing material from the **matrix**, the surface the image has been carved into, which is often wood, linoleum, or metal. (Figure 2.14) The remaining surface is covered with ink or pigment, and then paper is pressed onto the surface, picking up the ink. **Letterpress** is a relief printing process that transfers ink to paper but also indents an impression into the surface of the paper, creating a texture to the print that is often considered a sign of high quality.

**Intaglio** prints are made when a design is scratched into a matrix, usually a metal plate. Ink is wiped across the surface, and collects in the scratches. Excess ink is wiped off and paper is pressed onto the plate, picking up the ink from the scratches. Intaglio prints may also include texture.

**Planographic** prints are made by chemically altering a matrix to selectively accept or reject water. Originally, limestone was used for this process since it naturally repels water but can



**Figure 2.13 | *The Birth of Venus***

Artist: Sandro Botticelli

Author: User "Dcoetzee"

Source: Wikimedia Commons

License: Public Domain



**Figure 2.14 | Relief Wood Carving**

Author: User "Zephyris"

Source: Wikimedia Commons

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**Figure 2.15 | Stone used for lithography print**

Author: User "AndreasPraefcke"

Source: Wikimedia Commons

License: Public Domain

be chemically changed to absorb it. In stone matrix **lithography**, black grease pencil drawings are made on a flat block of limestone, which is then treated with nitric acid. (Figure 2.15) The nitric acid does not dissolve the stone, but changes it chemically so that it absorbs water. The grease pencil is removed, and the stone wetted. Where the grease pencil protected the stone from the acid, the limestone repels water and remains dry. Next, oil-based ink is rolled over the stone. Where the stone is dry, the ink will stick, but where the stone is wet, the ink will not. The image is “brought up” to the desired darkness by passing an ink covered roller on it, then it is printed by pressing paper onto the surface to pick up the ink. Most commercial printing today is **lithographic printing**, using aluminum plates instead of limestone blocks, or offset printing, where the inked image is transferred from a metal plate to a rubber cylinder and then to paper. (Figure 2.16)



**Figure 2.16 | Lithographic Press**

Photographer: Clemens Pfeiffer

Author: User "Panoramafotors"

Source: Wikimedia Commons

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**Stencil** prints are made by passing inks through a porous fine mesh matrix. In **silkscreen printmaking**, for example, silk fabric is mounted tightly on a rigid frame. Areas of the fabric are blocked off to form an image. The fabric-lined frame is placed on top of paper, canvas, or cloth. Ink is then pulled across the frame with a rubber blade. Where the fabric is blocked off, the ink does not transfer. Where the fabric is clear, ink is pushed through onto the receiving surface.

It is important to be able to distinguish between original prints and reproductions. **Original prints** are handmade prints. Since each print is subtly different due to its handmade character, each print is considered an original work of art. (Figure 2.17) Editions of original prints can range from a few to dozens or hundreds of copies. **Reproductions** are mechanically produced. An original artwork is photographed; the photograph is then transferred to a print-



**Figure 2.17 | Artist Preparing Linoleum Prints**

Author: Kyle Van Horn

Source: Wikimedia Commons

License: CC BY 2.0



**Figure 2.18 | Offset Press**

Author: User "RémiH"  
Source: Wikimedia Commons  
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ing plate on a mechanical press. Each print is nearly identical, and editions can run into the thousands or tens of thousands. (Figure 2.18)

The value of an individual print depends on a number of factors, including whether it is an original print or a reproduction and the number of prints in an edition. Recently a new kind of print has become popular, the **gicleé**. This is essentially a digital inkjet print. Those who buy gicleé prints should be careful that only acid-free paper and archival inks are used in its production. The fibers that make paper can come from many different sources, some of which contain acid that will turn the paper yellow with age. Over time, ink

pigments can be fugitive, lose color intensity or even shift in hue. These effects will lower the value of the print. Acid-free paper and archival inks resist these defects and preserve the original appearance of the art object, thus maintaining its value.

### 2.4.2 Three-Dimensional Art

**Three-dimensional art** goes beyond the flat surface to encompass height, width, and depth. There are four main methods used in producing art in three dimensions. All three-dimensional art uses one or a combination of these four methods: carving, modeling, casting, or assembly. A form of three-dimensional art that emerged in the twentieth century is installation, a work in which the viewer is surrounded within a space or moves through a space that has been modified by the artist.

**Sculpture** can be either **freestanding**—"in the round"—or it can be **relief**—sculpture that projects from a background surface. There are two categories of relief sculpture: low relief and high relief. In **low relief**, the amount of projection from the background surface is limited. A good example of low relief sculpture would be coins, such as these ancient Roman types dating from c. 300 BCE to c. 400 CE. (Figure 2.19) Also, much Egyptian



**Figure 2.19 | Common Roman Coins**

Creator: Rasiel Suarez  
Author: User "FSII"  
Source: Wikimedia Commons  
License: GFDL

wall art is low relief. (Figure 2.20) **High relief** sculpture is when more than half of the sculpted form projects from the background surface. This method generally creates an effect called **undercut**, in which some of the projected surface is separate from the background surface. Mythological scenes depicted on the Parthenon, an ancient Greek temple, (Figure 2.21) and the *Corporate Wars* series (*Corporate Wars*, Robert Longo: [http://media.mutualart.com/Images/2009\\_07/24/0205/582184/49777ffa-d61f-42aa-a3f1-9c47ed564b05\\_g.Jpeg](http://media.mutualart.com/Images/2009_07/24/0205/582184/49777ffa-d61f-42aa-a3f1-9c47ed564b05_g.Jpeg)) by Robert Longo (b. 1953, USA) are both examples of high relief using undercut.

**Modeling** is an **additive** process in which easily shaped materials like clay or plaster are built up to create a final form. Some modeled



**Figure 2.21 | Lapith fighting a centaur**

Author: User "Jastrow"

Source: Wikimedia Commons

License: Public Domain



**Figure 2.20 | Egyptian Relief Carving**

Author: User "GDK"

Source: Wikimedia Commons

License: Public Domain



**Figure 2.22 | Bust of Maximilien Robespierre**

Artist: Claude-André Deseine

Author: User "Rama"

Source: Wikimedia Commons

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**Figure 2.23 | A selection of woodcarving gouges, chisels, and a mallet**

Author: User "Aerolin55"

Source: Wikimedia Commons

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**Figure 2.24 | Sculptor Carving Stone**

Author: Bain News Service

Source: Wikimedia Commons

License: Public Domain



**Figure 2.25 | Marble statue of Eirene (the personification of peace)**

Artist: Kephisodotos

Source: Met Museum

License: OASC

forms begin with an **armature**, or rigid inner support often made of wire. An armature allows a soft or fluid material like wet clay, which would collapse under its own weight, to be built up. This method of sculpting includes most classical portrait sculpture in **terra cotta**, or baked clay. (Figure 2.22) Clay lends itself to modeling and is thus a popular medium for work of this kind, although clay may also be carved and cast.

**Carving** is the removal of material to form an art object. Carving is a **subtractive** process that usually begins with a block of material, most commonly stone. Tools—usually metal or metal tipped—are used to chip away the stone until the final form emerges. (Figure 2.23) The



**Figure 2.26 | Naophorous Block Statue of a Governor of Sais, Psamtik**

Source: Met Museum  
License: OASC



**Figure 2.27 | Jade ornament of flowers with grape design**

Author: User "Mountain"  
Source: Wikimedia Commons  
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from not only the artist's intention, but also the subtle shifts caused by unpredictable variations in the stone causing the artist to "change course" when too much stone came away. This possibility is not to suggest that trained sculptors do not know the limits of their medium: artists often encounter surprises and innovative ones can sometimes work solutions that incorporate them.

Different kinds of stone vary in hardness as well as color and appearance. Not all stone is suitable for sculpting. Marble, a form of limestone, was preferred by the ancient Greeks and Romans for its softness and even color. (Figure 2.25) Diorite, schist (a form of slate), and Greywacke (a form of granite) were preferred by Egyptian and Mesopotamian cultures for their hardness and permanence. (Figure 2.26) The Chinese have traditionally used jade, a hard, brittle stone found in numerous shades, most commonly green, to indicate wisdom, power, and wealth. (Figure 2.27)

Wood is also often used as a carving material. Because of variations in grain size and texture, different species of wood have different sculptural qualities. In general, wood is prized for its flexibility and ease of forming, though it reacts to changes in humidity and lacks permanence. During the Heian era (794-1185 CE), the Japanese artist Jocho used joined wood to construct his sculpture of the *Seated Buddha*. (Figure 2.28)

**Casting** is a process that replaces, or **substitutes**, an initial sculptural material such as wax or clay with another, usually more permanent, material such as **bronze**, an **alloy**, or mixture of copper and tin. Casting is also a process that makes it possible to create multiple versions of the same object.

In the **lost wax process**, an original sculpture is modeled, often in clay, coated in wax, and then covered in plaster to create a **mold**. When the plaster dries, it is heated to melt the wax, which is poured out of the mold. Molten metal is then poured into the space within the mold between the (now lost) wax coating and the original sculpted form. When the metal has cooled and solidified, the plaster is broken away to reveal the cast metal object. (Figure 2.29) In order to create multiple versions of the object, the mold must be made in such a way that it can be removed without being destroyed. (Figure 2.30) This operation is generally achieved by separating a mold into several sections while the original is being cast. Sectional molds are also used to cast original objects that cannot be melted or otherwise removed from the mold. To cast the form, the original is removed, and the sections are then re-fastened together. In some cases, complex sculptures are cast in several pieces and the resulting metal sections are welded together.

**Assembly**, or assemblage, is a fairly recent type of sculpture. Before the modern period, carv-



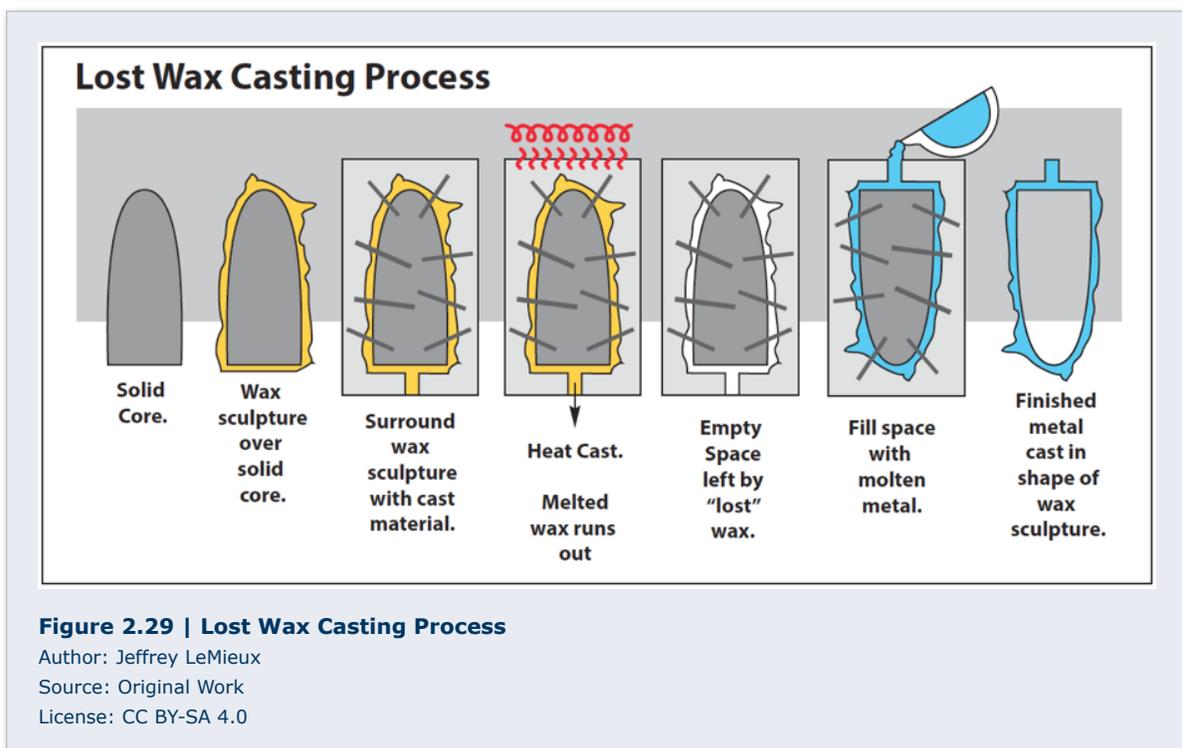
**Figure 2.28 | Seated Buddha**

Artist: Jōchō

Author: User "Kosigrim"

Source: Wikimedia Commons

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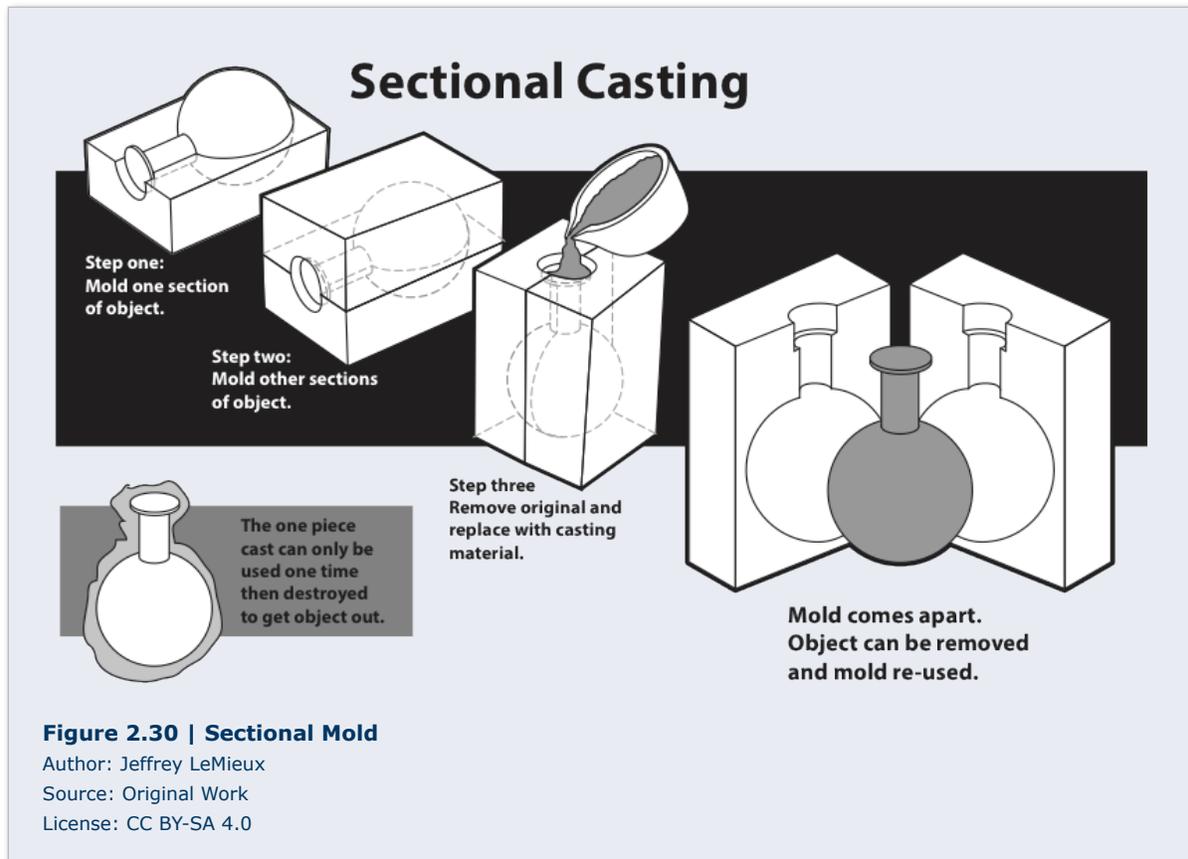


**Figure 2.29 | Lost Wax Casting Process**

Author: Jeffrey LeMieux

Source: Original Work

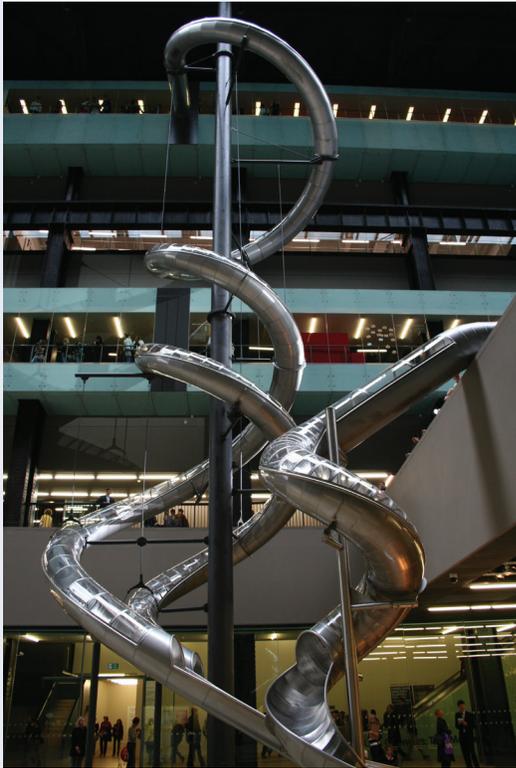
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ing, casting, and modeling were the only accepted methods of making fine art sculpture. Recently, sculptors have enlarged their approach and turned to the process of **assembly**, manually attaching objects and materials together. Assemblies are often composed of **mixed media**, a process in which disparate objects and substances are used in order to achieve the desired effect.

Because she spent time near a cabinetry workshop, Louise Nevelson (1899-1988, Ukraine, lived USA) would retrieve wooden cut-offs and other discarded objects to use in her sculpture. Her art practice involved the use of **found objects**. Consider Nevelson's *Sky Cathedral*. (*Sky Cathedral*, Louise Nevelson: <http://www.moma.org/collection/works/81006>) She filled individual wooden boxes with found objects. She then arranged these boxes into large assemblies and painted them a single color, usually black or white. Each sub-unit box in the sculpture can be read as a separate point of view or separate world. The effect of the whole is to recognize that both unity and diversity are possible in a single artwork.

**Installation** is related to **assembly**, but the intent is to transform an interior or exterior space to create an experience that surrounds and involves the viewer in an unscripted interaction with the environment. The viewer is then immersed *in* the art, rather than experiencing the art from a distance. For example, Carsten Höller (b. 1961, Belgium, lives Sweden) installed *Test Site* in the Turbine Hall, a five-story open space, at the Tate Modern in London. (Figure 2.31) Part of a series of slides Höller created at museums worldwide, he wanted to encourage visitors



**Figure 2.31 | Test Site**

Artist: Carsten Höller  
 Author: User "The Lud"  
 Source: Wikimedia Commons  
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to use the practical, though unconventional, means of transport, and, while doing so, to experience the momentary loss of control and whatever emotional response each individual felt.

An installation that is intended for a particular location is called a **site-specific** installation. Good examples of site-specific installations would be *Tilted Arc* by Richard Serra (b. 1939, USA), (*Tilted Arc*, Richard Serra: [https://en.wikipedia.org/wiki/File:Tilted\\_arc\\_en.jpg](https://en.wikipedia.org/wiki/File:Tilted_arc_en.jpg)); *Lightning Field* by Walter De Maria (1935-2013, USA), (*Lightning Field*, Walter de Maria: [http://sculpture1.wikispaces.com/file/view/Walter\\_de\\_Maria\\_Lightning\\_Field\\_1977.jpg/310921734/800x686/Walter\\_de\\_Maria\\_Lightning\\_Field\\_1977.jpg](http://sculpture1.wikispaces.com/file/view/Walter_de_Maria_Lightning_Field_1977.jpg/310921734/800x686/Walter_de_Maria_Lightning_Field_1977.jpg)); *Spiral Jetty* by Robert Smithson (1938-1973, USA), (Figure 2.32); and *Cadillac Ranch* by the art group known as Ant Farm. (Figure 2.33) In part because of the large scale of many of these works, installation is an increasingly popular form of public artwork.

**Kinetic art** is art that moves or appears to move. Generally this art is sculptural. Good examples of kinetic artworks are the suspended, freely moving **mobiles** of Alexander Calder (1898-1976, USA) that are meant to change shape as part of their design. (*Nénuphars Rouges*, Alexander Calder: [http://www.wikiart.org/en/alexander-calder/red-lily-pads-n-nuphars-rouges-1956?utm\\_source=returned&utm\\_medium=referral&utm\\_campaign=referral](http://www.wikiart.org/en/alexander-calder/red-lily-pads-n-nuphars-rouges-1956?utm_source=returned&utm_medium=referral&utm_campaign=referral)) *Homage to New York* was a work of kinetic art Jean Tinguely (1925-1991, Switzerland) intended to self-destruct, although it never completed its purpose because a local



**Figure 2.32 | Spiral Jetty**

Artist: Robert Smithson  
 Author: User "Yonidebest"  
 Source: Wikimedia Commons  
 License: CC BY-SA 2.0

fire department stepped in and stopped the process. (*Homage to New York*, Jean Tinguely: <http://www.wikiart.org/en/jean-tinguely/homage-to-new-york-1960>) Reuben Margolin (USA) is a contemporary artist who uses intersecting waves to create beautifully undulating sculptures. Click the following link to view a video of Margolin's *Square Wave*: <https://www.youtube.com/watch?v=4UQtDbybSWc>. Beginning with simple materials like paper towel tubes, fishing swivels, and fishing line, and then moving to larger, more complex

sculptures using more permanent materials like wood, metal, and wire, Margolin has made a career of creating meditatively flowing sculptures.



**Figure 2.33 | Cadillac Ranch, Amarillo**

Artist: Ant Farm

Author: Richie Diesterheft

Source: Wikimedia Commons

License: CC BY 2.0

### 2.4.3 Four-Dimensional Art

**Four-dimensional art**, or **time-based art** is a relatively new mode of art practice that includes video, projection mapping, performance, and new media art.

**Video art** uses the relatively new technology of projected moving images. These images can be displayed on electronic monitors or projected onto walls or even buildings; they use light as a medium. The early video constructions of Nam June Paik (1932–2006, South Korea, lived USA) are a good example. In *TV Cello*, video monitors are assembled in the shape of a cello. (*TV Cello*, Nam June Paik: <http://a141.idata.over-blog.com/356x499/1/96/04/42/s-rie-F/Paik-N.-J.-TV-Cello.jpg>) When a bow was drawn across this object, images of a woman playing a cello appeared on the screens.

**Projection mapping** is another use of video projection. One or more two- or three-dimensional objects (often buildings) are spatially mapped into a virtual program that then allows the image to conform to the surface of the object upon which it is projected. (Figure 2.34) Evan Roth (b. 1978, USA, lives France) creates graffiti as a video projection and then photographs the results; thus, the work is temporary. This method of spatially augmented reality has been used by numerous artists (and advertisers) to “tag” everything from public spaces to the human face, without leaving permanent marks.

**Performance art** is art in which the artist’s medium is an action. Performance artworks are generally documented by photography, but the artwork is in the act itself. *Cut Piece* is a performance work Yoko Ono (b. 1933, Japan, lives USA) originally created in 1964 in which audience members were given scissors to cut off pieces of her clothing while the artist sat on a stage.

(*Cut Piece*, Yoko Ono: <https://en.wikipedia.org/wiki/File:CutPieceOno.jpeg>) As the artist passively allowed her garments to fall away, the participants and viewers were in control of her transformation from whole to segmented.

**New media art** usually refers to interactive works such as digital art, computer animation, video games, robotics, and 3D printing, where artists explore the expressive potential of these new creative technologies. The international connectivity of the Internet has ushered in a globalization of information exchange which includes the arts. One example of the use of new media in art would be *10,000 Moving Cities* by Marc Lee (b. 1969, Switzerland). In this work, a viewer wears a video projection headset in which images from a chosen city are projected onto a digital urban architecture. The viewer can move within the new space through head motion. Real time social-media images and text from the chosen city are also captured and projected.

## 2.5 FORM AND COMPOSITION

When looking at art, many people today take a holistic or **gestalt** approach to understanding it. In this approach, the work of art is experienced as a single unified whole and an intuitive conclusion is drawn. This approach to art is a good place to start, but it can also be useful to examine the individual parts of an artwork and the relationships those parts have to the whole. When we examine an artwork by taking it apart, we are looking at its design. Design is divided into two broad categories: the elements of design and the principles of design. The **elements of design** are the physical parts of the artwork, or the **form**. The **principles of design** are the ways in which those parts are arranged or used, or the **composition**.

### 2.5.1 Elements of Design

A **design** is a governing plan or approach by which various parts of an artwork are created and assembled. It is rare to find a work of art that is entirely accidental or has come wholly out of the unconscious intuition of an artist. Further, looking at the way in which various parts of a work of art are arranged—even an intuitive or accidental work—can reveal clues to the goals and beliefs of the artist, the community in which the artist has worked, and the problems the work of art was meant to address.



**Figure 2.34 | Cathédrale St Jean illuminée**

Author: User "Gonedelyon"

Source: Wikimedia Commons

License: User "Gonedelyon"

There are six basic elements of design: line, shape, mass/volume, perspective, texture, and color. One way to think of these elements of design is to “walk up the ladder” of dimension. Our perceived world has three dimensions of space and one of time. Mathematically, a point has zero dimensions. A line has one dimension, length. A shape has two dimensions, length and height. A form with mass or volume has three dimensions, length, height, and width. In moving from points to volumes, we have “walked up the ladder” of dimension from zero to three. In addition to the three dimensions of physical space, there are two more things artists can incorporate into a given work. They can introduce texture, and they can introduce color.

Here is a brief explanation of the definition and dynamics of each element of design.

### 2.5.1.1 Line

Line is the first order element of design. A **line** is an infinite series of points that are arranged in a direction. The direction of a line may be straight (unchanging) or curved (changing). All kinds of objects are **linear**, or predominantly formed by using lines. **Calligraphy**, or “beautiful writing,” is one popular use of line. The character of line in writing has two main functions. First, the linear figure or shape of a written symbol denotes its meaning. Second, the manner in which the figure is created can be seen as expressive in itself. A **tughra**, or the calligraphic signature of a sultan, and the refined text of Arabic calligraphy are renowned for their expressive beauty, as are many works of Asian script. In many writing cultures, the beauty of the script is as important as the message the script contains. (Figure 2.35)



**Figure 2.35 | Tughra (Official Signature) of Sultan Süleiman the Magnificent**

Source: Met Museum

License: OASC

One quality of line is gesture. **Gesture** is the line produced by the movement of the artist’s hand, arm, or body, of a kind of dance with the material, as can be seen in this photograph of Jackson Pollock in the midst of painting. (Jackson Pollock: <https://upload.wikimedia.org/wikipedia/en/b/b7/Jackson-Pollock.jpg>) For example, short, uneven staccato lines may be read as impatient, or lacking in confidence or grace. Evenly drawn horizontal lines express calm. Straight lines can represent rigidity, which is neither good nor bad, but depends on context. A rigid bridge is a good



**Figure 2.36 | Nude Male Figure with a Sword**

Artist: Alexandre Cabanel  
Source: Met Museum  
License: OASC

or light and dark. These crosshatching lines generally follow the shape of an object. (Figures 2.4 and 2.36)

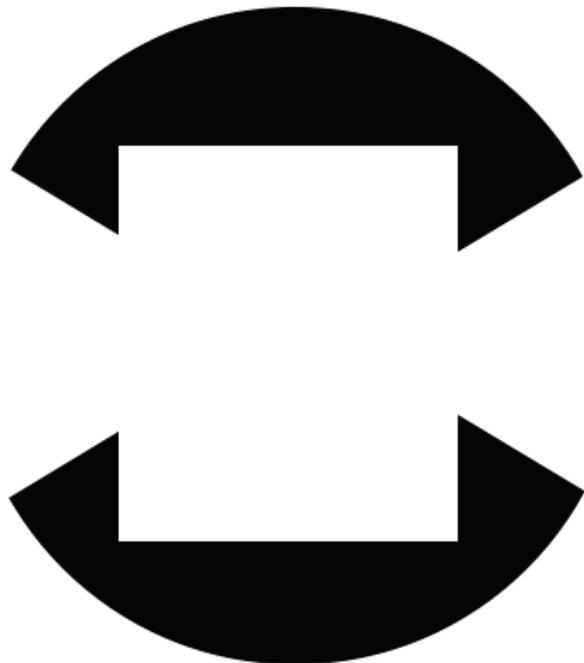
Some lines are not drawn at all. Instead, they are **implied** or suggested by an intentional alignment of shapes. The image of the square inside the circle is an example of implied line. (Figure 2.37) Lines that converge beyond the edge of an artwork are another because they imply a distant intersection. A third example of a line that is not actually there is **psychic** line. Two people looking at one another in an artwork create a psychic line between them.

Line has **expressive** content. By its nature, a line compels the viewer to follow

thing for those who depend on it not to give way. A rigid tree in a windstorm will sometimes be uprooted.

**Contour** is the line where differing areas meet and form edges. Human visual perception includes an enhanced ability to detect edges in nature. Contour lines follow the shapes of objects where they stand out from backgrounds. In mapmaking, contour lines indicate the shape of the landscape in regular increments of vertical height. On contour maps, lines that appear close together indicate a rapid change in height. Lines that are far apart indicate more gentle slopes. (GroundTruth Contours: [http://wiki.openstreetmap.org/w/images/thumb/b/b5/GroundTruthContours\\_Detail.png/300px-GroundTruthContours\\_Detail.png](http://wiki.openstreetmap.org/w/images/thumb/b/b5/GroundTruthContours_Detail.png/300px-GroundTruthContours_Detail.png))

**Crosshatching** is the use of uniformly spaced intersecting lines that create the perception of value



**Figure 2.37 | Square inside a circle, demonstration of implied lines**

Author: Jeffrey LeMieux  
Source: Original Work  
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along its path. The character of the line can control the direction, speed, and attention of the viewer. The movement of a line can be curved or angular. It can progress smoothly or with a staccato rhythm. A line can be thick or thin, pale or bold. These qualities are “read” rationally and emotionally; thus, line can have an expressive and emotional content that can often be found by viewer introspection.

Line is not just a two-dimensional design element. For example, wire is a linear medium that can be extended into three dimensions. Alexander Calder’s wire sculptures and portraits are fine examples of the expressive power of line in three dimensions. (*Acrobats*, Alexander Calder: [http://www.calder.org/system/post\\_images/images/000/001/082/medium/A00504.jpg?1352222725](http://www.calder.org/system/post_images/images/000/001/082/medium/A00504.jpg?1352222725)) Another example is Pablo Picasso drawing in space with light for photographer Gjon Mili (1904-1984, Albania, lived USA) for *Life* magazine in 1949. (Light Drawings, Pablo Picasso: <http://www.designboom.com/art/pablo-picassos-light-drawings-from-1949/>)

### 2.5.1.2 Shape

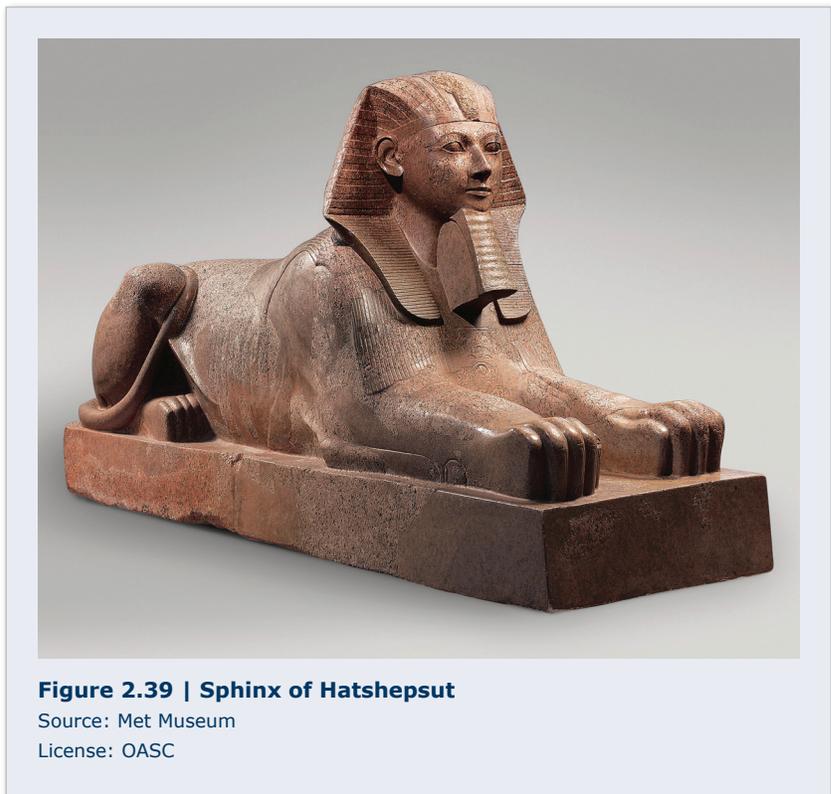
The design element of shape is the next element in the walk up the ladder of dimension. **Shape** has two dimensions, length and width. Shapes can be regular or irregular, simple or complex. Shapes can have hard or soft edges. **Hard-edged** shapes have clearly defined boundaries, while **soft-edged** shapes slowly fade into their backgrounds. There are two broad categories of shape: geometric and organic. **Geometric shapes** are regular and ordered shapes using straight lines and curves. **Organic shapes** are generally irregular and often chaotic. Hans Arp (1886-1966, France, lived Switzerland), in his work *Untitled*, used torn paper and cut shapes to create an abstract composition. While squares are geometric objects, Arp’s torn and irregular edges transform them into organic shapes. The orientation of those shapes roughly approximates a grid structure, but again, their deviation from a regular order implies a chaotic and accidental arrangement. In this work, Arp is dancing on the “edge of order.” (Figure 2.38)



In two-dimensional artworks, shapes are figures placed on a two-dimensional surface that is known as a **ground**. This creates a relationship between foreground and background known as the **figure/ground relation**. The **figure** is the object that appears to be in front of the ground. In some artworks this relationship is intentionally unclear. In this case, an effect known as figure/ground reversal can occur. In **figure/ground reversal**, what was seen as the positive shape of the figure can also be seen as the negative space of the ground. This effect disrupts the sense of space in an artwork and disorients the viewer. (*Escher Woodcut II Strip 3*, Maurits Cornelis Escher: <http://www.tau.ac.il/~tsurxx/FigureGround/Escher2.GIF>)

### 2.5.1.3 Mass/Volume

The next and final step up the dimensional ladder is volume **or** mass. **Volume** has three dimensions: length, width, and height. Volumes may have interior or exterior contours, and they may be closed or open in form. **Mass** is the quantity of matter, often meaning its weight. A **closed form** is a volume that is not pierced or perforated. One goal of ancient Egyptian sculpture was to last for eternity. Therefore, they used closed sculptural forms, which are more structurally robust and more resistant to wear or breakage. (Figures 2.26 and 2.39) Empty space surrounds a closed form but does not move through it. Conversely,



**Figure 2.39 | Sphinx of Hatshepsut**

Source: Met Museum

License: OASC

empty space surrounds but also moves through an **open form**. Open form sculptures are closer in shape to the figures they represent and thus are more lifelike or “true” to the original reference.

Modern sculptors such as Henry Moore (1898-1986, England) have explored the abstract use of closed and open forms, as well as negative and positive space. (*Reclining Figure 1969-70*, Henry Moore: [https://upload.wikimedia.org/wikipedia/commons/o/o8/PikiWiki\\_Israel\\_12097\\_reclining\\_figure\\_by\\_henry\\_moore\\_in\\_tel\\_aviv.jpg](https://upload.wikimedia.org/wikipedia/commons/o/o8/PikiWiki_Israel_12097_reclining_figure_by_henry_moore_in_tel_aviv.jpg)) In three-dimensional art, **positive space** is the space occupied by a given volume, while **negative space** is the empty space within that volume. Notice how the figure twists around an imaginary boundary. The “saddle” in the middle suggests an invisible weight pressing down on the form there. This sculpture depends as much on the empty space around it as it does on the volume occupied by the bronze. In addition, its mass is lessened by the openness of its form, especially when compared to ancient Egyptian sculpture, an entirely closed form.

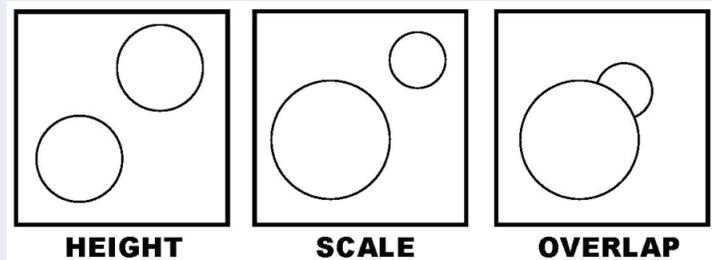
To convey the three dimensionality, mass and volume, of forms on a flat surface, artists use **chiaroscuro** (Italian: “clear-dark”) or varying shades of light and dark. As a form turns toward a light source it appears brighter, and as it turns away from the light source it appears darker; the shift in light and shadow creates the illusion of volume in space. The face and hands of Leonardo’s *Mona Lisa* are considered masterpieces of chiaroscuro. (Figure 2.7)

#### 2.5.1.4 Perspective

**Perspective** in art is the illusion of space on a flat surface. Before the discovery of the geometric system of linear perspective in fifteenth-century Italy, the illusion of space was created by using three main visual cues to the recession of space. These three cues are height, scale, and overlap. Objects that are higher on the drawing surface, objects that are smaller in scale, and objects that are partially obscured by other objects all appear further away in space. (Figure 2.40)

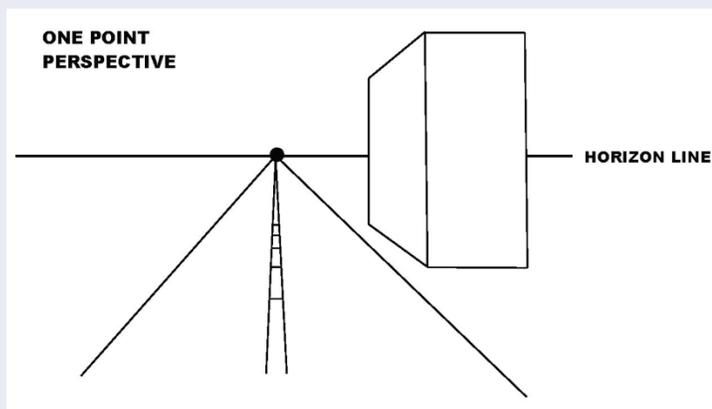
**Linear perspective** is based on the regular geometric recession of space. Linear perspective uses a vanishing point and horizon line. The **vanishing point** is the spot where all receding lines seem to converge on the horizon line. The **horizon line** is the set of all possible eye-level vanishing points. (Figure 2.41) **Orthogonal lines** are the lines that appear to meet at the vanishing point and imply the regular recession of space. Horizon lines and vanishing points can provide clues to the artist’s intent. In Leonardo’s *Last Supper*, for example, the artist has located the vanishing point directly behind the head of Jesus. (see Figure 1.25) Because the vanishing point is the viewer’s vision extended infinitely in one direction, Leonardo’s placement of the vanishing point behind the head of Jesus associates Him with the infinity of the Christian God.

Before linear perspective was formulated as a coherent geometric system, painters used intuitive perspective to portray receding space. **Intuitive perspective** acknowledges that receding lines converge, but does not recognize that they converge at a single horizon line and vanishing point. Nonetheless, even



**Figure 2.40 | Height, Scale, and Overlap**

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**Figure 2.41 | Height, Scale, and Overlap**

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when paintings lack a rigorously coherent geometric system of linear perspective, determining where the horizon would be can inform us about how the artist views the subject. Compare two paintings of the same name, *Madonna Enthroned*, one by Cimabue (1240-1302, Italy) and the other by Giotto (1266/7-1337, Italy). (Figures 2.42 and 2.43) Both paintings use intuitive perspective. In Cimabue's painting of 1285, the implied horizon is low and the viewer sits at the foot of the throne, while Giotto's image, painted in 1310, has the horizon higher, and thus the viewer is on the same level as the Madonna. This difference of viewpoint signifies changing ideas about the Madonna's relation to the individual. Cimabue's painting places the viewer in subservient homage, while Giotto's painting may be seen as more approachable, indicative of a tiny but significant shift in European thought that eventually blossomed into the Italian Renaissance.

There are different types of linear perspective. The main types are one-, two-, and three-point perspective. The distinction is in the number of vanishing points used. **One-point perspective** uses a horizon line and one main vanishing point and is normally used when simple views are



**Figure 2.42 | Santa Trinita Madonna**

Artist: Cimabue

Author: User "Eugene"

Source: Wikimedia Commons

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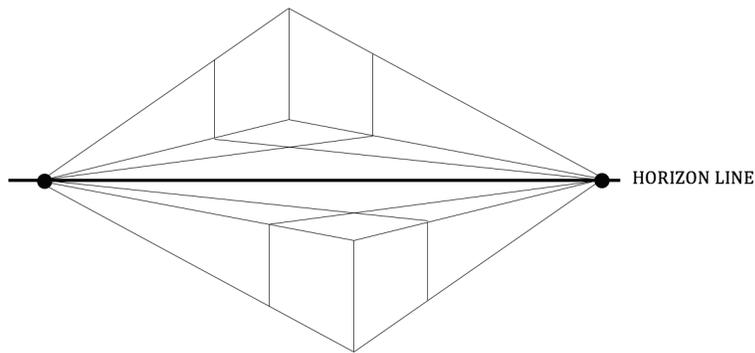
**Figure 2.43 | The Ognissanti Madonna**

Artist: Giotto

Author: User "Shizhao"

Source: Wikimedia Commons

License: Public Domain

**Figure 2.44 | Two-Point Perspective**

Author: Jeffrey LeMieux

Source: Original Work

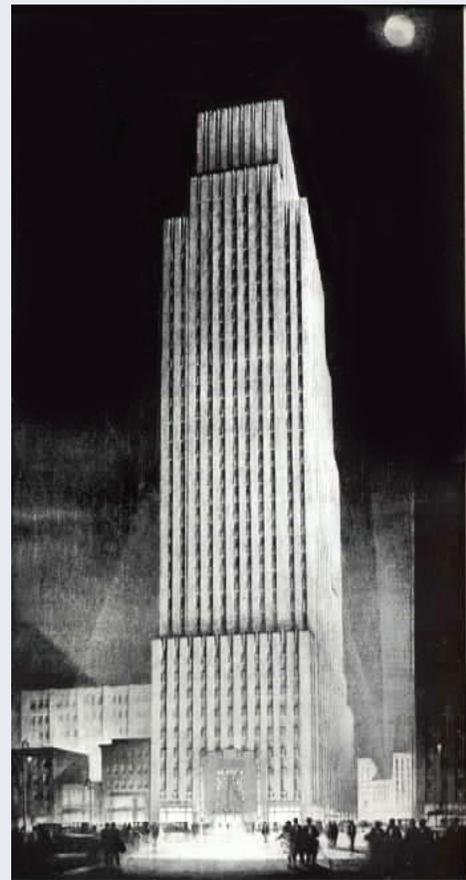
License: CC BY-SA 4.0

depicted, such as a railway track disappearing into the distance directly in front of the spectator. **Two-point perspective** uses a horizon line and two separated vanishing points to present the illusion of a space that recedes in two directions. (Figure 2.44)

**Three-point perspective** incorporates the recession of space in a third, vertical direction above or below the horizon line as well as the two horizontal directions in two-point perspective. As tall buildings recede upward from street level, they also diminish in apparent size in the same way railroad tracks appear to converge in the distance toward the horizon. (Figure 2.45)

Many people make the mistake of thinking that linear perspective gives a completely accurate picture of the world. It does not. Linear perspective is a limited tool for representing how the world looks. It is considered sufficiently “accurate” only within a limited “cone of perception” of about 60 degrees. So while linear perspective is an excellent tool to represent our experience of space, it has limitations that should be recognized.

**Atmospheric perspective** is the way in which the illusion of distance is created on a flat surface through the use of color and focus. In a landscape that extends into the distance, the haze of the intervening air alters the colors and clarity of objects. The further away an object is from the viewer, the more it approaches the color of air, which is a light blue-gray tone. Dark objects become lighter and more blue as they recede from the viewer. Additionally, the contrast between light and dark colored objects and the perception of detail decrease with increasing distance. Albert Bierstadt (1830-1902, Germany, lived USA) used this effect in his painting *The Rocky*

**Figure 2.45 | New York Daily News Building**

Artist: Hugh Ferriss

Author: Dover Publications

Source: Wikimedia Commons

License: OASC

*Mountains, Lander's Peak* to give a sense of monumental space. (Figure 2.46)

### 2.5.1.5 Texture

The term **texture** describes the surface quality of an artwork. Texture is an important element of design because it engages the sense of touch as well as vision. Objects can be rough or smooth, wet or dry, sticky or slick, hard or soft, brittle or flexible. The two main approaches to texture are *actual* texture and *implied* or simulated texture. **Actual texture** is primarily—though not exclusively—sculptural, while **implied texture** is primarily used in two-dimensional works of art.

The painters of the Northern Renaissance and the Dutch Golden Age, the fifteenth to the seventeenth centuries, were very interested in the simulation of a wide variety of textures. One main goal of artists from those periods was to excel at telling the truth about the material world. They worked to capture the full visual range of the sense of touch. Rembrandt van Rijn (1606-1669, Netherlands) is well known for his use of **impasto**, or very thick application of paint, in order to heighten the sense



**Figure 2.46 | *The Rocky Mountains, Lander's Peak***

Artist: Albert Bierstadt

Source: Met Museum

License: OASC



**Figure 2.47 | *Belshazzar's Feast***

Artist: Rembrandt van Rijn

Source: Wikiart

License: Public Domain

of reality in many of his paintings by adding actual texture. This can be seen in his handling of flesh on some of his self-portraits, as well as his rendering of metal and jewelry in his painting of *Belshazzar's Feast*. (Figure 2.47)

### 2.5.1.6 Color

**Color** is the most prominent element of design and is one of the most powerful and yet subjective elements in art. The nineteenth-century American transcendentalist Ralph Waldo Emerson noted this subjective quality of color when he wrote, "nature always wears the colors of the spirit."<sup>1</sup> Ideas about color

1 C. A. Bartol, *Ralph Waldo Emerson: A Discourse in West Church* (Boston, Mass: A. Williams & Co., 1882), 14.

can be grouped into three broad categories: the history of color, physics of color, and perception of color.

The earliest use of color was limited to what kinds of pigments or coloring agents could be found in the local environment: ochres (yellow-browns) from various colors of earth, blacks and grays from ashes and burned wood or charcoal, reds and yellows from minerals, plants, and insects. Paleolithic cave painters used these materials for their murals. In addition to natural pigments, ancient Egyptians formulated synthetic pigments such as powdered glass to create Egyptian blue, a distinctive hue used on statues, walls, and monuments. In the Roman Empire, a rare form of purple was extracted from a particular kind of snail and, because of its rarity, was used primarily for royal garments. During the Renaissance, a deep blue was made from a finely ground gemstone, lapis lazuli.

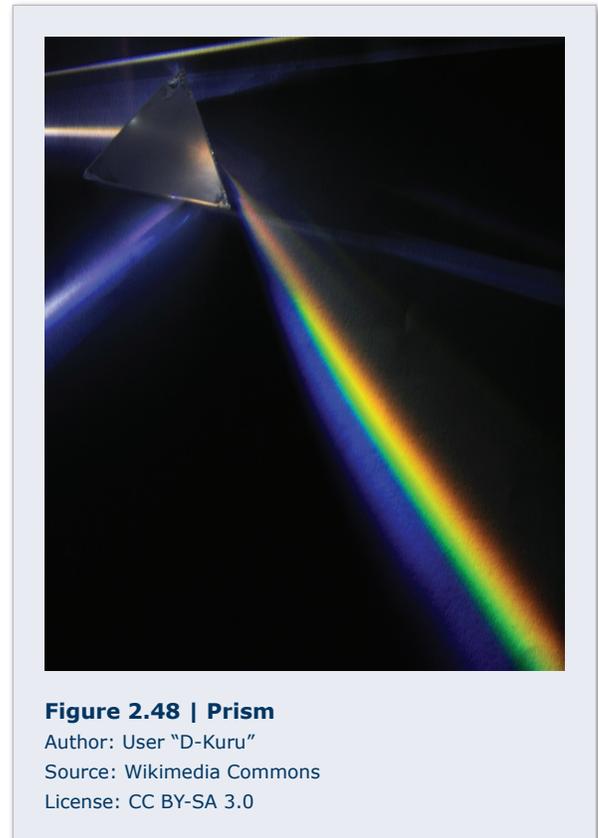
Egyptians associated colors with the gods; the god Amon had blue skin, and Osiris had green. The ancient Greeks took a more scientific approach to color. The ancient Greek philosopher Empedocles thought that color fell into four categories: white/light, dark/black, yellow, and red. The ancient Chinese associated color with the five elements taught in traditional physics: water (black), metal (white), wood (green), earth (yellow), and fire (red). In a number of Asian traditions, black is the color of heaven and white is the color of death or mourning. In western culture the opposite is the case.

Modern ideas about color were greatly refined beginning in the fifteenth century by architect and art theorist Leon Battista Alberti (1404-1472, Italy). In his treatise *Della pittura (On Painting)*, published in 1435, Alberti stated:

Through the mixing of colors infinite other hues are born, but there are only four true colors from which more and more other kinds of colors may be thus created. Red is the color of fire, blue of the air, green of the water, and grey of the earth . . . white and black are not true colors but are alterations of other colors.<sup>2</sup>

From this early framework, others made further discoveries.

The term “color” describes the sensation caused by variations in the wavelength and intensity of light as it interacts with the human eye. **Visible light** is the small portion of the **electromagnetic spectrum** that can be seen by humans. When the white light of the sun is passed through a prism, it is **refracted** into the colors of the rainbow from red through orange, yellow, green, and blue to violet. (Figure 2.48)



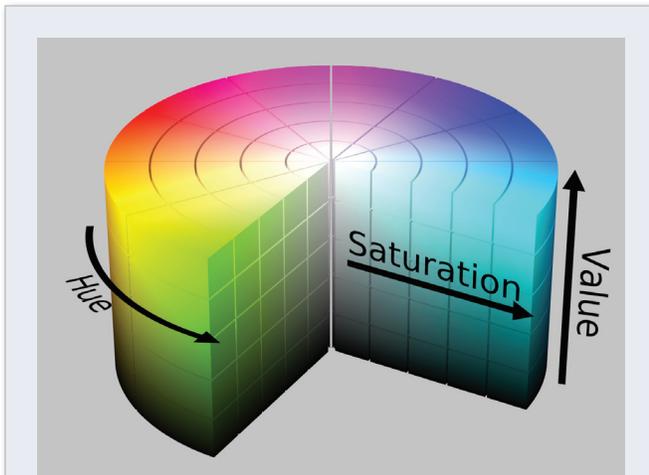
**Figure 2.48 | Prism**

Author: User "D-Kuru"

Source: Wikimedia Commons

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<sup>2</sup> Leon Battista Alberti, *On Painting*, trans. John R. Spencer (New Haven, Connecticut: Yale University Press, 1956), 49-50.



**Figure 2.49 | HSV Color Model**

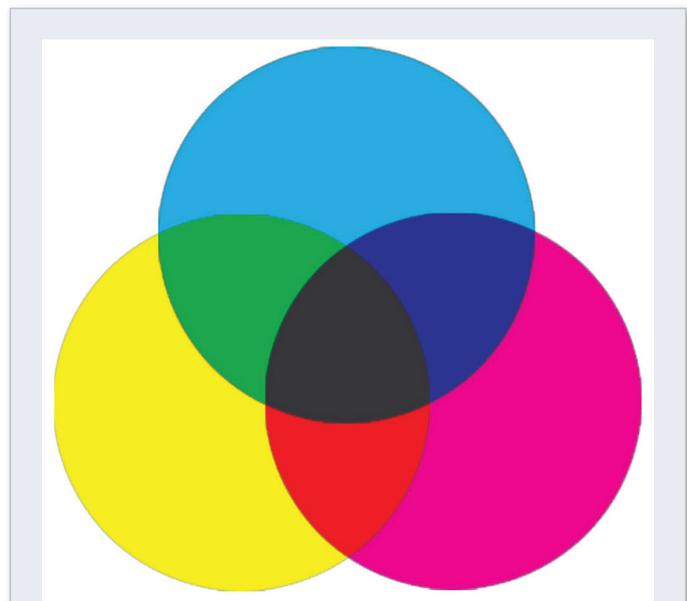
Author: User "SharkD"  
 Source: Wikimedia Commons  
 License: CC BY-SA 3.0

Color as perceived by humans can be broken into three discrete parts: hue, saturation, and brightness. (Figure 2.49) **Hue** is the wavelength of a given color. Longer wavelength colors appear on the red end of the spectrum, while shorter wavelength colors are on the violet end. Hue is the color "name," e.g., red, yellow, blue, green, etc. Color can be either subtractive or additive. **Saturation** is the purity of a color and ranges from a neutral gray to the pure color while holding brightness as a constant. **Brightness** is the lightness or darkness of a color and ranges from fully illuminated (the pure hue) to fully darkened (black). Each pure hue also has a relative brightness, for example, pure yellow has a greater brightness than pure blue.

**Subtractive color**, or reflective color, occurs when white light is reflected off a surface, and all the colors of the spectrum are absorbed by that surface except for the color that is reflected back to the viewer. Subtractive color mixing starts with the **primary colors** of red, yellow, and blue. When these colors are mixed, the **secondary colors** of green, orange, and purple, are created. Mixing yellow and blue makes green, mixing red and yellow makes orange, and mixing red and blue makes purple.

The English mathematician and physicist Sir Isaac Newton demonstrated in the seventeenth century that white light, when refracted through a prism, could be separated into the visible spectrum. In the nineteenth century, writer and statesmen Johann Wolfgang von Goethe and chemist Michel Eugène Chevreul separately published research that concluded that red, yellow, and blue were primary colors and that all other colors could be mixed from them. At the beginning of the twentieth century, industrial chemists further refined the understanding of printing inks and derived the CMYK (cyan, magenta, yellow, and black) subtractive color model: beginning with white, as one adds color, the mixture moves toward black. (Figure 2.50)

With the advent of television, computers and digital imaging, the additive model of RGB (red, green, blue) in which colors are added together and the HSB (hue, saturation,



**Figure 2.50 | Subtractive Color Mixing**

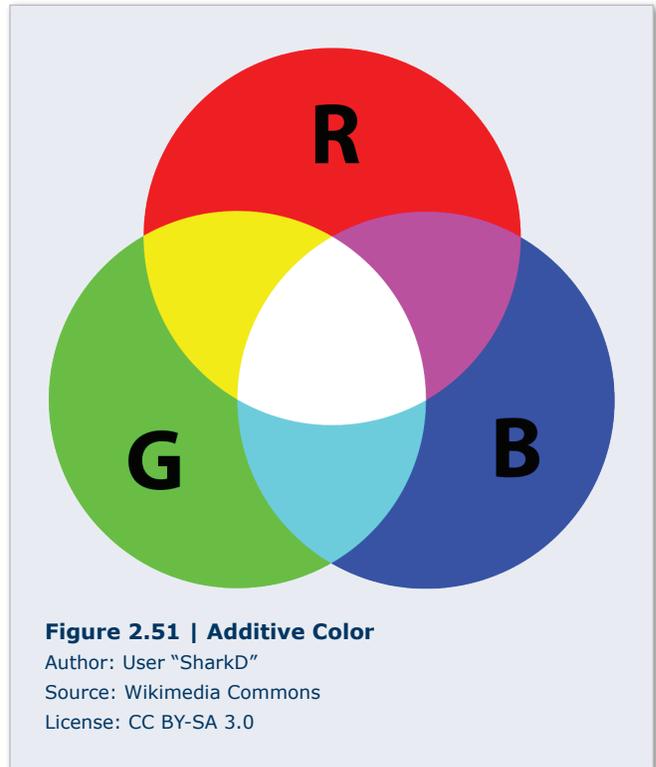
Author: User "Ntozis"  
 Source: Wikimedia Commons  
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and brightness) color system, based on human perception, have become industry standards. **Additive color**, or transmission color, occurs when light of different colors is projected. The primary hues of additive color are red, green, and blue. This is the RGB color model. (Figure 2.51) When red and green lights overlap, yellow is seen. When red and blue lights overlap, magenta is seen, and when green and blue lights overlap, cyan appears. These are the secondary hues of additive color. When red, green, and blue lights all overlap, white light is seen. Television screens are actually tiny dots, or pixels, of red, green, and blue glowing lights. The colors we see coming off those screens are additive.

Our RGB model of additive color is directly dependent on how human eyes function. The human retina is a sheet of neurons that coats the inside of the eye. Within this sheet of neurons, there are specialized neurons called rods and cones. Rods are neurons that are sensitive to changes in light intensity, and cones are sensitive to red, green, or blue light. The reason we have RGB computer monitors is because we have RGB eyes.

Artists sometimes intentionally exploit the physiology of human vision. Because human vision is limited by unique biology, certain effects become possible. Neurons store chemical neurotransmitters to send signals. If a neuron must continually “fire” because it is being continuously stimulated, it can deplete its supply of neurotransmitter. There is a slight delay between the depletion and restoration

of this chemical supply within the neuron. In the interim, an **after-image** occurs. Look at the green, orange, and black flag for 10 seconds, then look at a blank wall or empty white space. (Figure 2.52) For a few moments, you will see the **complement**, or opposite, of green (red), the complement of orange (blue), and the complement of black (white) in their correct place on the American flag. The fading of this image indicates that the neurotransmitters in the retina have been replenished.



This effect was regularly used by artists during the Impressionist movement (c. 1870-1886). Consider *Impression Sunrise* by Claude Monet (1840-1926, France), one of the first Impressionist paintings. (Figure 2.53) Looking for more than a moment at the expanse of blue in the painting “exhausts” the sensation of blue and creates a complementary afterimage response, which is orange. Then when we look at the orange of the rising sun, we see not only the orange pigment on the painting itself, we also have the additional effect of “tired blue” in our retina. For this reason, the orange paint of the sun looks brighter than it would if we saw that color by itself. Many Impressionist artists intentionally used this effect, and this is one reason why Impressionist paintings tend to look so vibrantly colored.



**Figure 2.53 | Impression Sunrise**

Artist: Claude Monet  
 Author: User “Paris 16”  
 Source: Wikimedia Commons  
 License: Public Domain

In his *Homage to the Square* series of paintings that he began in 1949, the Bauhaus artist Josef Albers (1888-1967, Germany, lived USA) experimented with the relative perception of color. (*Homage to the Square*, Josef Albers: <http://www.metmuseum.org/toah/works-of-art/59.160/>) His main interest was to demonstrate how a color can be affected by other colors that surround it. His book, *Interaction of Color* (1963), showed that perception of a single color can change depending on context. To demonstrate this, look at the accompanying image. (Figure 2.54) The band of gray in the center is one single color, but it appears to shift when placed on a contrasting background.

Contemporary artists employ specific terms for different uses of color. Natural, or **local color**, describes the body color of a given object. **Observed color**, on the other hand, is how the percep-



**Figure 2.54 | Gradient Illusion**

Author: Jeffrey LeMieux  
 Source: Wikimedia Commons  
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tion of that local color changes as light shifts on an object. In Monet's series of paintings of the Rouen Cathedral, his depictions of different lighting conditions are a good example of the difference between local color and observed color. The color of the stone of the Cathedral is a medium gray. But at different times of day, such as the waning light of sunset, it will reflect the oranges and blues of the lingering sun and the growing shadows. (Figure 2.55)

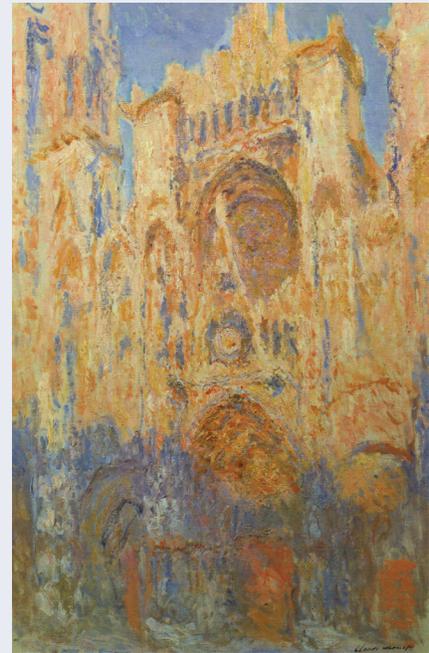
The Fauves were a group of artists in the early twentieth century who used **intuitive color** as the basis of their approach to making art. They were more interested in the expressive power of color than robotically reporting the local or observed color of their subjects. Consider this portrait by Henri Matisse (1869-1954, France) of his wife, Amélie Matisse. (Figure 2.56) Clearly she did not in reality have a green stripe running down the center of her face. The colors chosen by the artist were meant to express something other than simple visual observation.

Another aspect of color used by artists is **color temperature**. Colors can be either warm or cool. The **warm** end of the spectrum includes red, orange, and yellow. The **cool**

end of the visible spectrum contains green, blue, and purple. That said, even yellow can be cool, and even blue can be warm. Warm and cool colors interact in different ways and artists are trained to notice and use this difference; for example, warm colors seem to “advance” while cool colors “recede” in space and consequently shapes represented in those colors appear to be at different depths.

In organizing ideas about color, artists and art theorists have evolved a series of color schemes, or ordered relations between different colors. A **monochromatic** color scheme uses a single color. *The Old Guitarist* by Picasso is a good example of a monochromatic color scheme. (Figure 2.57) The pose of the figure, the texture of the ragged clothing and hair, and the dominating use of blue work together to create a unified emotional response of weariness and loneliness to the image.

A **complementary** color scheme uses colors opposite to each other on the color wheel. As mentioned ear-



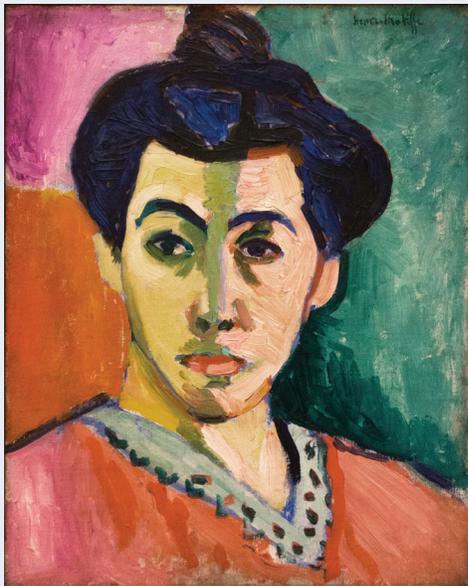
**Figure 2.55 | Rouen Cathedral, Facade (Sunset)**

Artist: Claude Monet

Author: User "Ribberlin"

Source: Wikimedia Commons

License: Public Domain



**Figure 2.56 | Portrait of Madame Matisse (The green line)**

Artist: Henri Matisse

Author: User "Sparkit"

Source: Wikimedia Commons

License: Public Domain



**Figure 2.57 | *The Old Guitarist***

Artist: Pablo Picasso  
 Author: User "Chimino"  
 Source: Wikimedia Commons  
 License: Public Domain



**Figure 2.58 | *Starry Night***

Artist: Vincent van Gogh  
 Author: User "Dcoetzee"  
 Source: Wikimedia Commons  
 License: Public Domain

lier, Impressionist painters exploited the effect of complementary color schemes to heighten the brilliance of their color palettes. While not an Impressionist, in his painting *The Starry Night*, Van Gogh (1853-1890, Netherlands, lived France) uses the blue of the night sky to charge the orange of his crescent moon. (Figure 2.58)

An **analogous** color scheme uses only one area of the color wheel. If the color green is chosen as the anchor color for the scheme, for example, the artist will use colors that occur between the yellow and blue points on the wheel. *Still Life with a Glass and Oysters* by Jan Davidsz. de Heem (1606-1684, Netherlands, lived Belgium) is a good example of an orange/yellow/green analogous scheme. (Figure 2.59) There are many other color schemes that are used for various applications, but these three suffice to illustrate the idea.

### 2.5.2 Principles of Design

The elements of design are the visual components that artists use to make artworks. The principles of design are



**Figure 2.59 | *Still Life with a Glass and Oysters***

Artist: Jan Davidszoon de Heem  
 Source: Met Museum  
 License: OASC

the various ways in which those elements or components are arranged to produce a desired effect. There are as many ways to approach the arrangement of the elements of art as there are artists. Each work of art is unique in its conception, design, and execution. Recent developments in the visual arts have introduced accidental and irrational approaches to artmaking. In these approaches, the outcome of the work of art is not planned. While these works of art may be said to lack conscious design, sometimes they are successful. It is often possible to attribute the success of irrationally or accidentally produced works of art to one or more operating principles of organization. Becoming aware of the principles of design in a work of art allows the viewer to add depth to the analysis of those works. What follows are five principles of design. The list is not exhaustive but is a good place to start.

### 2.5.2.1 Unity/Variety

Unity is found in similarity, while variety is found in difference. A design that shows **unity** is one in which the elements of the work or relations between the elements are similar or identical. Leonardo's *Mona Lisa* (see Figure 2.7) is considered a breakthrough in Italian Renaissance art because the soft edges of the figure are similar in approach to the soft tones of the muted background, thus unifying the image. A design that shows **variety** is one in which the elements of the work are varied in size, color, shape, or some other attribute. One concern with the overuse of unity in design is visual monotony. Visual unity may occur on a **conceptual** level as well as a physical one. Elements that are chosen based on a theme can display conceptual unity and yet display a variety of form. A work of art that lacks variety may be monotonous and lack interest. Many artists introduce variety into their compositions by making sure that no two intervals are the same. An **interval** is the space between elements, figures, or objects in a work of art.

### 2.5.2.2 Scale/Proportion

The design principle of **scale** and **proportion** is the issue of size of elements both individually and in relation to other elements. A famous example of the subtle use of scale is the relative size of the figures in Michelangelo's *Pietà*. (Figure 2.60) The sculpture is a depiction of Mary holding the body of her son Jesus after His crucifixion. If we measure the bodies of Jesus and Mary from heel to knee, knee to hip, and so on, and then compare them, we find that Mary is larger than Jesus. In addition,



**Figure 2.60 | Pietà**

Artist: Michelangelo  
 Author: User "Juan M Romero"  
 Source: Wikimedia Commons  
 License: CC BY-SA 4.0

the figure of Mary is out of proportion, that is, the sizes of the parts of her body are not in alignment. This unusual use of scale and proportion serves to infantilize Jesus in order to subtly emphasize the mother/child relationship. Another use of scale and proportion is the use of forced perspective. (Figure 2.61) **Forced perspective** is the arrangement of figure and ground that distorts the scale of objects, making small objects appear large or large objects appear small by juxtaposing them with opposites. Forced perspective is most convincing when done photographically.

### 2.5.2.3 Balance

The design principle of **balance** is the issue of visual “weight.” Design elements like lines and shapes can attract our attention in a number of ways. For example, they can be brightly colored, they can be large in relation to other similar shapes, or they can be textured in unusual ways. Compositional balance is achieved when these competing visual weights are roughly equivalent. There are two kinds of compositional balance: symmetrical and asymmetrical.



**Figure 2.61 | The Leaning Tower of Pisa: Forced Perspective**

Author: User “Vin7474”

Source: Wikimedia Commons

License: Public Domain



**Figure 2.62 | The Great Wave off Kanagawa**

Artist: Katsushika Hokusai

Author: User “Durova”

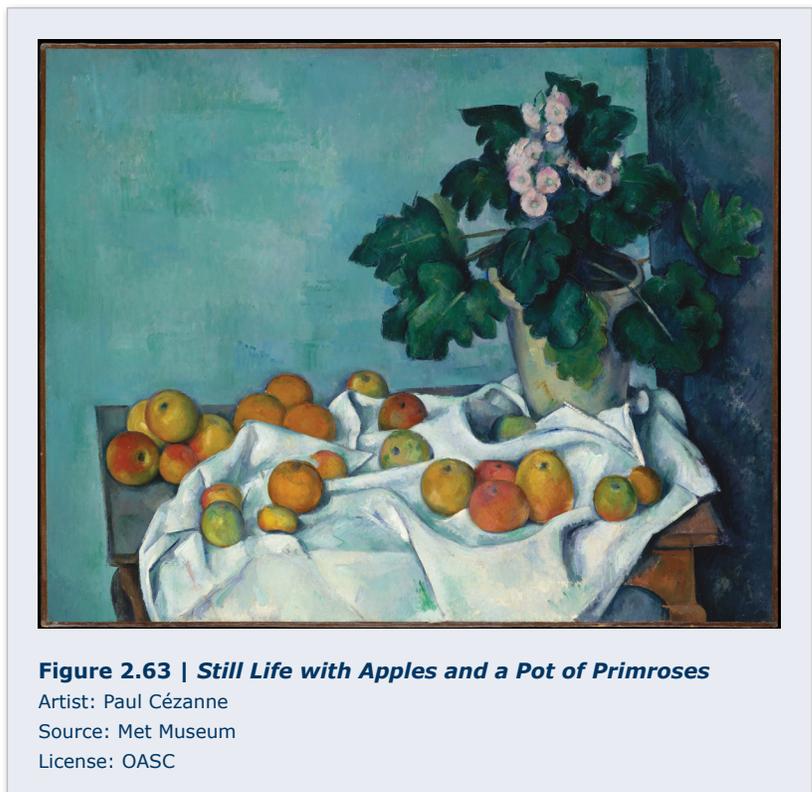
Source: Wikimedia Commons

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The lines and shapes in a composition that uses the principle of **symmetrical** balance are usually equally arranged around an **axis**, or central line. In *The Sacrament of the Last Supper* by Salvador Dali (1904-1989, Spain), notice the balance of like forms to the left and right of the central figure of Jesus. (*The Sacrament of the Last Supper*, Salvador Dali: [https://upload.wikimedia.org/wikipedia/en/f/f1/Dali\\_-\\_The\\_Sacrament\\_of\\_the\\_Last\\_Supper\\_-\\_lowres.jpg](https://upload.wikimedia.org/wikipedia/en/f/f1/Dali_-_The_Sacrament_of_the_Last_Supper_-_lowres.jpg)) Vertical and horizontal axes are generally reserved for very stable compositions, and this strategy is often used in a religious context to imply unchanging truth.

**Asymmetrical** balance is achieved when visual weights do not correspond to one another in shape, size, or placement; they are not distributed equally in a composition. The woodblock print *The Great Wave off Kanagawa* by Katsushika Hokusai (1760-1849, Japan) and *Still Life with Apples and a Pot of Primroses* by Paul Cézanne (1839-1906, France) are good examples of asymmetrical compositions. The large space to the right of the Hokusai's *Great Wave* "offsets" the approaching wave in the left half of the composition. (Figure 2.62) In a similar way, the large gray wall to the left in Cézanne's *Still Life with Apples* serves to offset the visually complex flowerpot on the right. (Figure 2.63) In each work, nearly one-third of the composition (the sky and the wall) is unoccupied, so to speak; there are no objects in those areas. Within the two-dimensional space of the work, however, we "read" each blank area as having a visual weight that counterbalances the forms in the remainder of the compositional space.

It is not always necessary for an artwork to be balanced. An obvious imbalance can produce the effect of unsteadiness, disorientation or distress, which can become a useful part of the larger idea within the work of art. The large empty spaces in the painting by Odd Nerdrum (b. 1944, Norway) carry substantial visual weight and imply both physical and psychological isolation. (*Man and Abandoned Landscape*, Odd Nerdrum: <https://s-media-cache-ako.pinimg.com/736x/27/a3/3b/27a33b6c5d3c9e087d20f7cb3c34296a.jpg>)



**Figure 2.63 | *Still Life with Apples and a Pot of Primroses***

Artist: Paul Cézanne  
Source: Met Museum  
License: OASC

#### 2.5.2.4 Emphasis/Movement

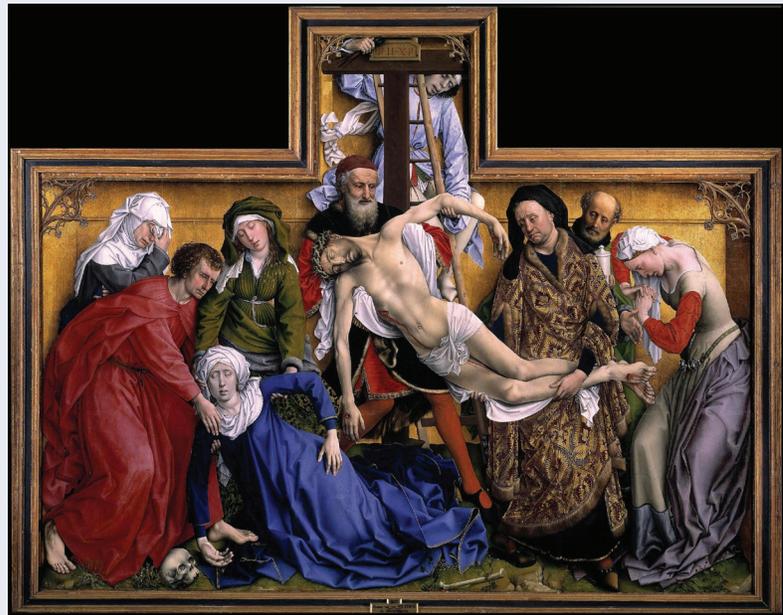
The design principle of emphasis or movement is the intentional use of directional forces to move the viewer's attention through a work of art. When we see a color shift within a shape, this implies movement. And, when we see a line in a work of art, we are compelled to follow it. For example, arrows of any shape will signify direction and are widely used in advertising to attract and direct the attention of potential customers.

There are more subtle means of moving a viewer's attention through a work of art. *Descent from the Cross* by Rogier van der Weyden (1404-1464, Belgium) uses the positions of the figures' arms, legs, and heads to trace the infinity symbol, which resembles the number 8 laying

on its side. (Figure 2.64) This subtle reminder of Christ's everlasting life is meant to reassure and give hope to the faithful gazing upon this scene of death and grieving.

### 2.5.2.5 Rhythm/Repetition

The design principle of **rhythm** is the repetition of visual elements to establish a pattern. This pattern can then be used to provide a stage for a special object, or the pattern can be interrupted to direct attention to the change. In his commentary of mass consumer culture, Andy Warhol's use of repetition compels us to notice the small differences between the apparently identical elements of his installation of paintings, *32 Campbell's Soup Cans*. (Figure 2.65)



**Figure 2.64 | Descent from the Cross (Deposition)**

Artist: Rogier van der Weyden

Author: User "Argento"

Source: Wikimedia Commons

License: Public Domain



**Figure 2.65 | Campbell's Soup Cans**

Artist: Andy Warhol

Author: User "Gorup de Besanez"

Source: Wikimedia Commons

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## 2.6 KEY TERMS

**2-Dimensional Art:** art that is executed on a two dimensional surface that has length and width; a flat (or nearly flat) surface. These include, but are not limited to, paintings, drawings, and prints.

**3-Dimensional Art:** art that is executed in the three dimensions of length, width, and height. These include, but are not limited to, sculpture, architecture, ceramics, glass, textiles, assembly, and installation.

**4-Dimensional Art:** art that is executed in, and depends upon, both space and time, which is considered the “fourth dimension.” Examples include but are not limited to performance art and video art.

**Abstract Expressionism:** or **ABEX**; this art historical term is specific to a group of painters working in New York after the Second World War. This group includes Jackson Pollock, Willem de Kooning, Lee Krasner, and Helen Frankenthaler. Their primary approach to painting was gestural, and “all over,” a condition in which no single part of the work is visually predominant.

**Acrylic:** a fast drying water-soluble petroleum based painting medium.

**Actual Texture:** the condition in which texture is created, not represented. Actual texture is the opposite of simulated texture or the illusion of texture. Examples include brushstrokes, impasto, collage, and inclusion.

**Additive Color:** color based on projected light.

**Afterimage:** the optical sensation that occurs after a visual stimulus is removed. The afterimage is a quickly fading complement of the original stimulus.

**Analogous Color:** a color scheme that uses colors adjacent to an initial point on the color wheel. For example, if an artist chose red for the initial color, then an analogous color scheme would employ the color range that occurs between orange, red, and purple.

**Armature:** a wire or wood substructure used to support a clay sculpture while it is being worked.

**Assembly:** a sculptural process in which disparate materials are combined to form the final artwork.

**Asymmetric:** lacking symmetry.

**Atmospheric Perspective:** the use of color to simulate the illusion of space.

**Axis:** an imaginary line around which objects are arranged.

**Balance:** the property of equality in visual weight.

**Binder:** a transparent fluid used to suspend colored pigment and attach it to a support. **Brush:** tools used to apply paint to a support, usually hair or fiber attached to a wooden or plastic handle.

**Buon Fresco:** literally, “good fresco.” A mural process in which pigment is painted on and absorbed into wet plaster.

**Calligraphy:** beautiful writing.

**Carving:** a sculptural process in which material is removed to reveal the final artwork.

**Casting:** a sculptural process in which material is substituted to form the final artwork.

**Charcoal:** an art medium made from burned wood used to make dark black marks usually on paper.

**Closed Form:** sculptural forms that are not penetrated by exterior space.

**Color Scheme:** an organized or formulaic approach to the selection of color. For example, Monochromatic (one color), Complementary (opposite colors), and Analogous (adjacent colors) color schemes.

**Color Temperature:** in visual art, the sensation of “warm” or “cool” relative to a given color. Monochromatic (one color), Complementary (opposite colors), and Analogous (adjacent colors) color schemes.

**Color:** the sensation caused by differing qualities of light.

**Complementary Color:** colors that when blended together create a neutral gray. On a color wheel, complementary colors appear opposite to one another. Examples of a complementary pair would be blue and orange or red and green.

**Composition:** the arrangement of visual elements.

**Conte Crayons:** in drawing, square sticks of compressed charcoal or pigment and wax or clay.

**Conte:** a mixture of pigment and clay used to make colored marks, usually on paper. Traditionally manufactured in black, white, and sanguine (red) colors.

**Contour:** the exterior boundary of a form.

**Contrast:** areas with a high difference in value, color, texture, or other scale.

**Cool Color:** a color that tends toward blue/white in hue. A cool color can be any color that tends toward blue/white when compared to another color. For example, alizarin crimson is a cool red when compared to cadmium red medium.

**Crosshatching:** intersecting marks that create value on a form.

**Description:** the process of enumerating the various elements of an artwork.

**Design:** a plan for the arrangement of visual elements.

**Drawing:** the process of making marks on a support, often but not always representative of an idea or object.

**Edge:** exterior boundary of a shape.

**Edition:** a series of prints made from a single matrix.

**Electromagnetic Spectrum:** continuous range of radioactive energy by wavelength.

**Elements of Design:** the physical components of visual art.

**Emphasis:** the strategy of directing attention with the use of high contrast.

**Encaustic:** a painting process which uses wax as the binder.

**Figure/Ground Relation:** the figure in front of the ground. Used to specify which objects qualify as figures.

**Figure/Ground Reversal:** ambiguous figure ground relation in which figures can be alternately seen as grounds and vice versa.

**Figure:** a shape that appears in front of a background.

**Forced Perspective:** use of perspective to create a distorted or unnatural scale relation. Form: the physical components of visual art.

**Found Objects:** material incorporated into artwork that is not normally considered an artistic medium. Found objects serve the same purpose in sculpture that magazine cutouts serve in collage.

**Freestanding:** sculpture that can be viewed from all angles.

**Fresco Secco:** the process of painting on dry plaster.

**Fresco:** the process of painting on wet or dry plaster.

**Fugitive:** pigments that change color or become transparent with time or weathering.

**Geometric:** a shape with mathematically regular contours.

**Gestalt:** intuitive perception of an artwork as a single whole experience.

**Gesture:** direction interpreted as movement.

**Gicleé:** an Ink-Jet print, usually on acid free paper with archival inks.

**Graphite:** a carbon-based mineral mixed with clay to make pencil leads of varying hardness.

**Ground:** the stage on which a figure resides.

**Gum Arabic:** a water-soluble resin from the Gum tree used as a binder in watercolor.

**Hard-Edged:** a shape with clearly defined boundaries.

**Height:** vertical distance or measurement.

**High Relief:** sculpture that remains attached to a base, but uses undercut. Opposite of low relief.

**Horizon Line:** the visual limit of space where sky and land or water meet. In linear perspective, the vanishing point rotated 360 degrees.

**Hue:** the quality of wavelength in color; the color name.

**Impasto:** thick application of paint.

**Implied Line:** invisible line perceived by alignment of unrelated shapes.

**Impressionism:** a nineteenth century art movement, originating in Paris, in which changing variations of light become a principal subject. Examples include the work of Claude Monet, Edgar Degas, and Mary Cassatt.

**Ink:** a liquid pigment traditionally used with pens of various manufacture.

**Installation:** an art practice that surrounds the viewer in an environment.

**Intaglio:** a printing process in which a metal plate is scratched with a steel point to produce printed images.

**Interactive:** artwork in which the viewer is expected to participate.

**Interval:** the space between elements of an artwork.

**Intuitive Color:** an approach to the selection of color that relies on intuition or other internal state rather than observation of an external condition.

**Kinetic Art:** art that incorporates motion into its design.

**Line:** an infinite series of points with limited length.

**Linear Perspective:** geometrically constructed illusion of the recession of space.

**Linear:** of or pertaining to the quality of line.

**Lithograph:** a printing process that relies on the repulsion between oil-based ink and water. A stone (or aluminum plate) is drawn on and etched. Where the stone is etched will absorb water. Where the stone is not etched (protected by the drawing or image) the stone will remain dry. Water is applied to the stone. Ink is then rolled over the stone. Where the stone is wet, ink is repelled. Where the stone is dry, ink adheres. Paper is then pressed onto the inked stone resulting in a print.

**Local Color:** the color of an object under even illumination.

**Lost Wax:** a casting process in which a wax original is molded, then wax is melted out and replaced with metal.

**Low Relief:** sculpture that remains attached to a base and does not use undercut. Opposite of high relief.

**Mass:** the quality of possessing three dimensions.

**Matrix:** in printmaking, any material used to produce an image. For example, in relief printing, the matrix is usually a carved linoleum or wood block.

**Metalpoint:** drawing using ductile metal such as silver, gold, or pewter as the pigment. Usually on paper or gessoed panel.

**Mixed Media:** the use of unconventional or unusual combinations of materials in a single artwork.

**Mobile:** in sculpture, a kinetic artwork moved by wind or gravity.

**Modeling:** a sculptural process in which material is added to form the final artwork.

**Mold:** a hollow form used to shape a fluid or plastic substance.

**Monochromatic:** of or using a single color.

**Motion:** movement or change in position over time.

**Negative Space:** the absence of mass in space.

**Negative Space:** the absence of mass in space.

**Non-Objective Art:** art that does not have direct pictorial reference to objects seen.

**Observed Color:** the perception of color on an object illuminated by a directional light source. The perceived color of such an object varies as it tends toward highlight or shadow.

**Oil Pastels:** paper covered sticks of solid pigment and oil-based binder originally used to mark livestock.

**Oil:** in painting, a solvent soluble binder that dries slowly, usually linseed oil.

**One-point perspective:** a mathematical drawing system with the intention of making three dimensional objects and space look realistic in appearance as they converge on a single vanishing point.

**Open Form:** sculptural forms that are penetrated by exterior space.

**Organic:** shapes or forms that are loose or undefined.

**Original Print:** a handmade print.

**Orthogonal:** in perspective, lines that recede to the vanishing point.

**Overlap:** a shape or object which obscures or lies over something else.

**Painting:** the process of applying liquid pigment to a surface, or an art object resulting from this process.

**Pastel:** solid sticks of pigment.

**Performance Art:** an approach to art in which the object is an action by participants.

**Performance:** artworks consisting of actions, usually documented photographically.

**Perspective:** in art a system that portrays three dimensions on a flat surface.

**Pigment:** in art, the substance which gives color to a medium.

**Pigment:** the coloring agent in paints, pastels, inks, and other art media.

**Planographic:** a printing process which occurs on a flat surface, originally limestone.

**Point:** in perspective, an object with zero dimension.

**Positive Space:** the area occupied by a solid or filled object.

**Primary Colors:** in art the three basic colors by which all other colors are mixed, i.e., red, yellow, and blue.

**Positive Space:** the area occupied by a solid or filled object.

**Primary Colors:** in art the three basic colors by which all other colors are mixed, i.e., red, yellow, and blue.

**Principles of Design:** the strategies by which the elements of art are arranged to create a desired visual effect.

**Print:** an artwork produced by transferring pigment from a matrix to a support, usually paper. Most often done in a series of identical impressions. See “edition.”

**Printmaking:** the process of producing multiple identical or nearly identical images from a single print matrix or set of matrices.

**Psychic Line:** in art, line that is understood without being seen by the eye.

**Refracted Light:** light that has been separated into distinct colors after having been passed through a prism.

**Relief:** the physical projection of an artwork beyond the support or base.

**Reproduction:** a mechanically produced print.

**Rhythm:** in art, a pattern formed by repeated objects.

**Scale:** the size of an object.

**Sculpture:** the production of artwork that exists in three dimensions. Examples are carving, casting, modelling, or assembly.

**Secondary Colors:** in art, the three colors formed by mixing two primary colors, i.e., green, orange, and purple.

**Shape:** an area of two dimensional space.

**Simulated Texture:** a visual representation of a tactile experience.

**Site Specific:** installations which use their location as part of the intended effect.

**Soft-Edged:** lacking a definite boundary.

**Solvents:** substances usually liquid, which dissolve a given paint binder.

**Stencil:** a printing process in which pigment passes through a mask onto a support.

**Substitutes:** in sculpture, replacing one substance with another. In casting, hot liquid metal is substituted for melted wax.

**Subtractive Color:** sensation of color created by reflection of light off of a surface.

**Subtractive:** a sculptural process in which material is removed.

**Support:** the surface on which an artwork is created.

**Symmetric:** shapes reflected equally about an axis.

**Technological Change:** notable shifts in available technology and science that play a part in the shift of culture and determine the availability of new artistic media.

**Texture:** the tactile quality of a surface.

**Three-Point Perspective:** a system of perspective that uses a third point above or below the horizon line to indicate the recession of space above the viewer.

**Time Arts:** the use of change as an element in art, usually performance art, kinetic art, or video.

**Tughra:** Islamic calligraphic device designating a high status individual.

**Two-Point Perspective:** a system of perspective that uses two points on the horizon to indicate the recession of space on either side of the viewer.

**Undercut:** in sculpture, an overhang created by removing material from underneath an object without detaching it from the base or support.

**Value:** in visual art, the characteristic of lightness or darkness of a color, ranging from near-white to black.

**Vanishing Point:** the point on the horizon where orthogonals meet, representing the viewer's vision extended infinitely in one direction.

**Vector:** the characteristic of having one direction.

**Video:** moving images recorded and projected or displayed on a monitor.

**Visible Light:** the portion of the electromagnetic spectrum that can be seen by the human eye.

**Volume:** a bounded three dimensional area.

**Warm Color:** a color that tends toward red/orange in hue. A warm color can be any color that tends toward red/orange when compared to another color. For example, ultramarine is a warm blue when compared to cobalt blue.

**Watercolor:** a water soluble painting medium that uses gum arabic as binder.

**Willow/Vine Charcoal:** a drawing medium made from burned willow twigs, and used primarily or initial layout of paintings as it does not adhere well to drawing surfaces.