

## Art in Science and Mathematics

### Art and Science: Elements, Medium, Design, and Technology

#### A. The Darwinian Theory of Beauty and Art

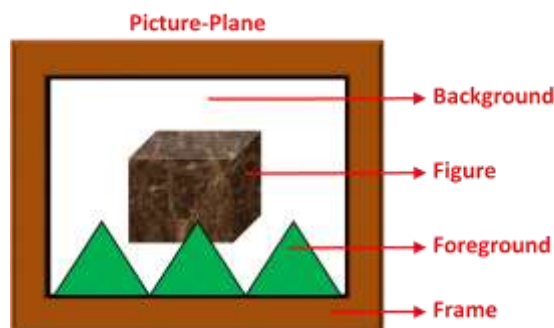
Denis Dutton (1944-2010) was a philosopher, professor, and editor of Arts & Letters Daily. In his book *The Art Instinct*, he suggested that humans are hard-wired to seek beauty. Also, in his provocative theory of beauty he stated that art, music, and other beautiful things, far from being simply “in the eye of the beholder,” are a core part of human nature with deep evolutionary origins.

#### B. Media and Elements of Visual Arts

##### Media of Art

- Painting – \_\_\_\_\_ (canvas), \_\_\_\_\_ (oil paint)
- Sculpture architecture – stone, \_\_\_\_\_, metal, \_\_\_\_\_
- Music – \_\_\_\_\_ voice, \_\_\_\_\_
- Dance – motion of the human body
- Literature – written or \_\_\_\_\_ language
- Drama – \_\_\_\_\_: Action and spoken language (motion picture, cinema, movie/film)

##### Physical and Visual Parts Of Painting

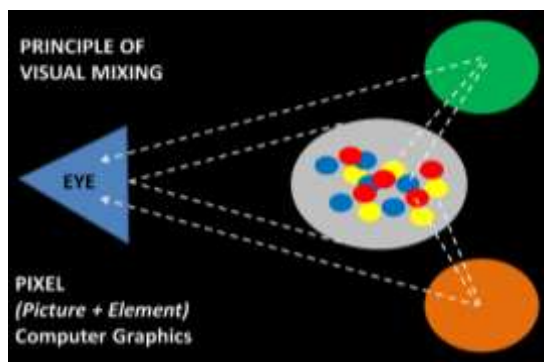


Source: Lecture Notes on Aesthetics: Theories of Art and Beauty, 2010

##### Elements of Art

- **Painting** – Visual: points, lines, shapes, size, value, texture (sometimes texture and space are included, but primarily they are elements of sculpture and architecture)
- **Sculpture and architecture** – Formal: lines, shape, size, color, space; Function: roof, wall, floor
- **Music** – Auditory: rhythm, pitch, melody, harmony, dynamics, tempo, timbre
- **Dance** – Kinesthetic: body, action, space, time, energy
- **Literature** – Literary: character, theme, plot, point of view, setting, conflict, tone
- **Drama** – Performative: actor, acts, script, dialogue, scene, props, theater

##### Principle of Visual Mixing (Pointilism)



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### Elements of Visual Art (Painting)

- Point – It is the most \_\_\_\_\_ visual element. It has \_\_\_\_\_.
- Line – It is \_\_\_\_\_ dimensional. Structurally, it is a \_\_\_\_\_, or points in a series.

### Three (3) Ways of Producing Lines

1. by actually drawing a line
2. by the \_\_\_\_\_ as in painting
3. by the \_\_\_\_\_, as in sculpture and architecture

### Kinds of Lines and Their Suggestive Expressions and Meanings

*Horizontal line* – \_\_\_\_\_. It produces an illusion of wideness and shortness.

*Vertical line* – \_\_\_\_\_. It creates an illusion of narrowness and tallness.

*Sliding lines Above the Horizon* – rising up, \_\_\_\_\_, and \_\_\_\_\_

*Sliding lines Below the Horizon* – falling down, shyness, \_\_\_\_\_ and \_\_\_\_\_

Intersecting diagonals produce radial balance which implies movement.

*Thick line* – strength and \_\_\_\_\_

*Thin line* – weakness and \_\_\_\_\_

*Straight line* – Order and reason

*Curve line* – motion and \_\_\_\_\_

*Broken line* – \_\_\_\_\_ and passion

- Shapes – the boundaries or edges of an object

### Ways of Making Shapes

1. by the boundary of a line that closes into itself (polygon), in a drawing
2. by the boundary of color, in painting
3. by the boundary of contour, in sculpture and architecture

### Kinds of Shapes

Rectilinear – shapes of objects

Curvilinear (Biomorphic) – shapes of living things

Irregular – any possible shapes

- Value – the application of light and dark in a painting

### Ways of Producing Value

1. by shading – darkening the area on the surface of the object
2. by shadowing – darkening the area on a receiving surface
3. Chiaroscuro – application of light and dark that enhances the shape of the figure

4. Sfumato – smoky effect which creates a sense of mystery

- Texture – the sense of touch
- Color – may be considered as the most beautiful visual element; produced by light striking a surface

#### **Physical Properties of Color**

Hue – distinguishes one color from the others (primary, secondary, tertiary)

Value – the lightness and darkness of a color

- Tint – adding white to a color
- Shade – adding black to a color
- Saturation – the intensity of a color; expressed as the degree to which it differs from white

C. Principles of Design and Composition

#### **Principle of Design**

In artistic form, organization or design is about answering the question “how are the elements put together?” To achieve formal design, the following principles are applied:

- Harmony
- Variety
- Balance (equality)
- Dominance

D. The Application of Technology to Art Production

It is the influence of mechanical or technological reproduction or presentation of art.

E. The Art of *Selfie* and *Groupie*

- Self-portrait – painting of the artist made by him/herself
- Selfie – a self-portrait photograph typically taken with a digital camera or camera phone with self-fronting lens held in the hand or supported by a selfie stick
- Groupie – it is when a person takes a photo of oneself with other people using a camera or a phone camera.

### **Art and Mathematics: Aesthetic Formalism**

A. Aesthetic Formalism



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#### **The Form of Beauty**

Fundamental Principle – order and \_\_\_\_\_

Specific Principles – \_\_\_\_\_ and \_\_\_\_\_

Individual Principle – \_\_\_\_\_

B. Harmony of Proportion

According to Marco Vitruvio, man is spiritual (circle), material (square), mystical (triangle), and supernatural (five-sided star).

## C. The Golden Measure

Mathematics is found in several works of art, architecture, nature, human body, and other living and non-living things.

## D. Mathematical Structure of Music

**Auditory Elements**

Rhythm - \_\_\_\_\_

Pitch - \_\_\_\_\_

Dynamics - \_\_\_\_\_

Tempo - \_\_\_\_\_

The are difference between the tone and the note: the tone is the \_\_\_\_\_ while the note is the \_\_\_\_\_.

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**References**

Dutton, D. (2010). Ted ideas worth spreading. *A Darwinian theory of beauty*. Retrieved from [https://www.ted.com/talks/denis\\_dutton\\_a\\_darwinian\\_theory\\_of\\_beauty](https://www.ted.com/talks/denis_dutton_a_darwinian_theory_of_beauty)

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