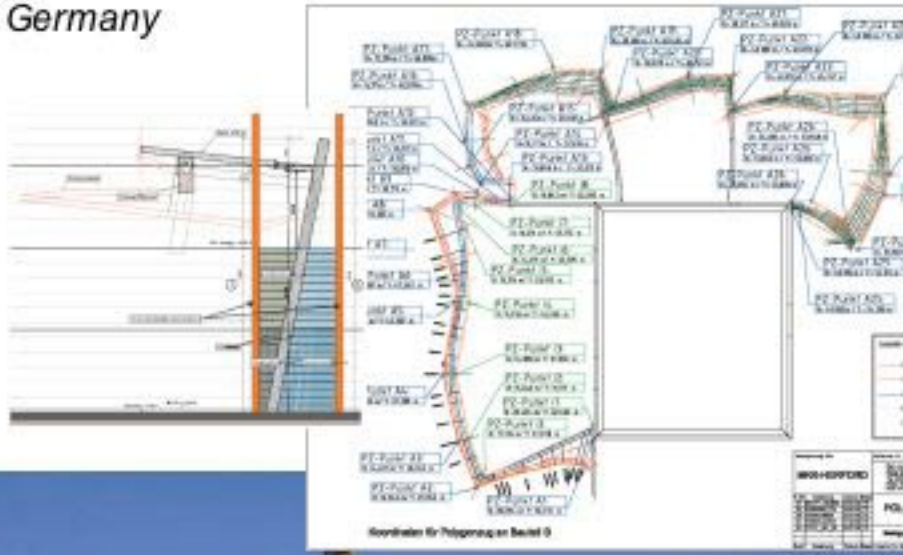
Formal Literacy

ID YEAR 2 2009

Frank Gehry & Jess Maertterer

mARTa Herford Germany



Santiago Calatrava

$$D = \frac{1}{c}\frac{1}{l}\frac{dl}{dt} = \frac{1}{c}\frac{1}{P}\frac{dP}{dt}$$

$$D^2 = \frac{1}{P^2}\frac{P_0 - P}{P} \sim \frac{1}{P^2} \qquad (1a)$$

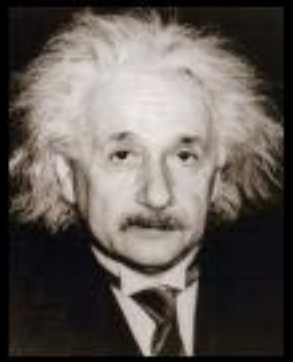
$$D^2 = \frac{K\varrho}{3}\frac{P_0 - P}{P_0} \sim \frac{1}{3} K\varrho \qquad (2a)$$

$$D^2 \sim 10^{-53}$$

$$\varrho \sim 10^{-26}$$

$$P \sim 10^{8}\ \mathcal{L}.\mathcal{J}.$$

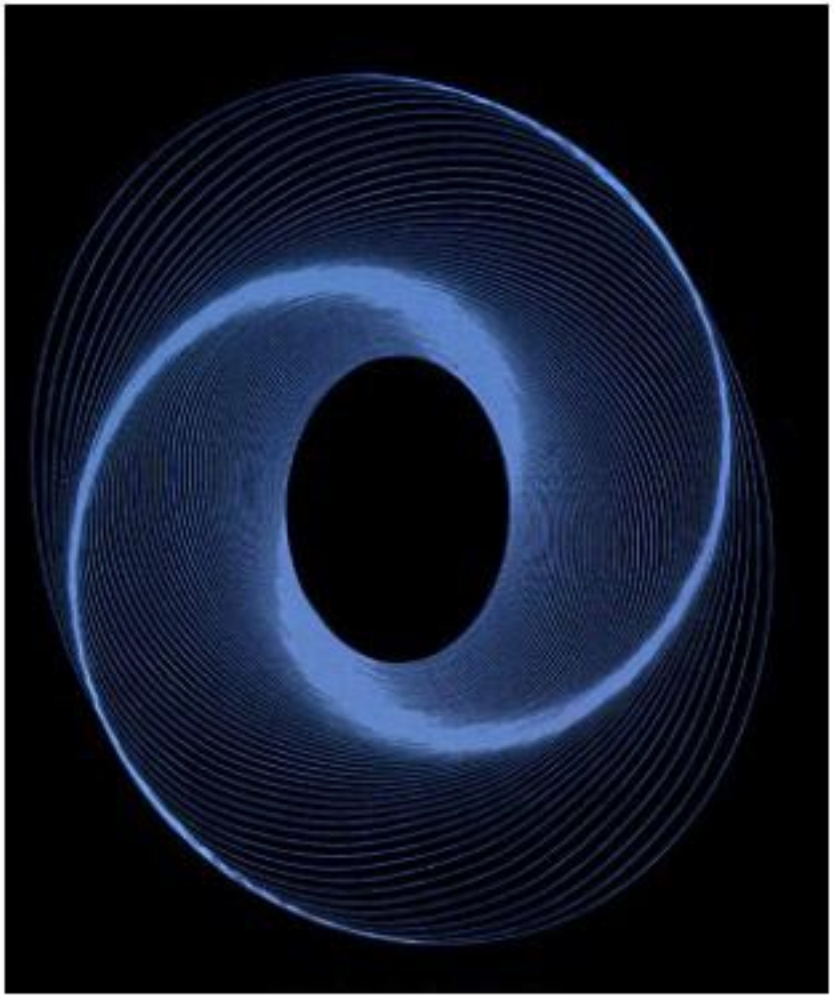
$$t \sim 10^{10}\,(10^{11})\ \mathcal{J}$$



Einstein

Mathematics Geometry and Aesthetics

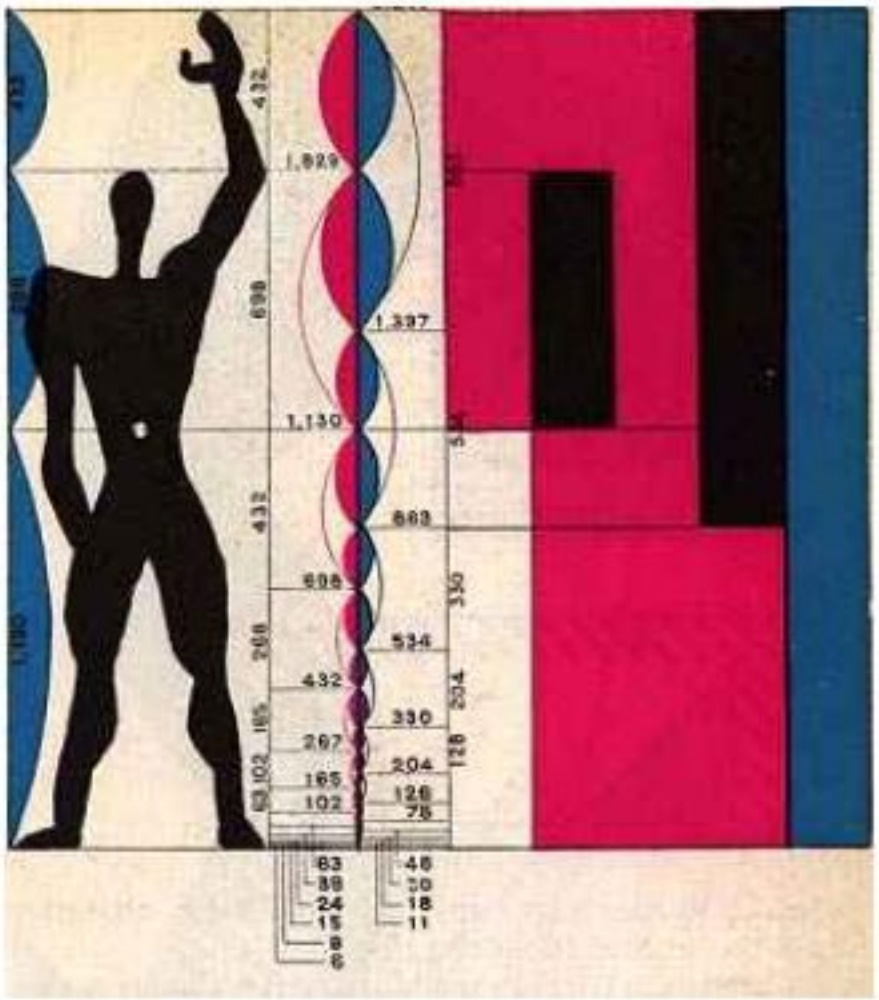
Einstein ….'*mathematics is the search for the abstract'*



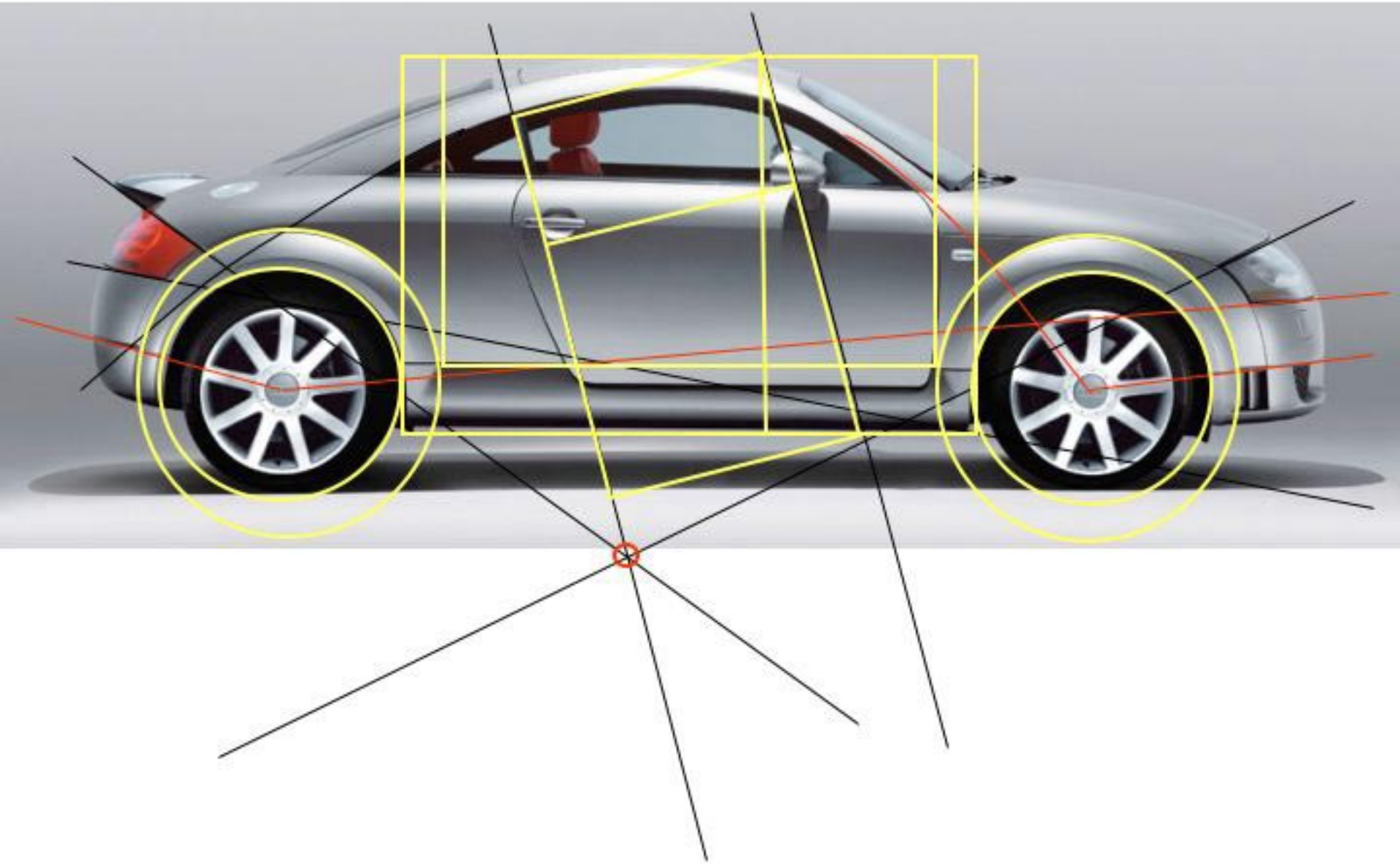
Theory of relativity *(1905)*

Le Corbusier
Chapel, France 1950
Sofa lc2 1929
Villa Savoye, Poissy, France1929

Mathematics Geometry and Aesthetics



Le Corbusier …. *'good design is to be found in the search for mathematical order'* ***Le Modular*** (1948)



Geometry and Aesthetics

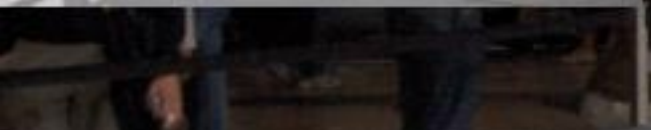
Walter de'Silva

- Simple
- Rational
- Precise
- United
- Emotion

Audi TT 2007

BMW Concept Coupé **Mille Miglia** 2006

- Emotion
- Tension
- Passion



Chris Bang

'flame suracin

Anders Warming

The vocabulary and language of form and function in design

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BMW GINA 2008

BMW GINA 2008

Richard Saper 1972

Ross Loegrove 2002

NATIONAL GEOGRAPHIC™

Braun Radio

Deiter Rams

- Order
- Harmony
- Economy

1959

Apple iPod

COURTESY OF APPLE

2001

Jonathan Ive

- Minimal
- Simple – 'real simplicity'

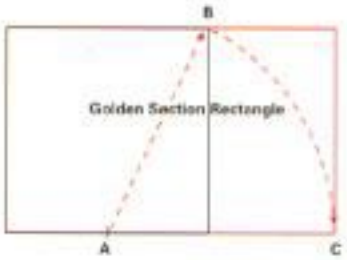
Apple iPhone (2007)

Proportion

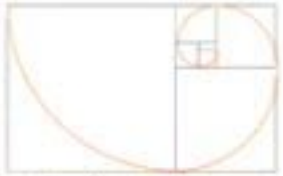
Golden Section – Ratio 1:1.618

The Divine Proportion:

AB = AC
AC CB



Chambered Nautilus
Cross section of the Nautilus' spiral growth pattern.

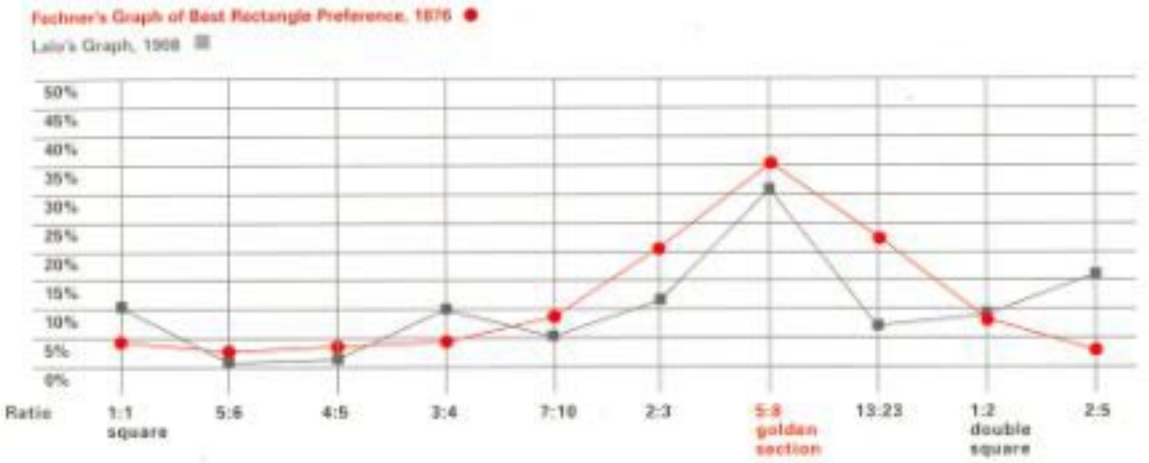


Golden Section Spiral
Construction diagram of the golden section rectangle and resulting spiral.

Atlantic Sundial Shell
Spiral growth pattern.

Moon Snail Shell
Spiral growth pattern.

Comparison Graph of Rectangle Preference



Formal LIteracy

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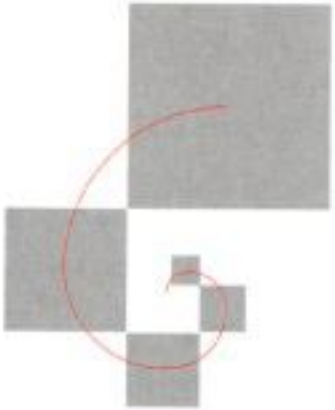
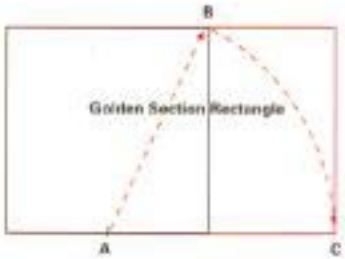
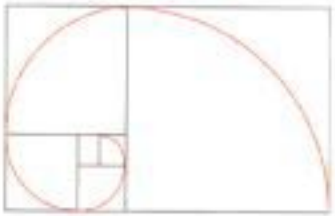
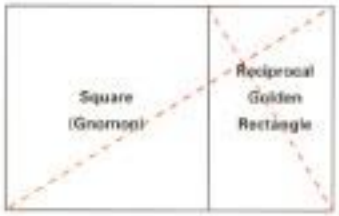
The Divine Proportion:

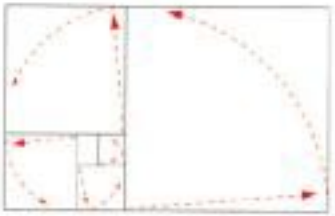
$$\frac{AB}{AC} = \frac{AC}{CB}$$

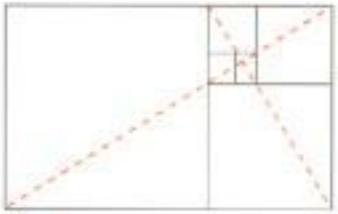




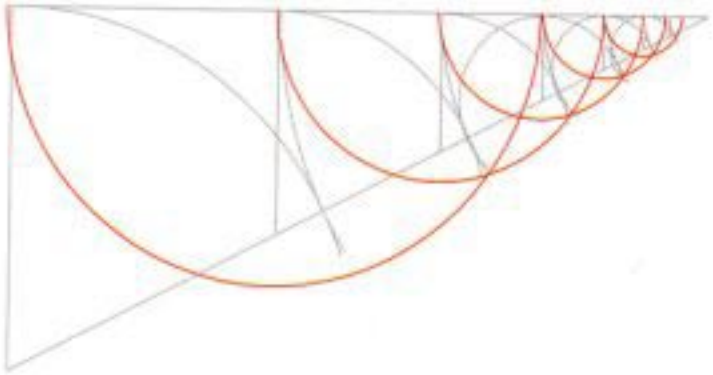






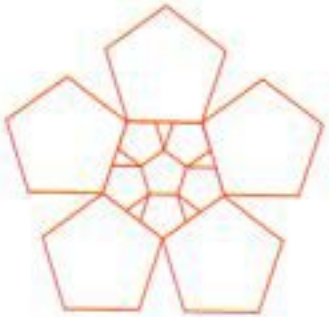


Comparison of Tibia Shell Spiral Growth Pattern and Golden Section Proportion

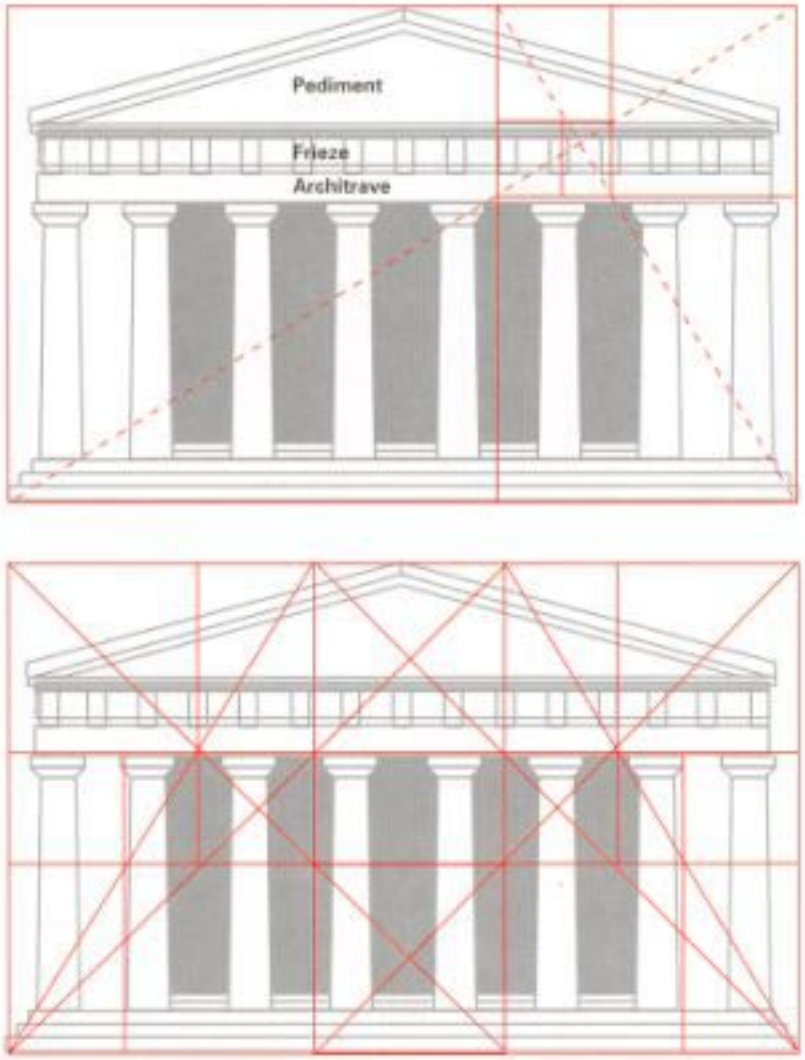


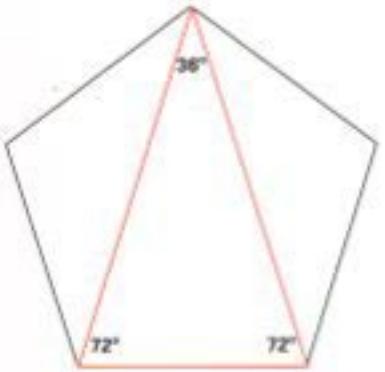
Pentagon Pattern

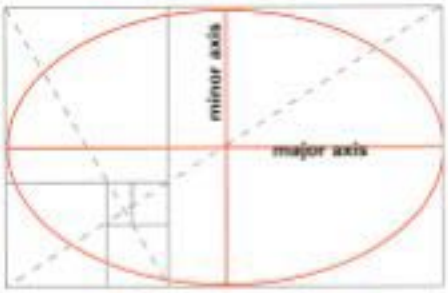
The pentagon and star pentagram have golden section proportions, as the ratios of the sides of the triangles in a star pentagram is 1:1.618. The same pentagon/pentagram relationships can be found in the sand dollar and in snowflakes.



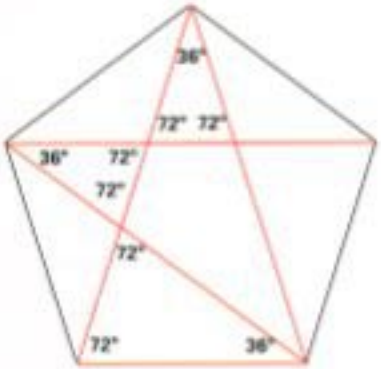
Parthenon Athens – Golden Section

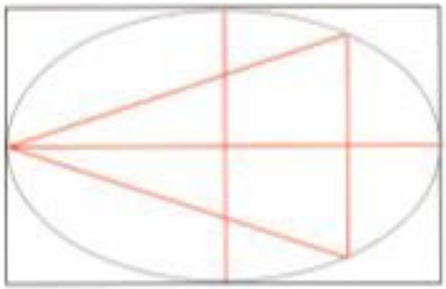






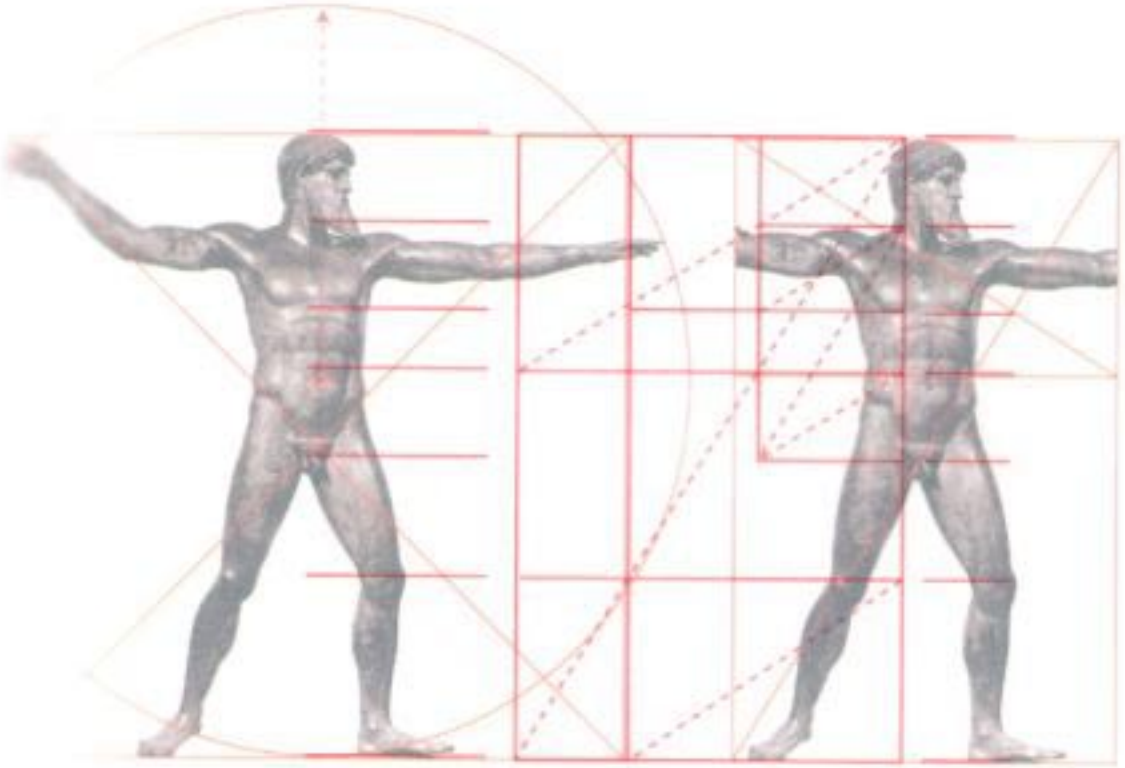
Golden Section Ellipse Inscribed Inside a Golden Section Rectangle



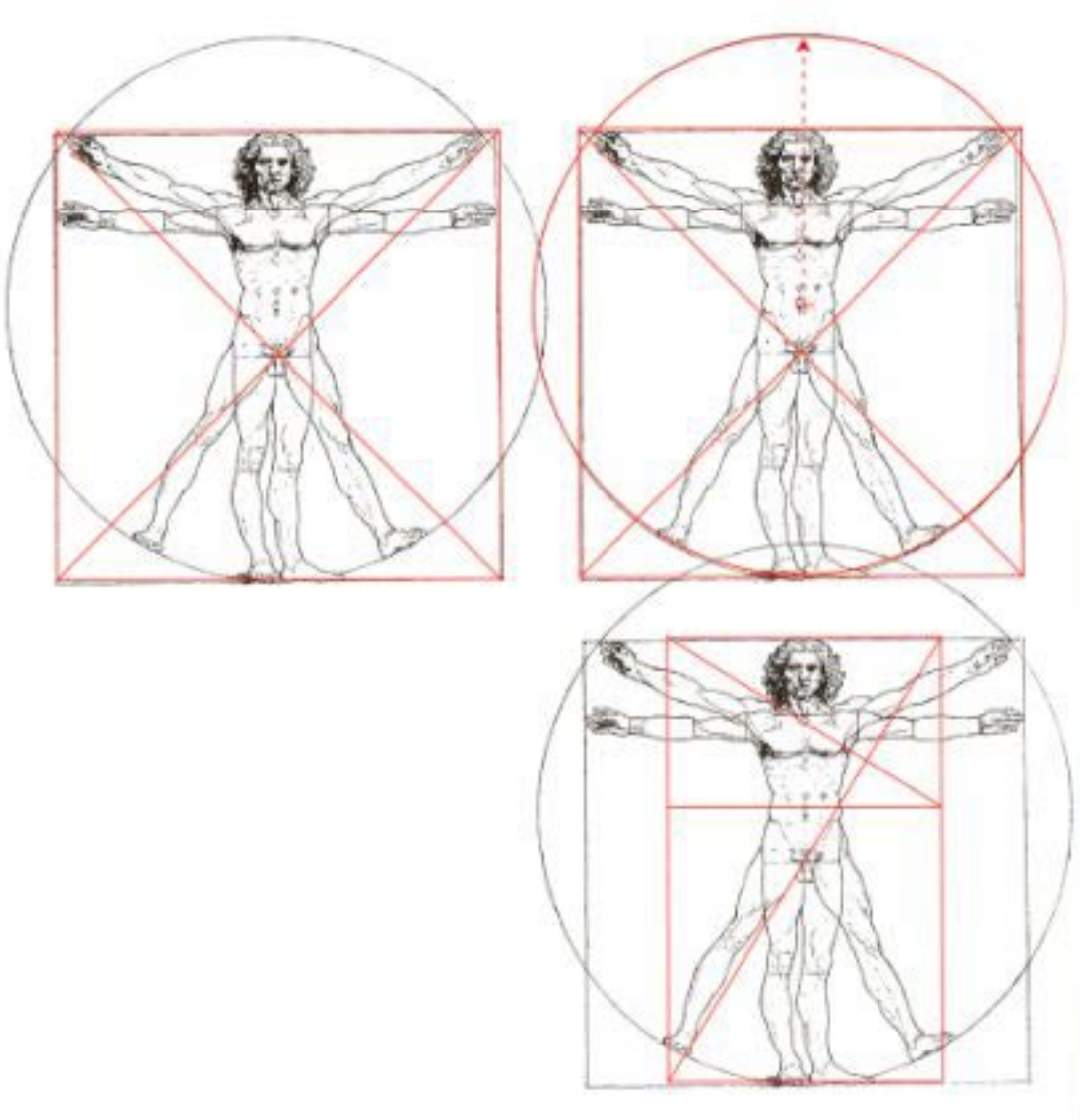


Golden Section Triangle Inscribed in a Golden Section Ellipse, Inscribed in a Golden Section Rectangle

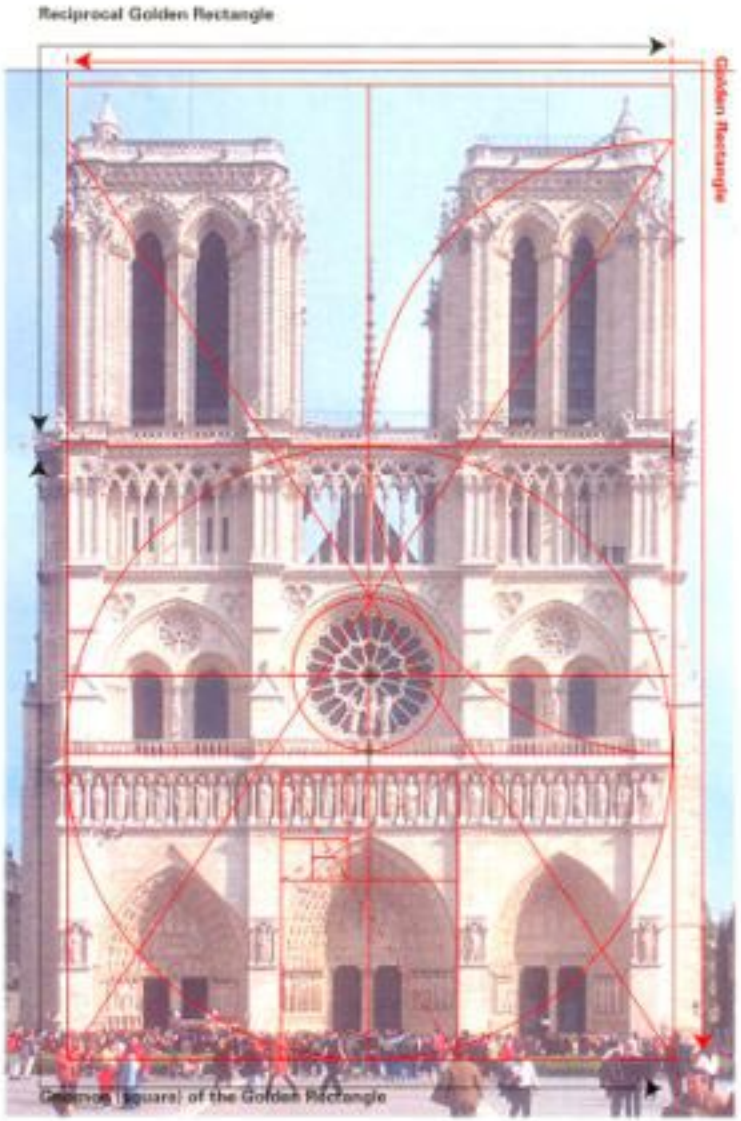
Zeus Sculpture – Golden Section



Leonardo da Vinci – Golden Section



Notre Dame Cathedral Paris – Golden Section



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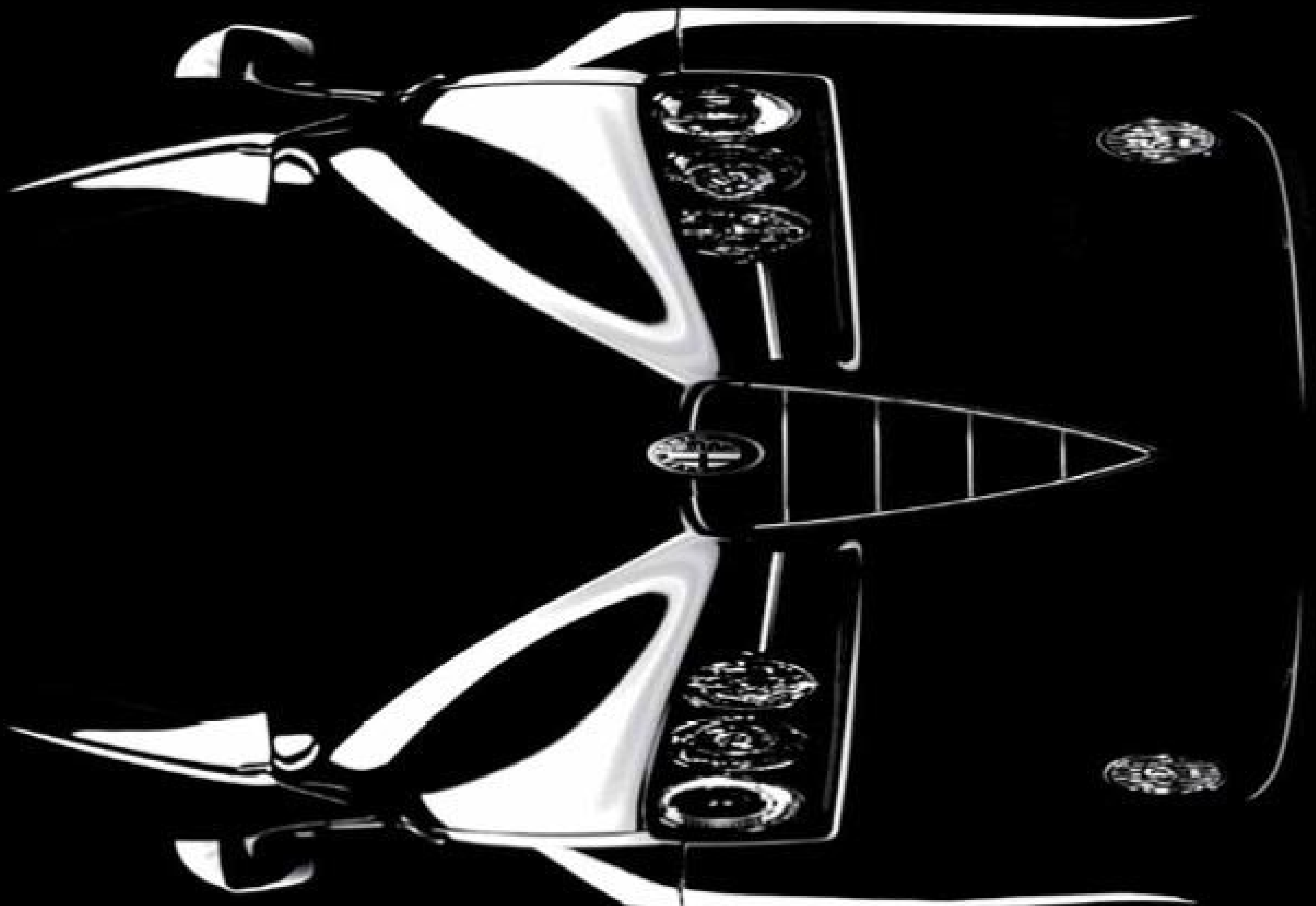
a - b = 1.618

Samsonite – Laptop Backpack (2004)

Credit Cards 96mm x 54mm

National
Geographic Logo



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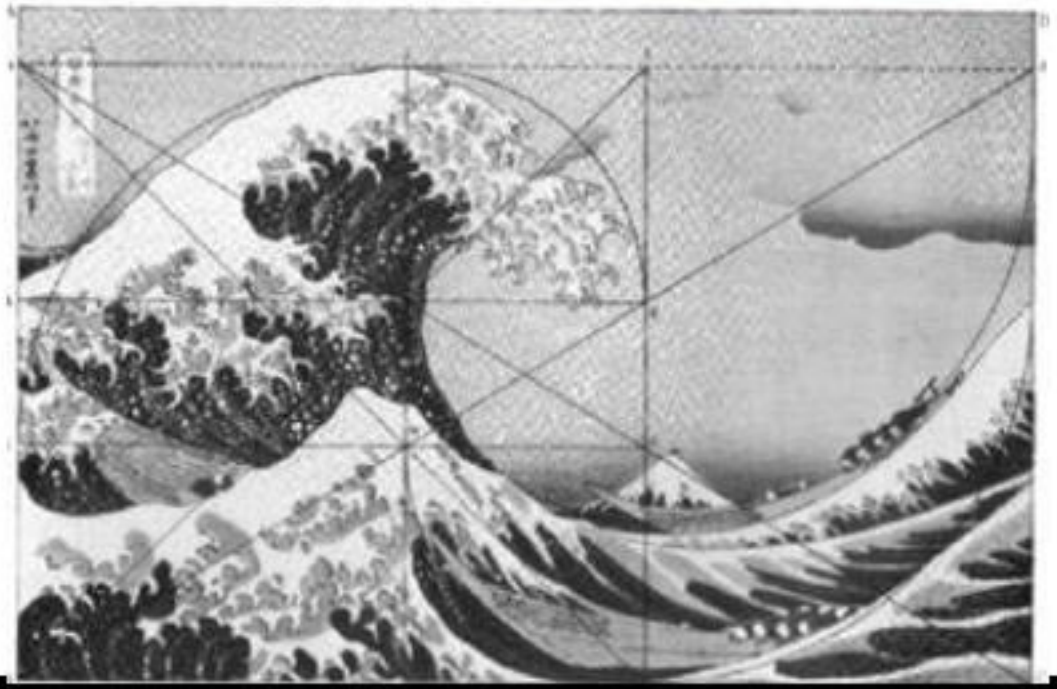
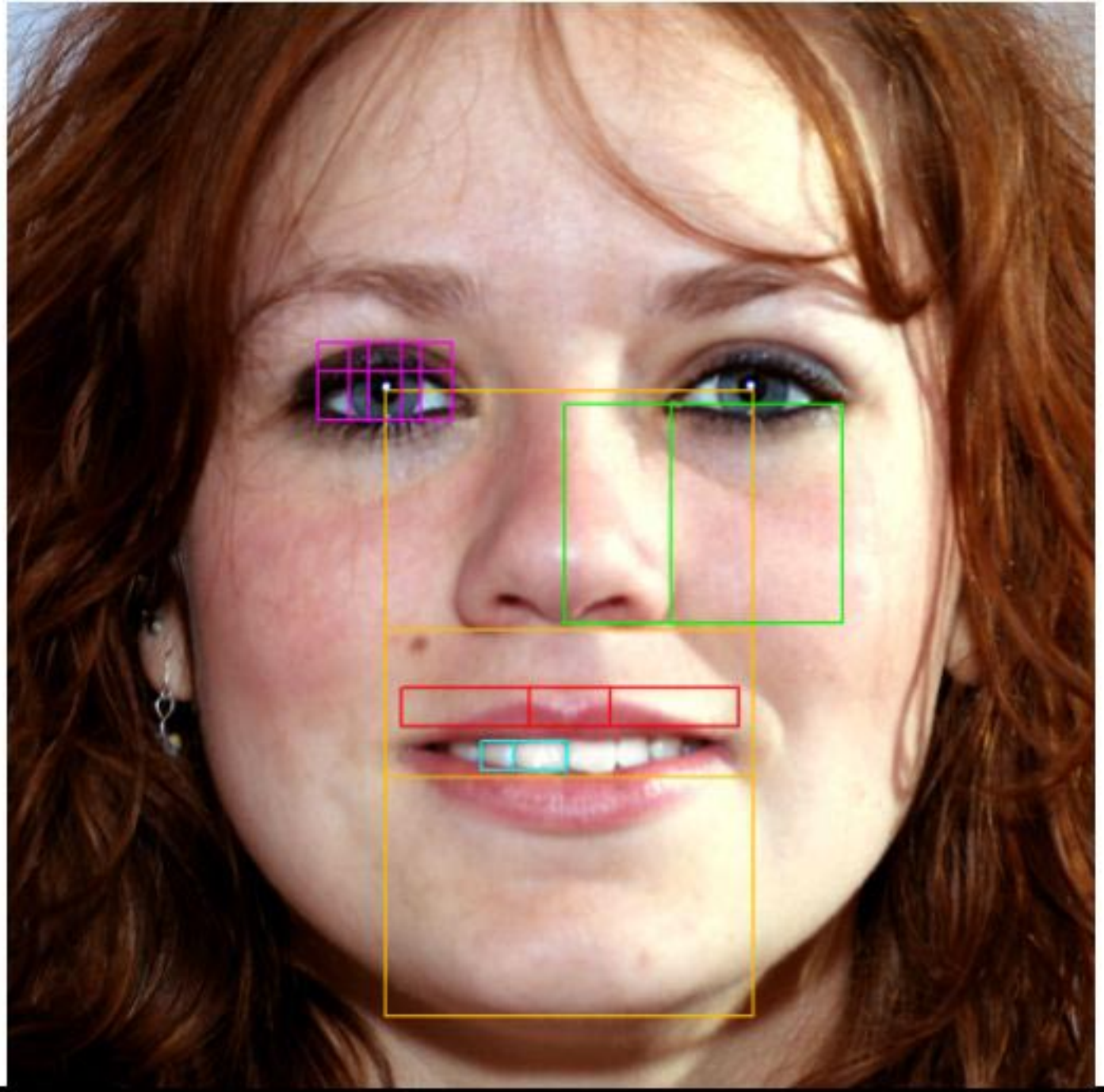
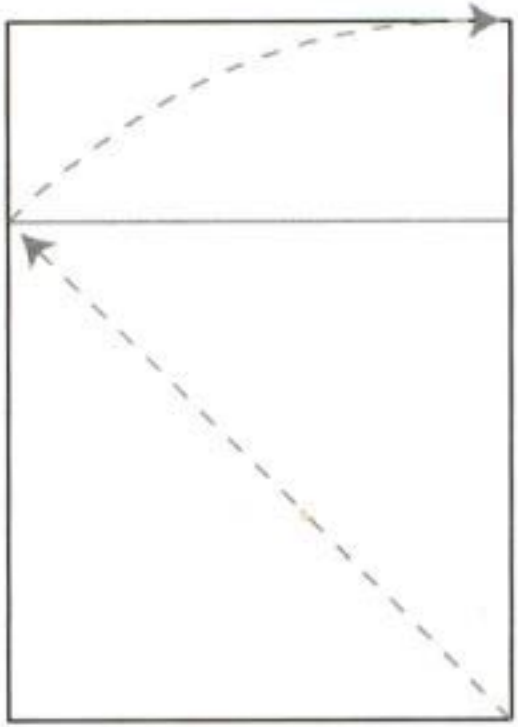


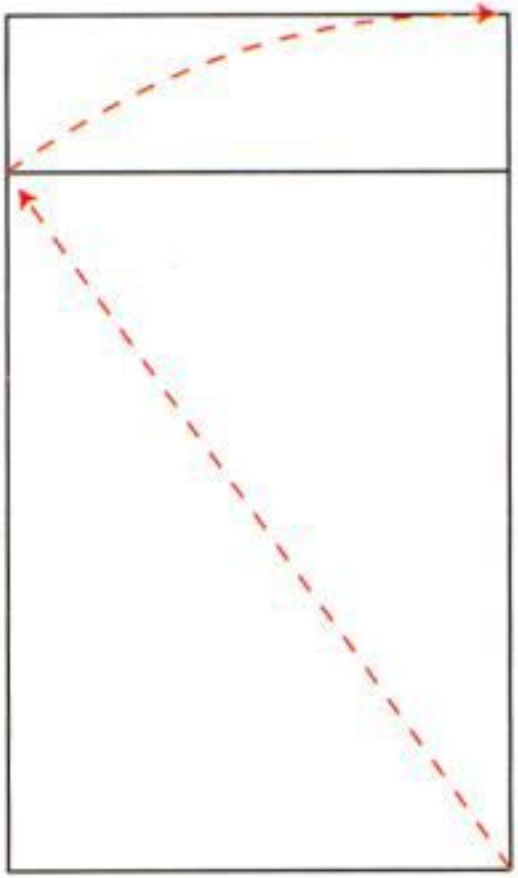


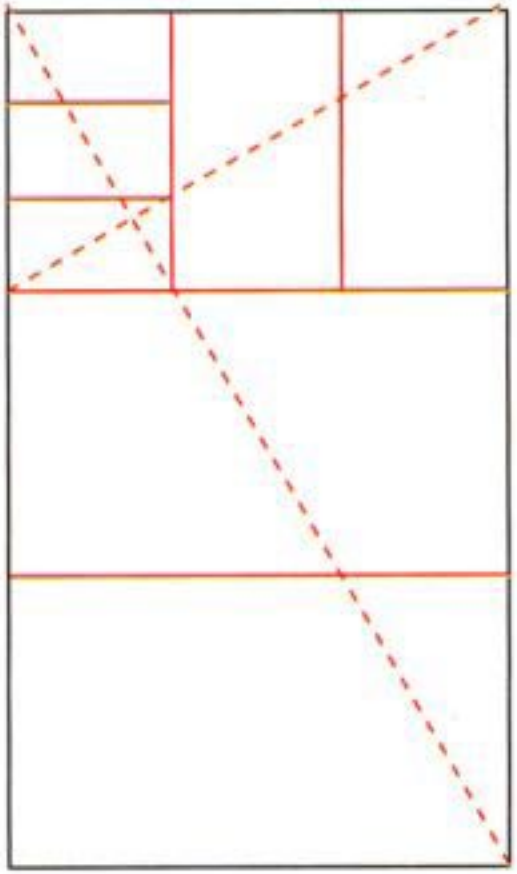
Root 2 and 3 Rectangle

Silver Rectangle

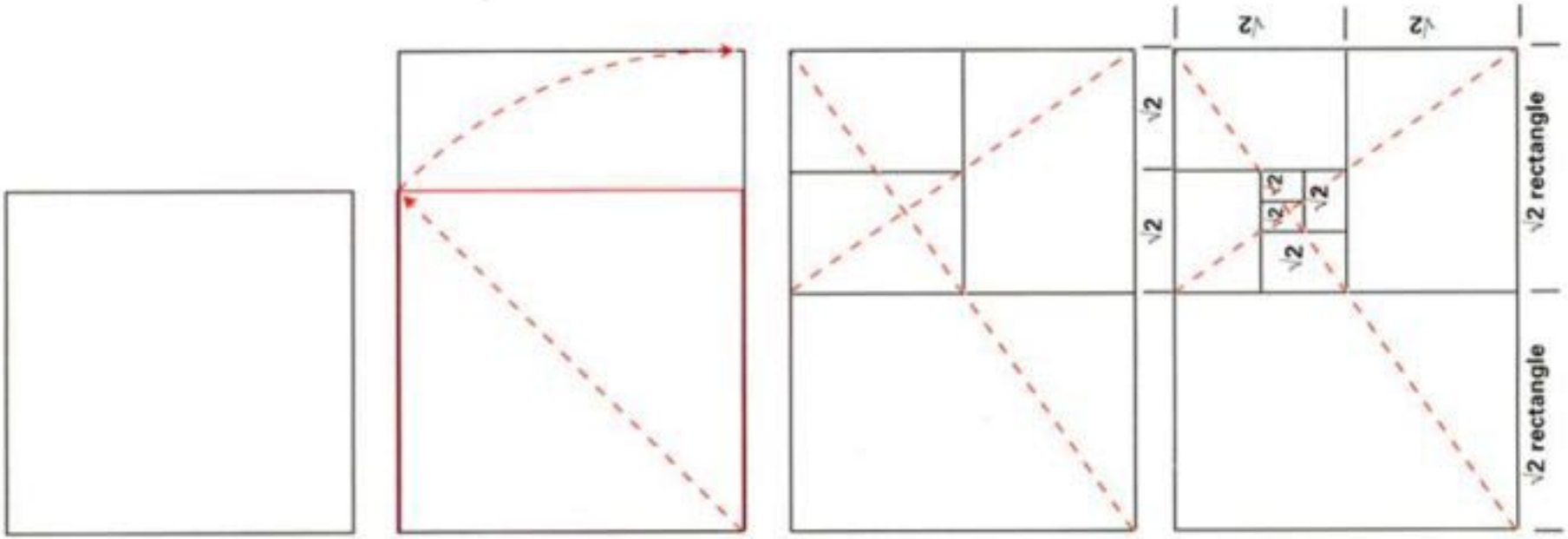
Root 2 or A4



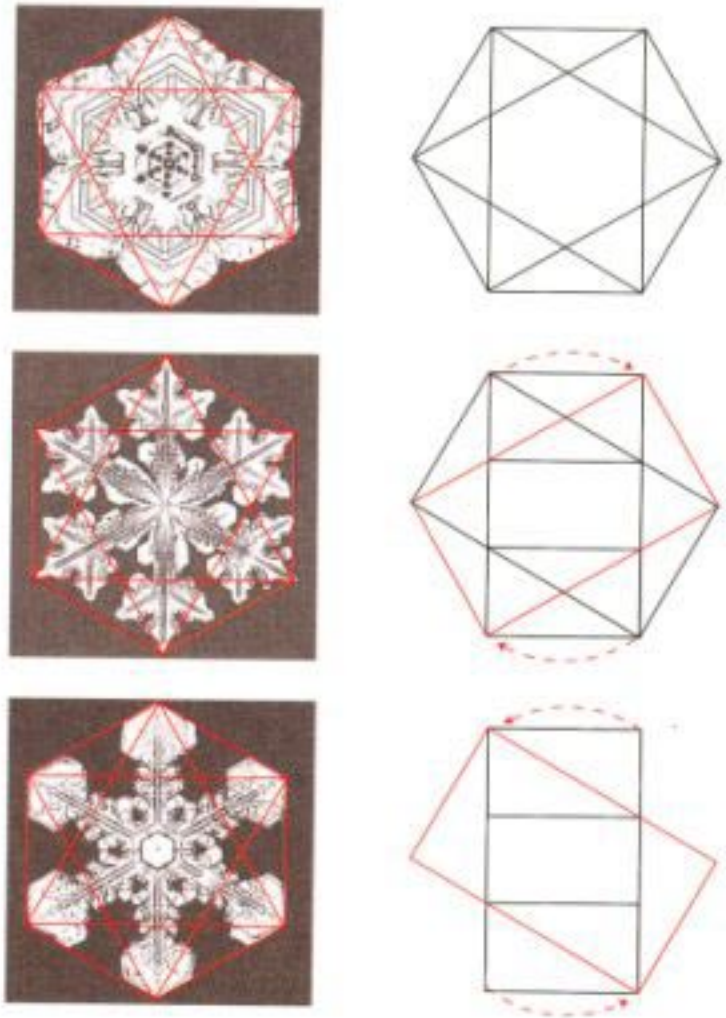




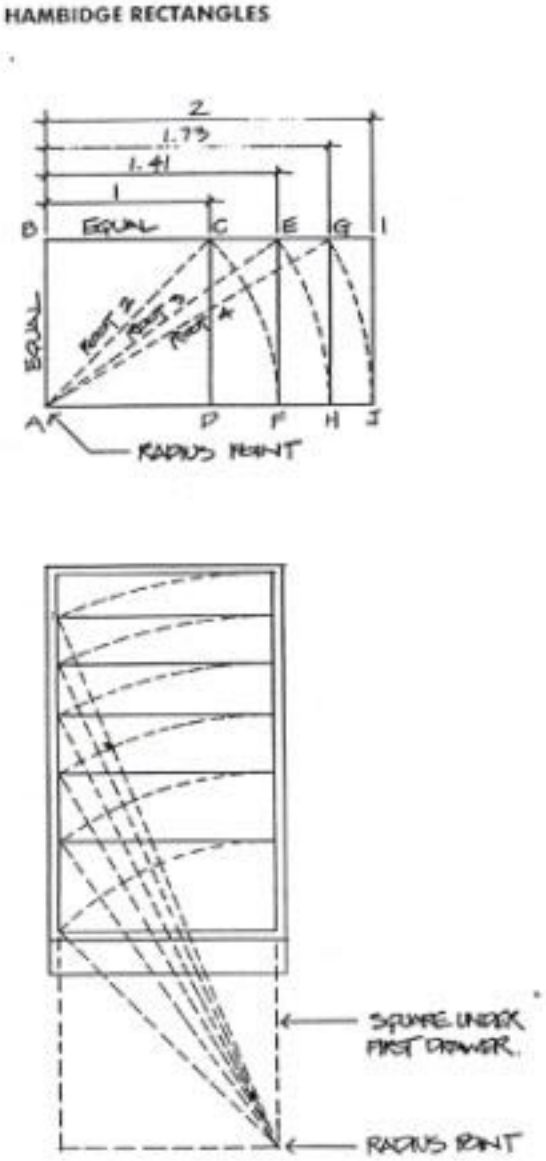
Root 2 Rectangle – A4

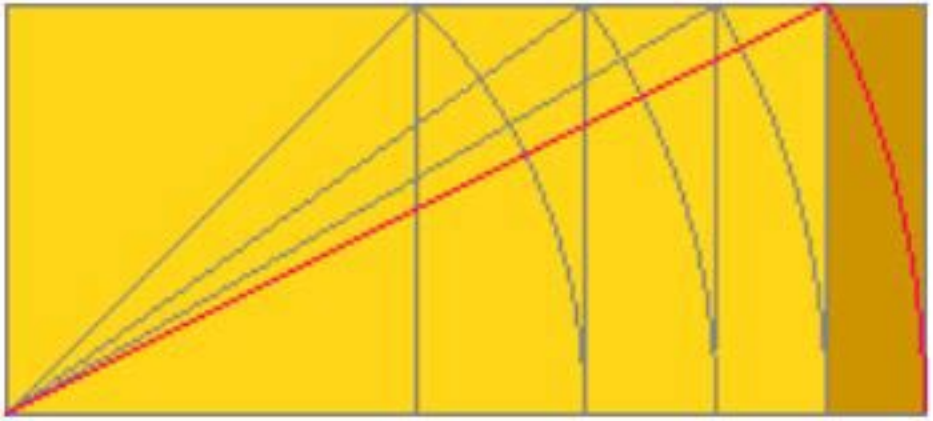


Root 3 Rectangle

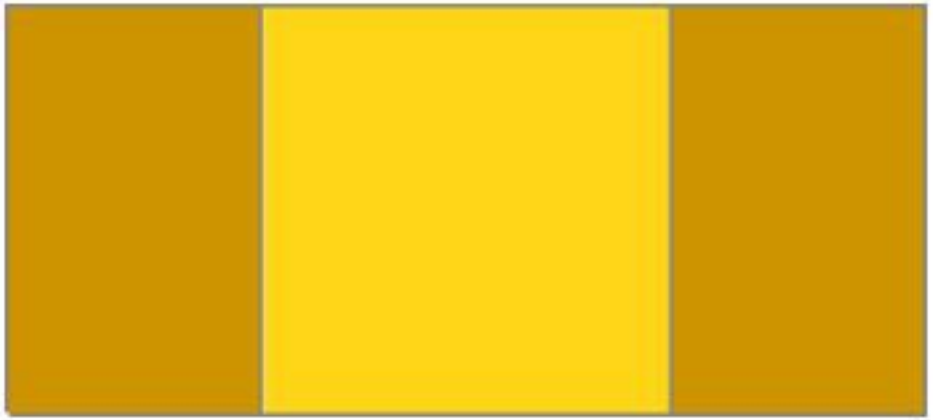


Hambridge Rectangles

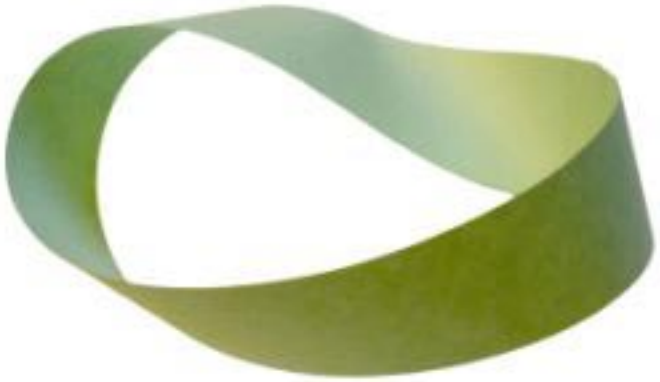




The Root 5 Rectangle has
Two Golden Sections in it

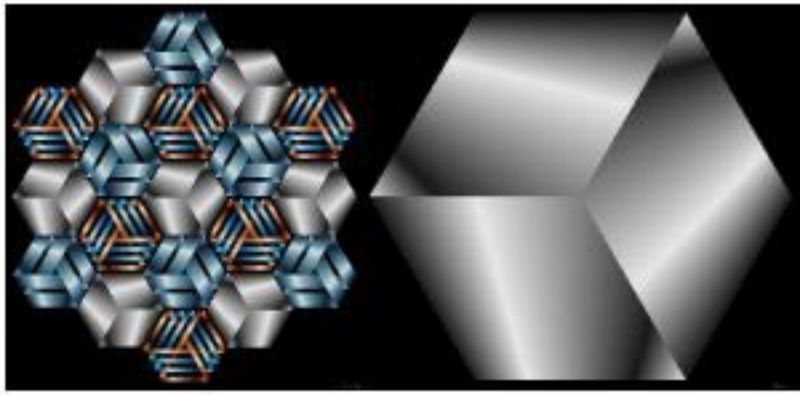


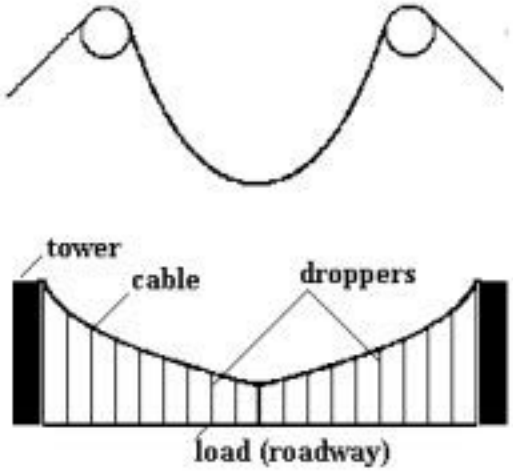
A Square & Two
Golden Rectangles



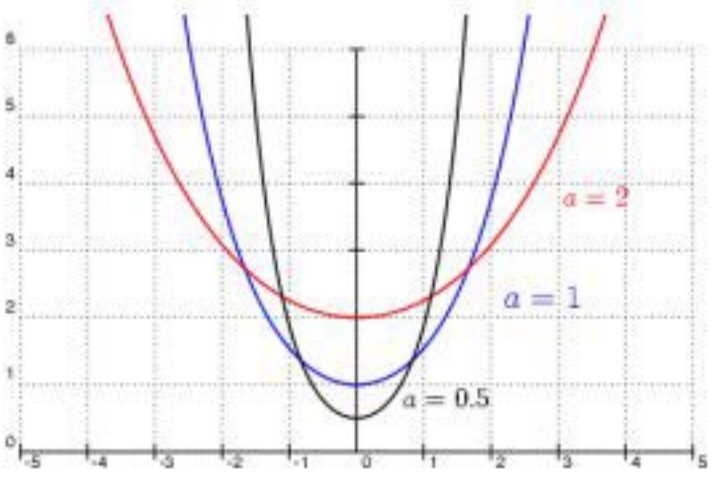
The Mobius Strip

The Mobius Strip Ramsey Auditorium 1974

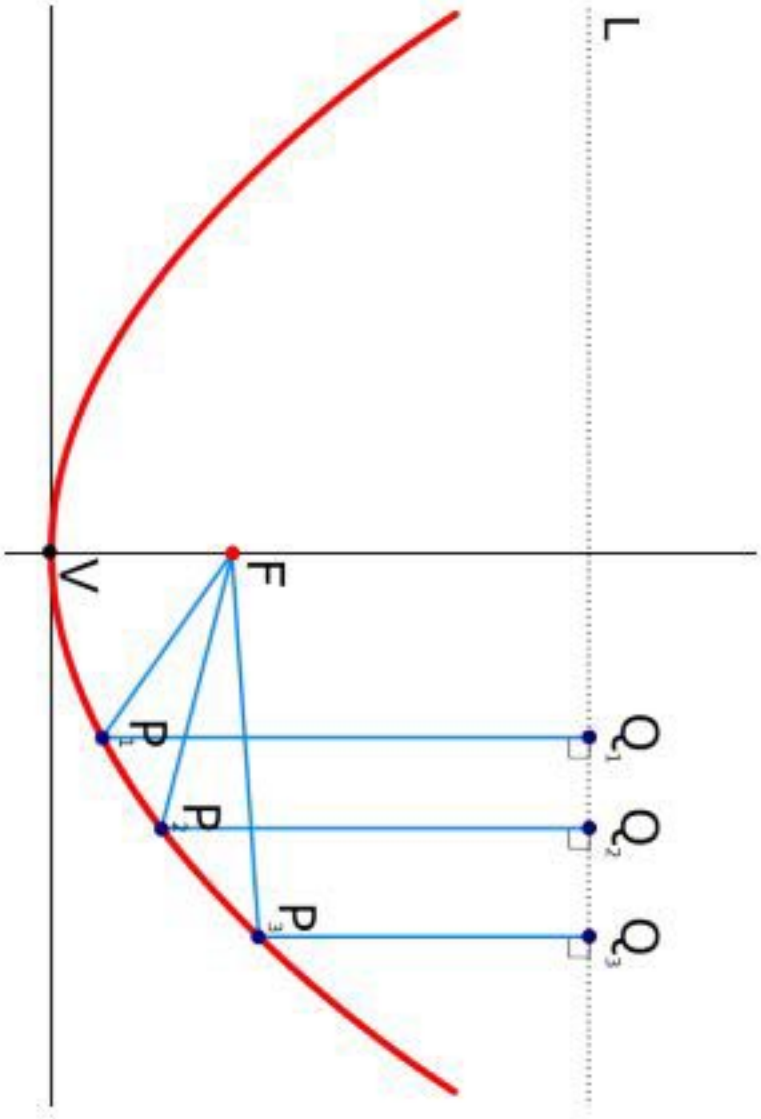




Catenary



Parabola



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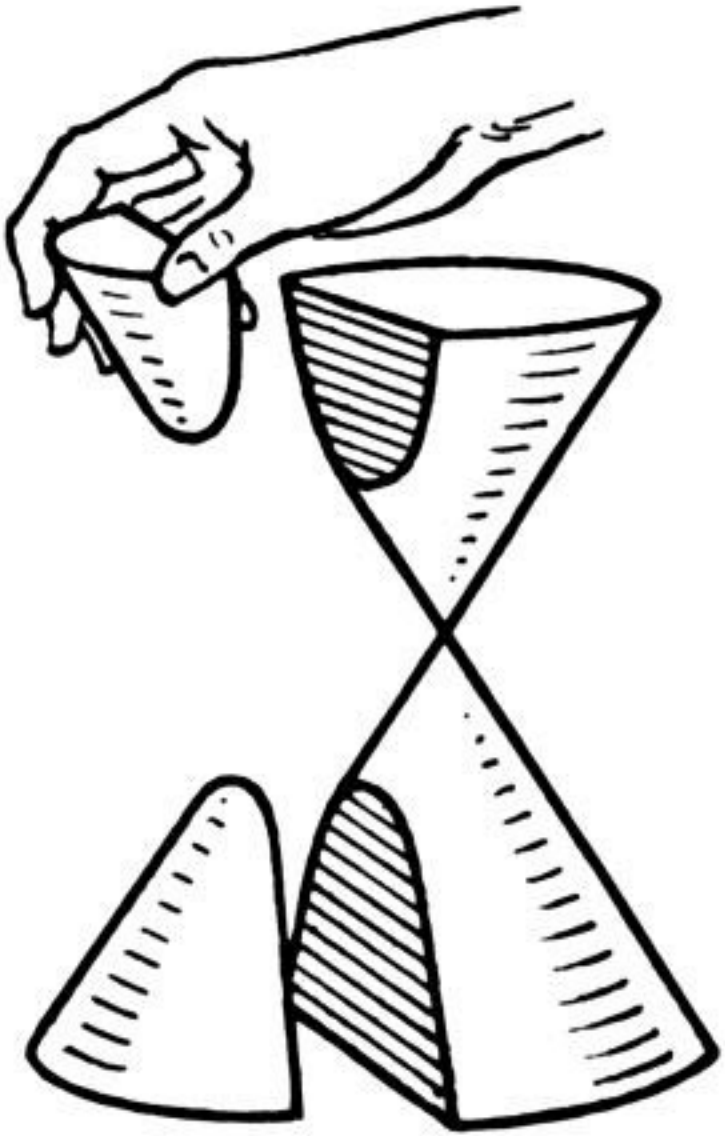
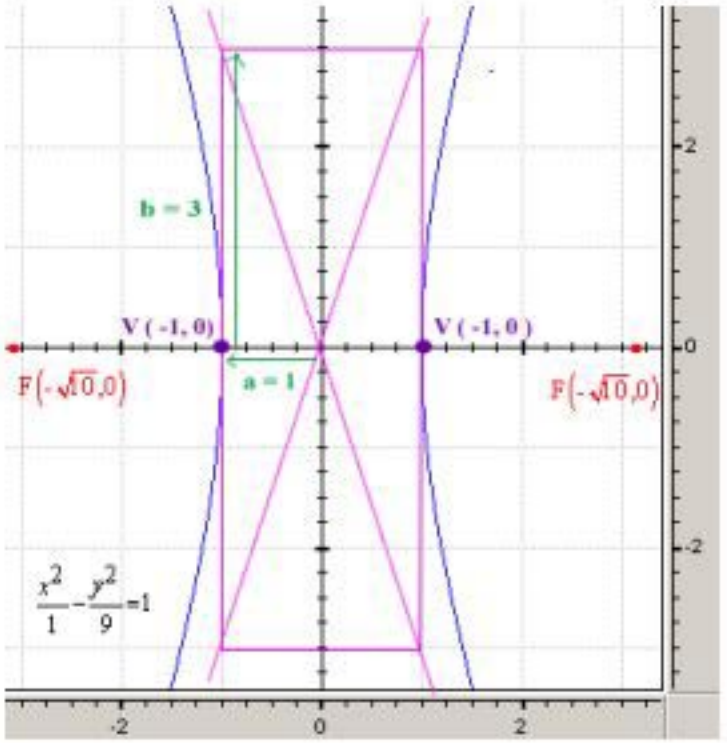
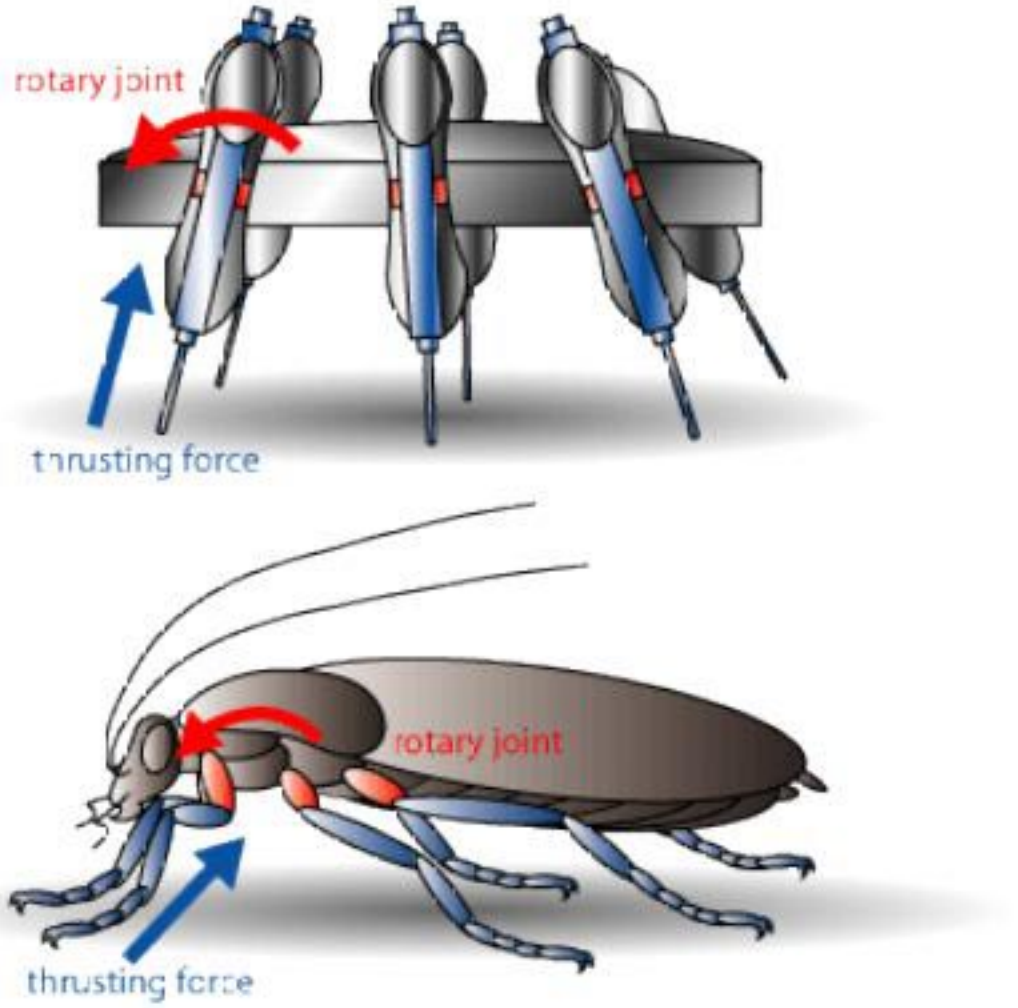




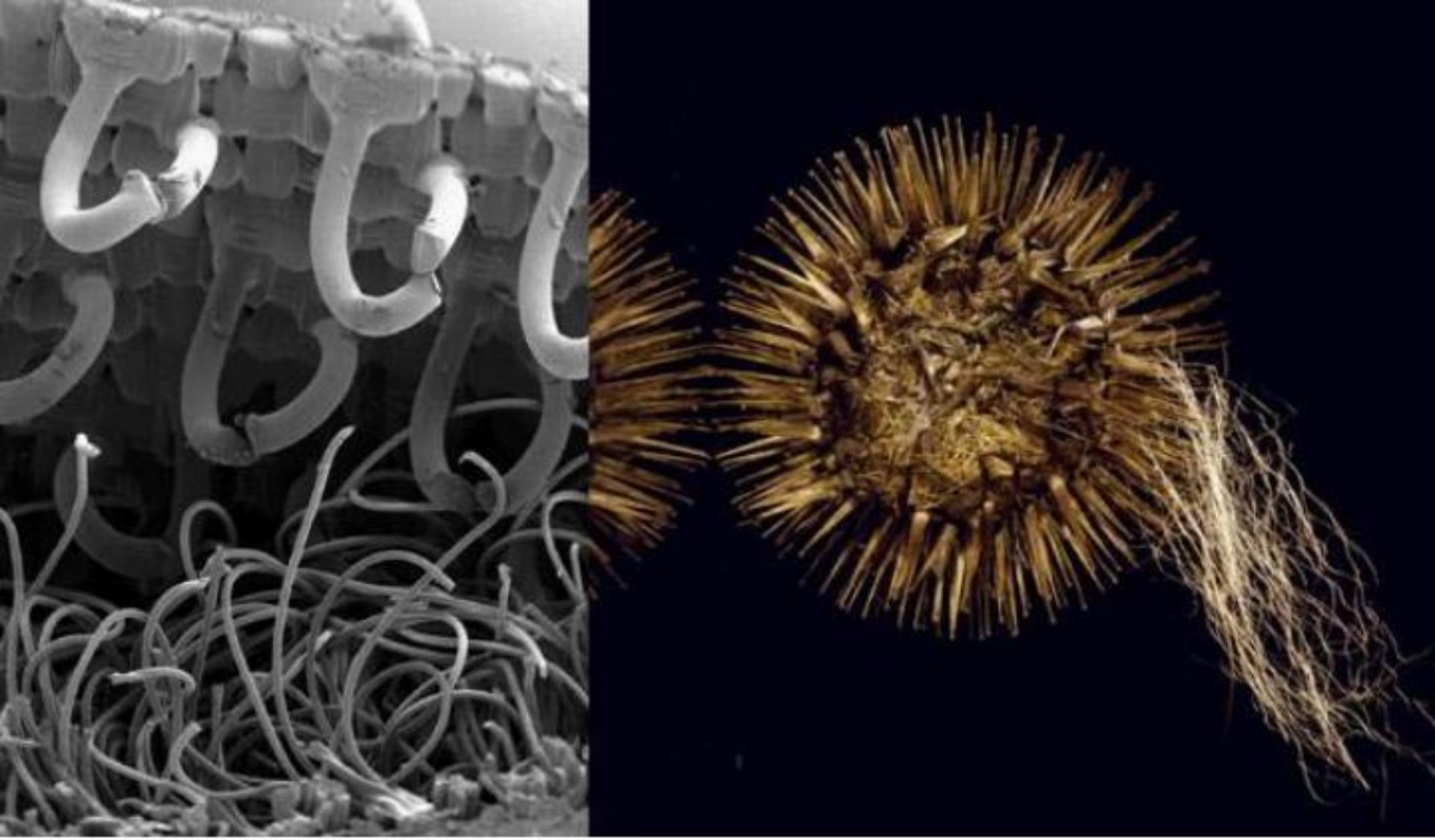
Hyperbola

Biomimicry Design by Nature

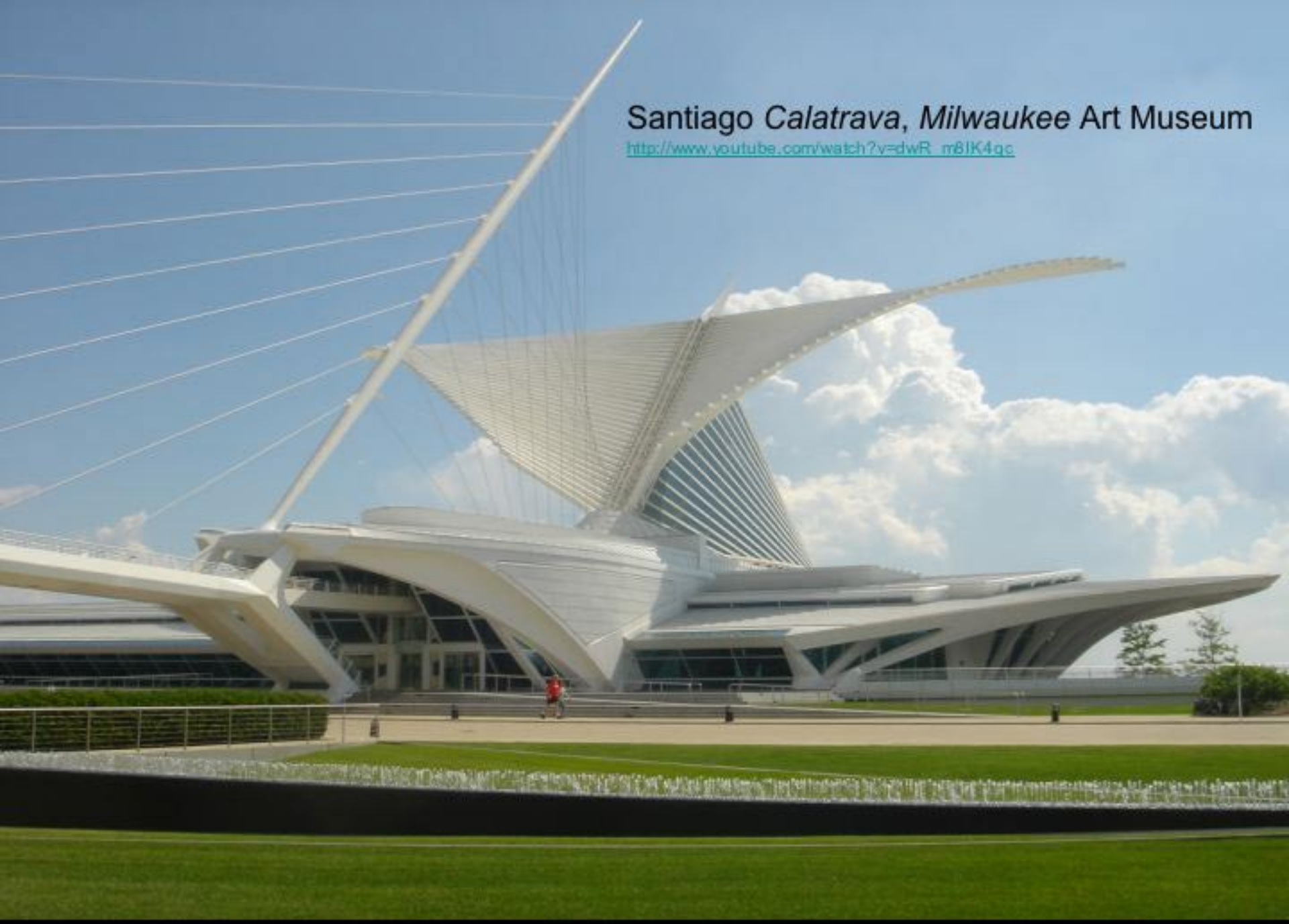
Mercedes Bionic Concept Car - Boxfish



Biomimicry researchers at Stanford, Harvard Universities modelling the **joint and leg structure** of the **cockroach** for the development of a **hexapedal running robot**.



Biomimicry Velcro - Burdock hooks -1948


Santiago *Calatrava*, *Milwaukee* Art Museum
http://www.youtube.com/watch?v=dwR_m8IK4gc

Gestalt (shape) principles of perception 1890

“things are better described as "more than the sum of their parts."

Symmetry

Similarity

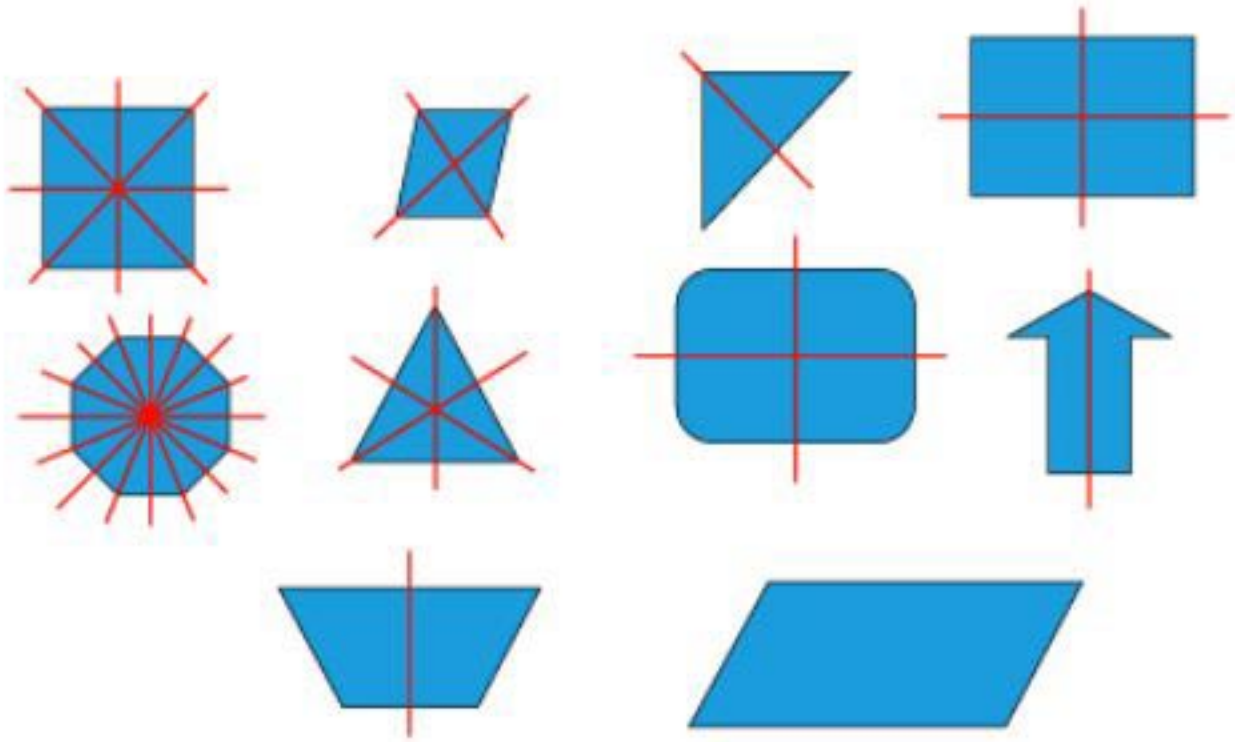
Proximity

Closure

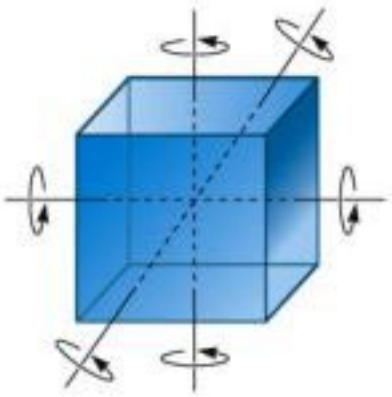
Symmetry

Symmetry is property of visual equivalence
among elements of form
There are three types of symmetry

Reflection Rotation Translation

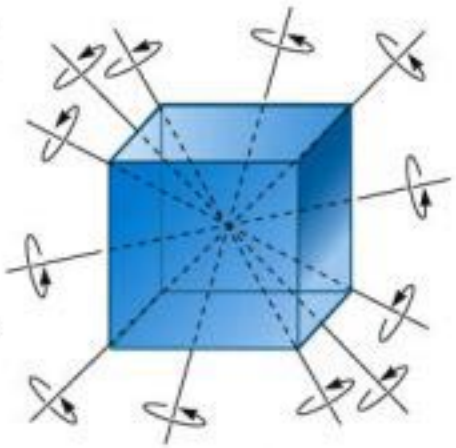


Symmetry

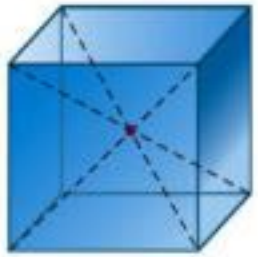


Three 4-fold axes

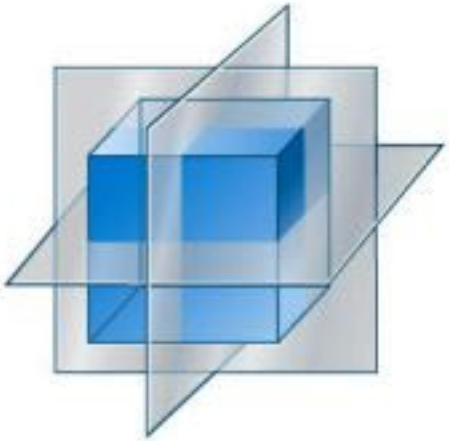
Four 3-fold axes

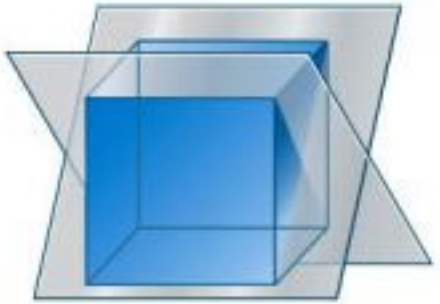


Six 2-fold axes



Center of inversion





Similarity

Elements that are similar are perceived to be more related than elements that are dissimilar

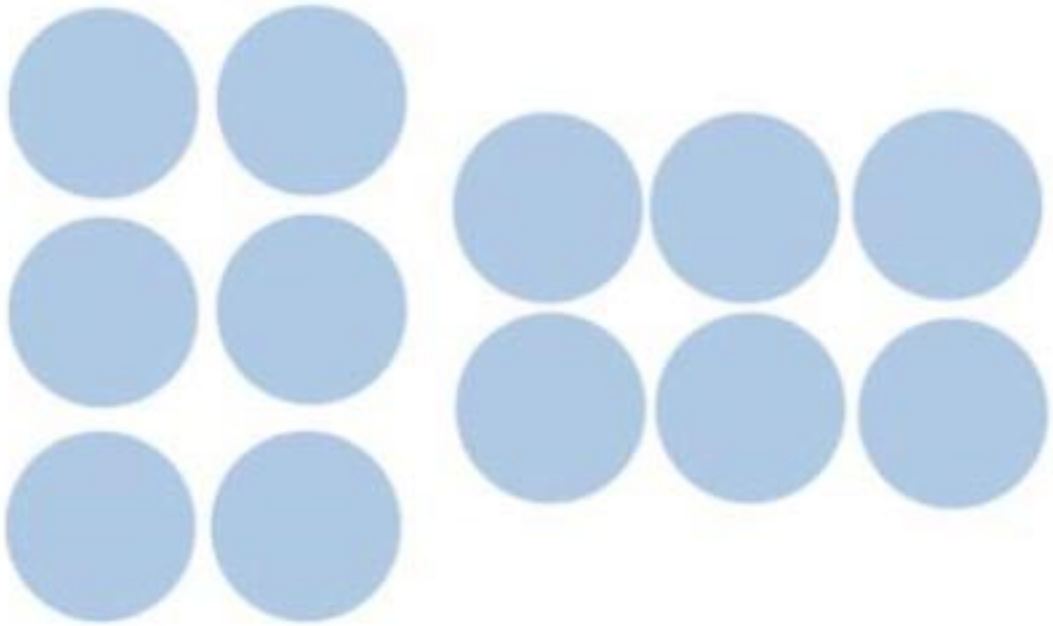
Elements that are similar are perceived as being part of a group

Lack of symmetry results in the perception of multiple, disprete groups

Use similarity to indicate relatedness amongst elements in design

Proximity

Elements that are closer together are perceived as being more related than elements that are further apart

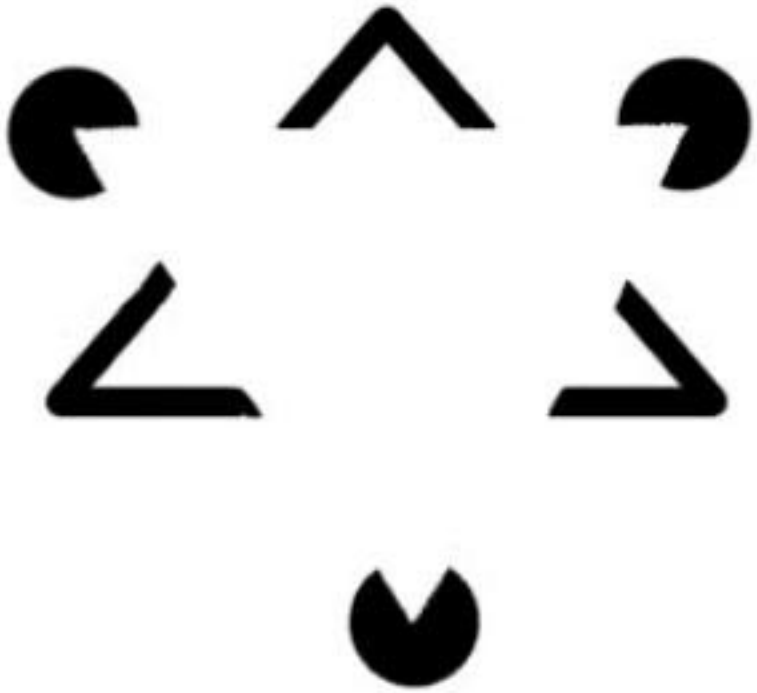


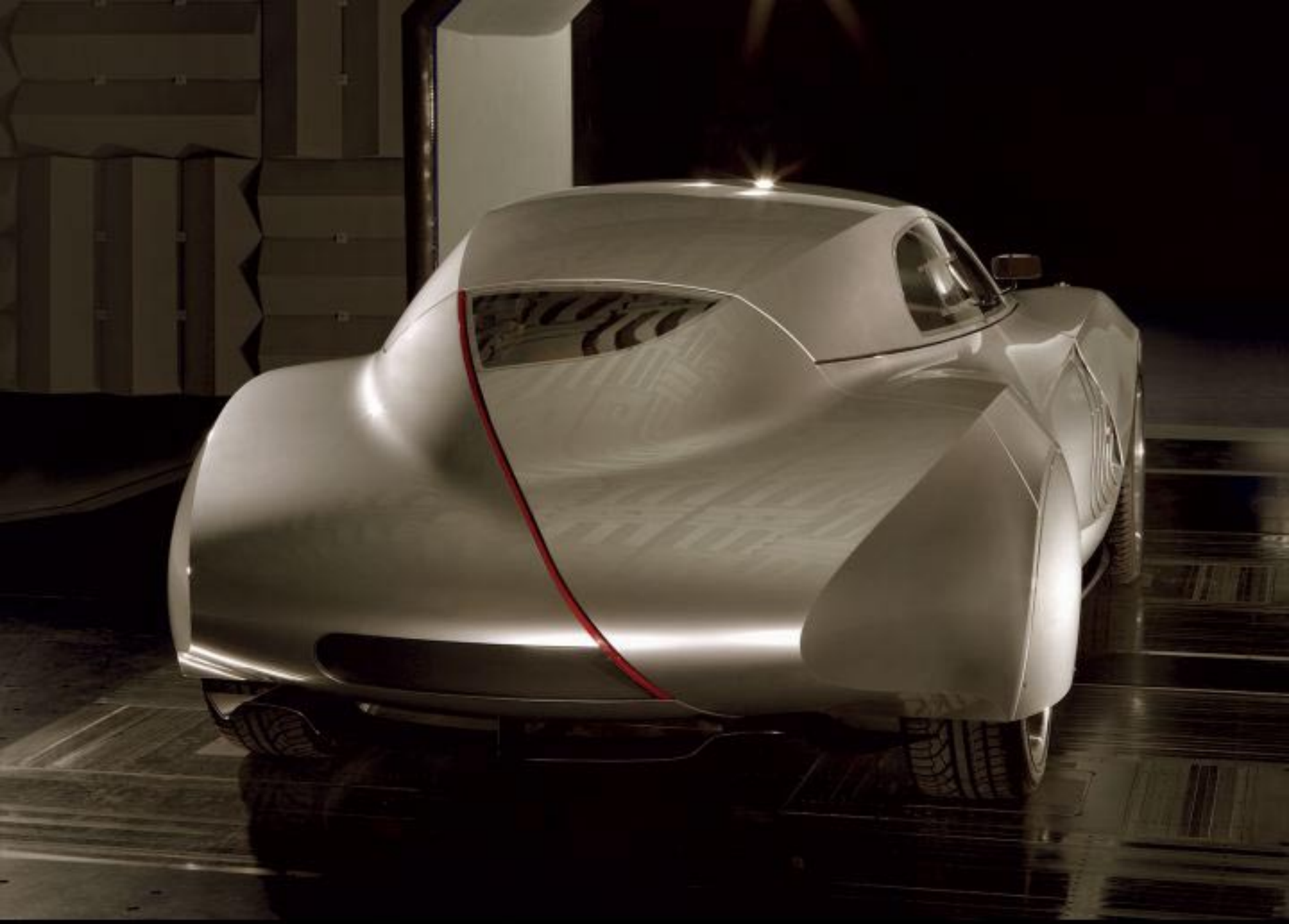
Daniel Libeskind

Performing Arts Centre
Grand Canal Square

Closure

Elements grouped together are seen as a whole. We tend to complete contour lines





Formal Literacy

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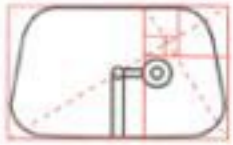
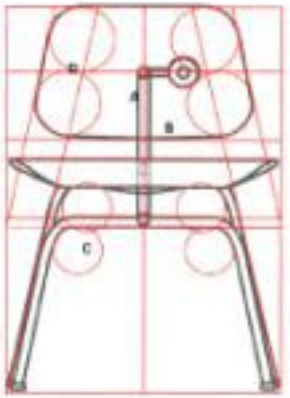
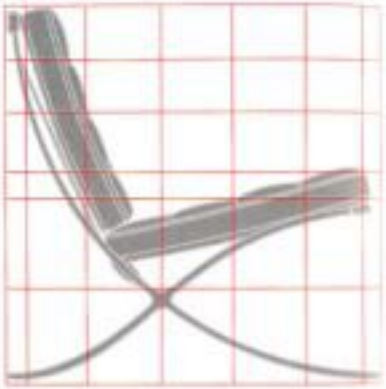
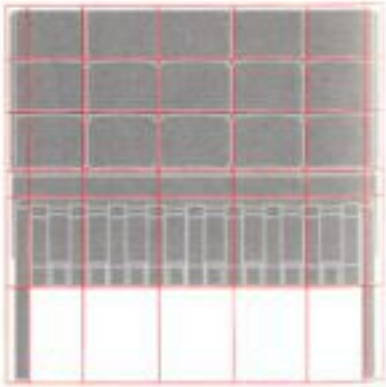
Golden Section – Charles Eames 1946

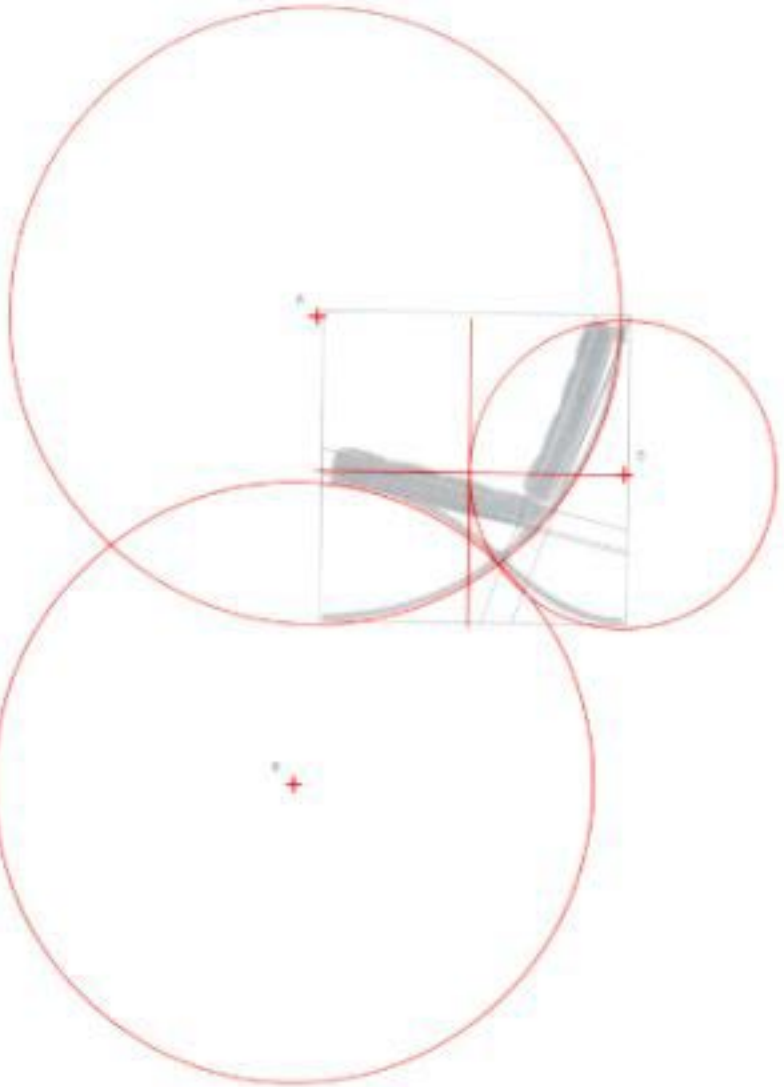




Barcelona Chair Mies van der Rohe 1929



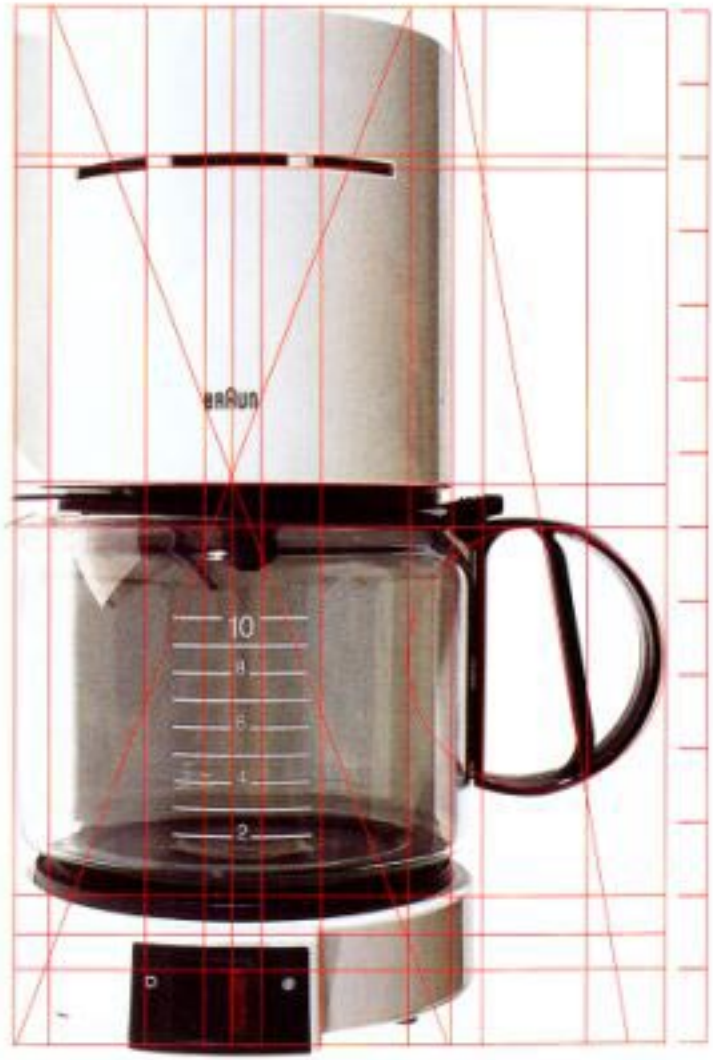




Chair Proportions (right)
The chair side view (top right) as well as front view (bottom right) fit perfectly into a square. The divisions of the back cushion approximate small root 2 rectangles.

Braun Radio 1959

Braun Coffee Maker 1975



Dieter Rams - 10 Principles of 'good design'

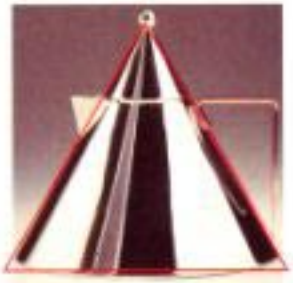
is innovative.
makes a product useful.
is aesthetic.
helps us to understand a product.
is unobtrusive.
is honest.
is durable.
is consequent to the last detail.
is concerned with the environment.
is as little design as possible.

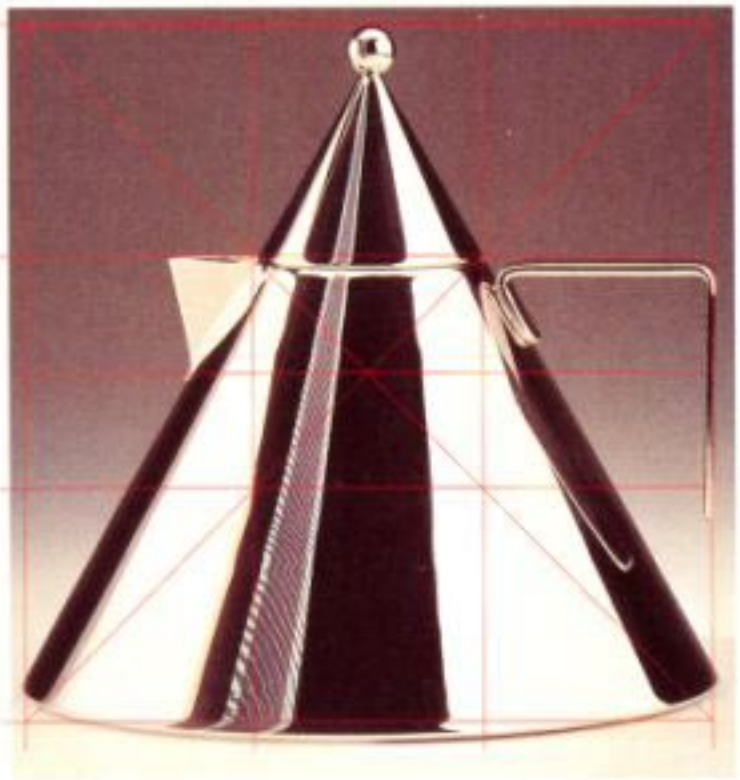
iPod - Generation 1

Sony flatscreen TV

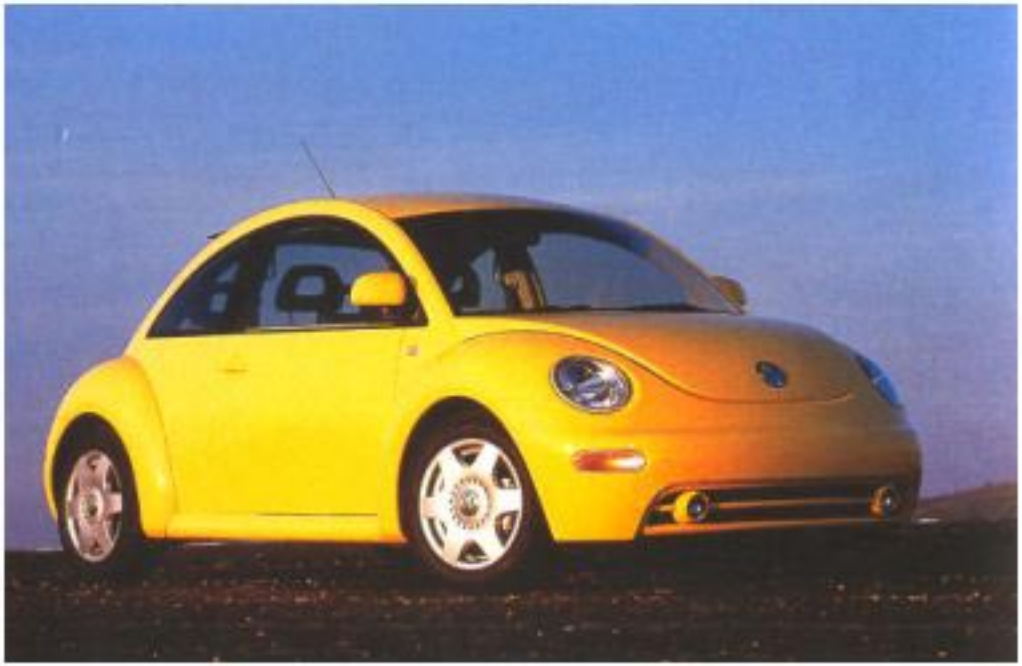
Daniel Libeskind - Spirit House Chair

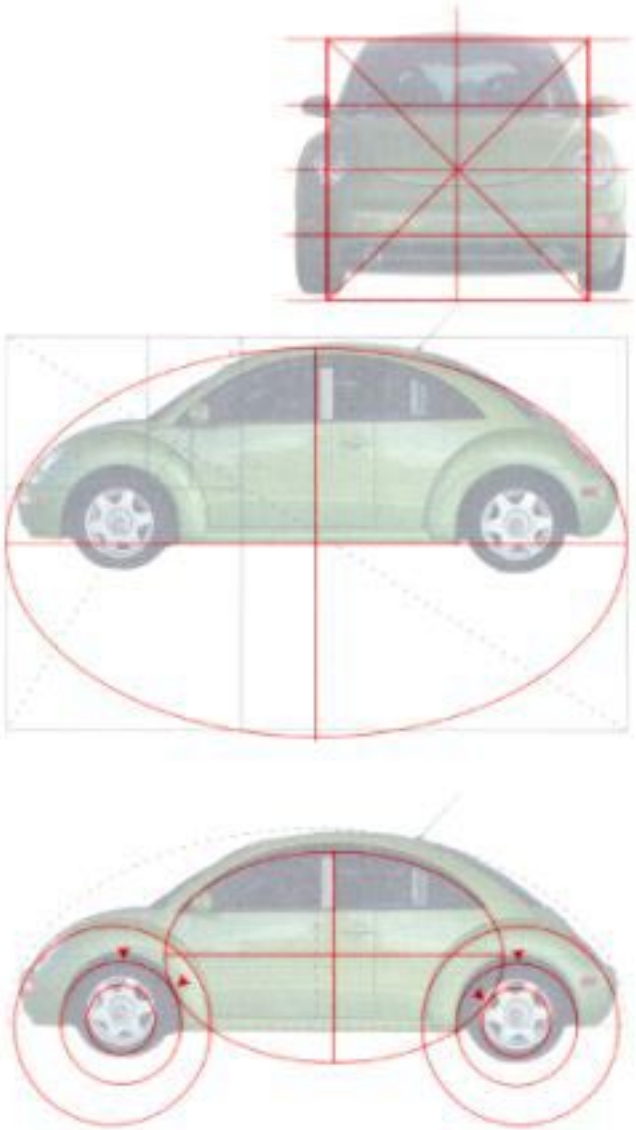
Aldo Rossi Kettle 1983





Golden Section - VW Beetle 1997





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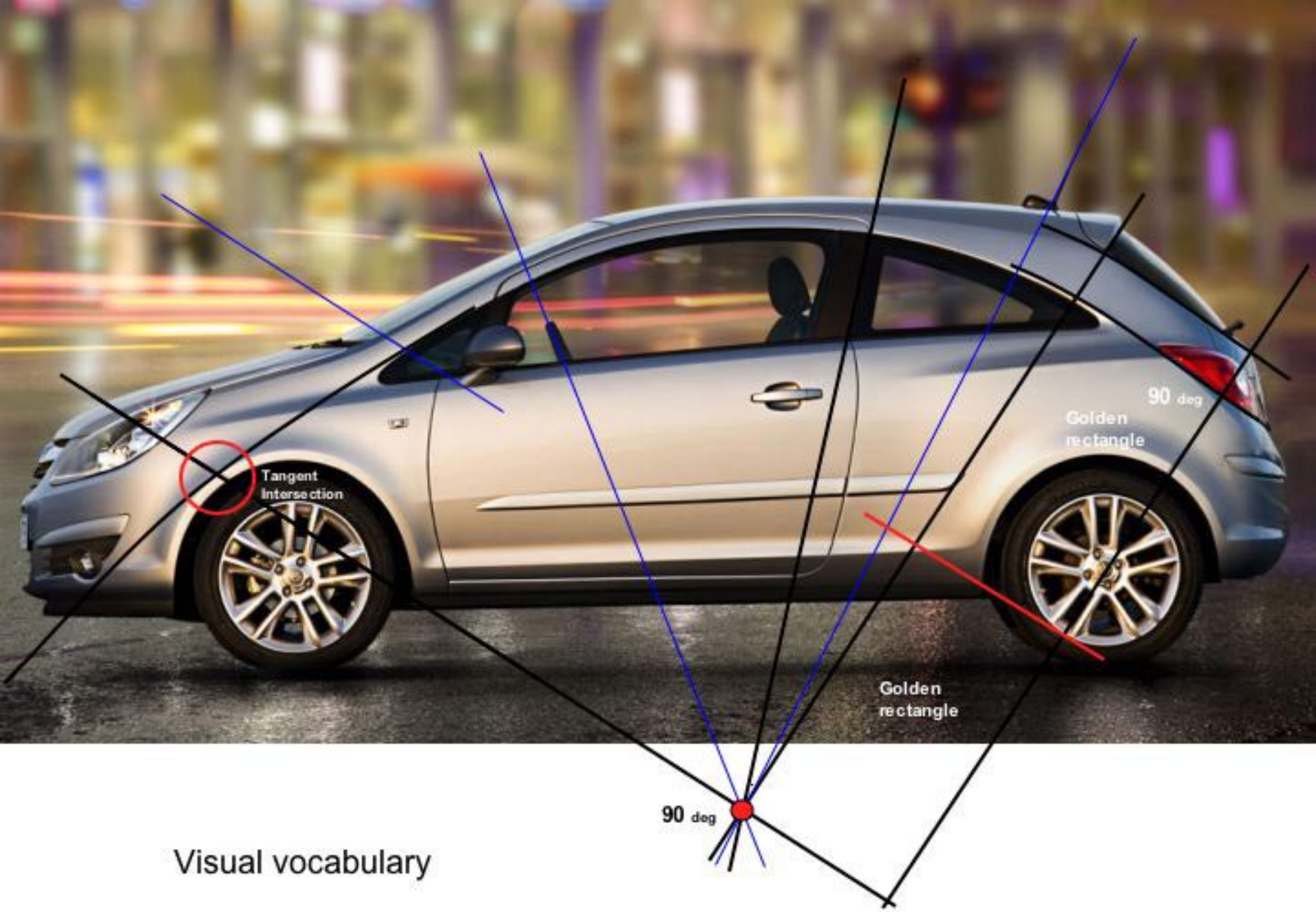
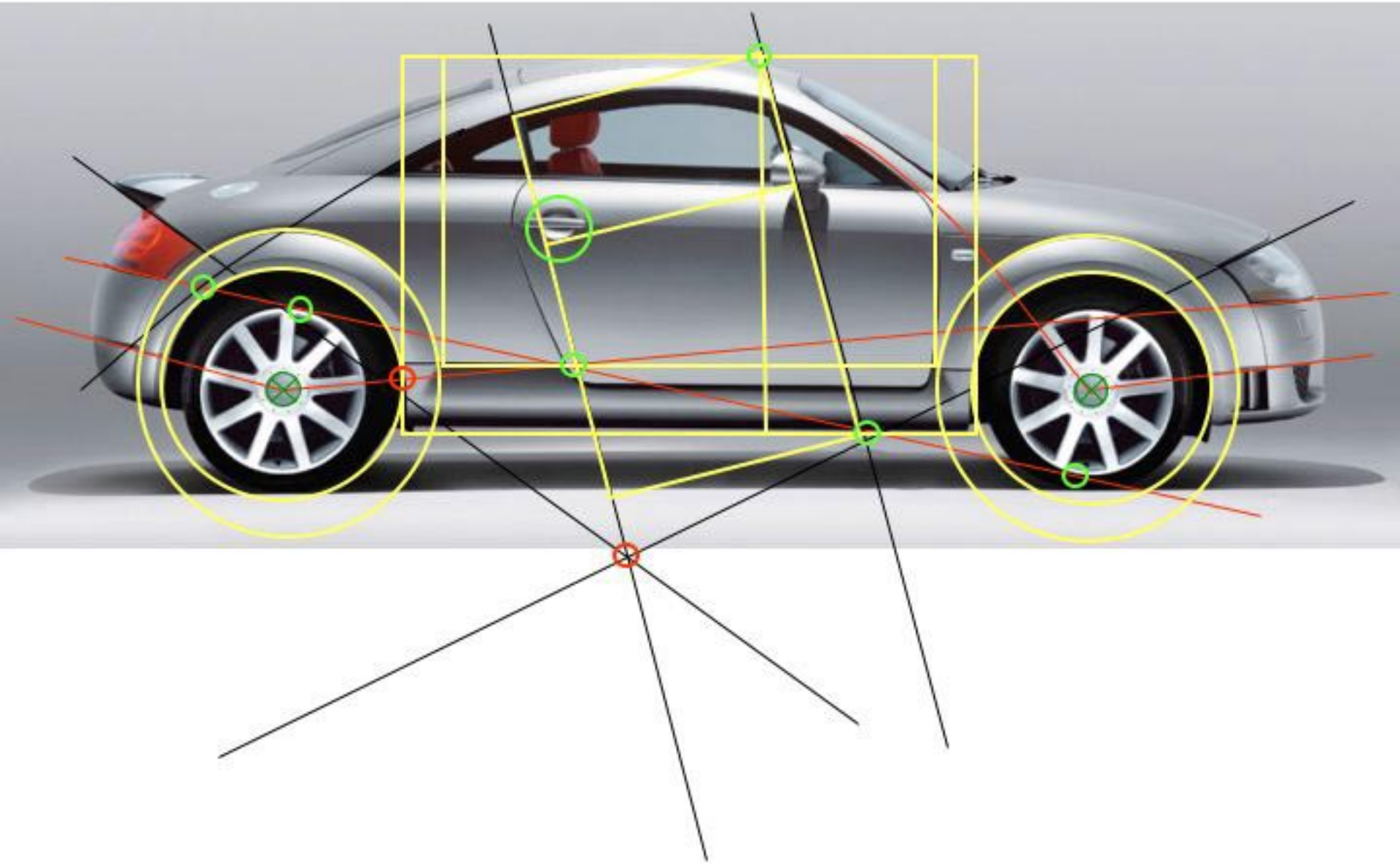
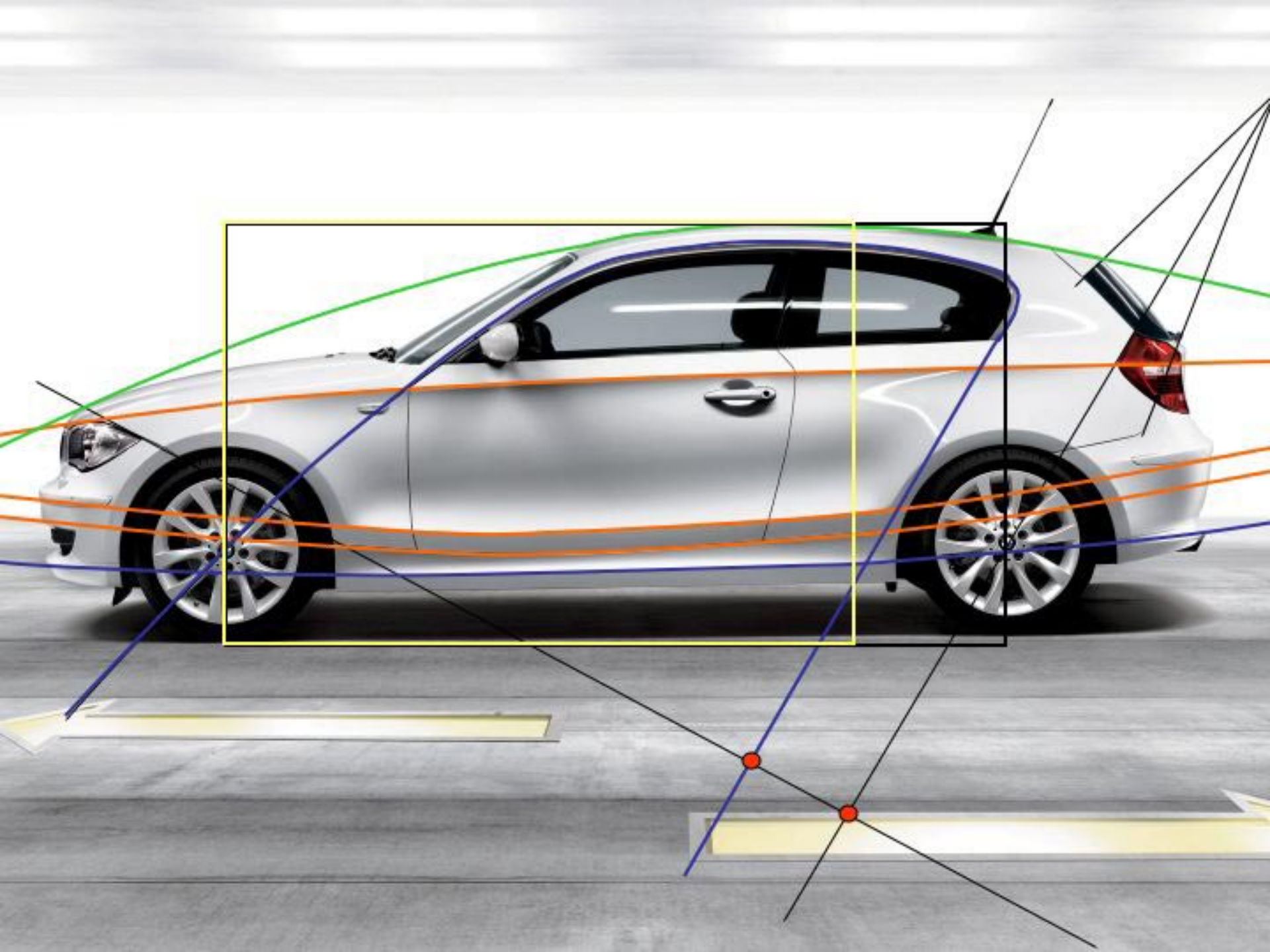
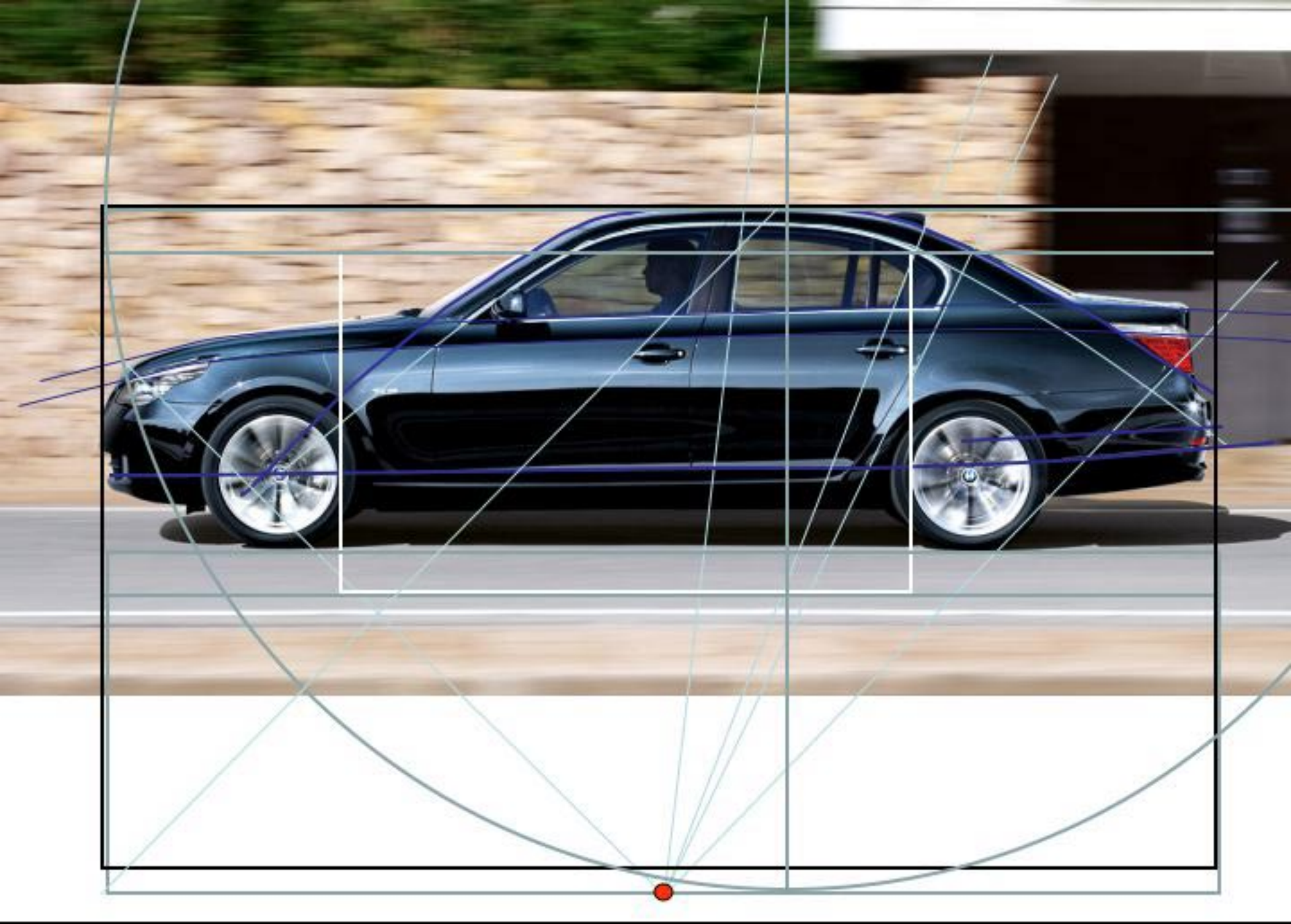


Visual vocabulary



Visual vocabulary





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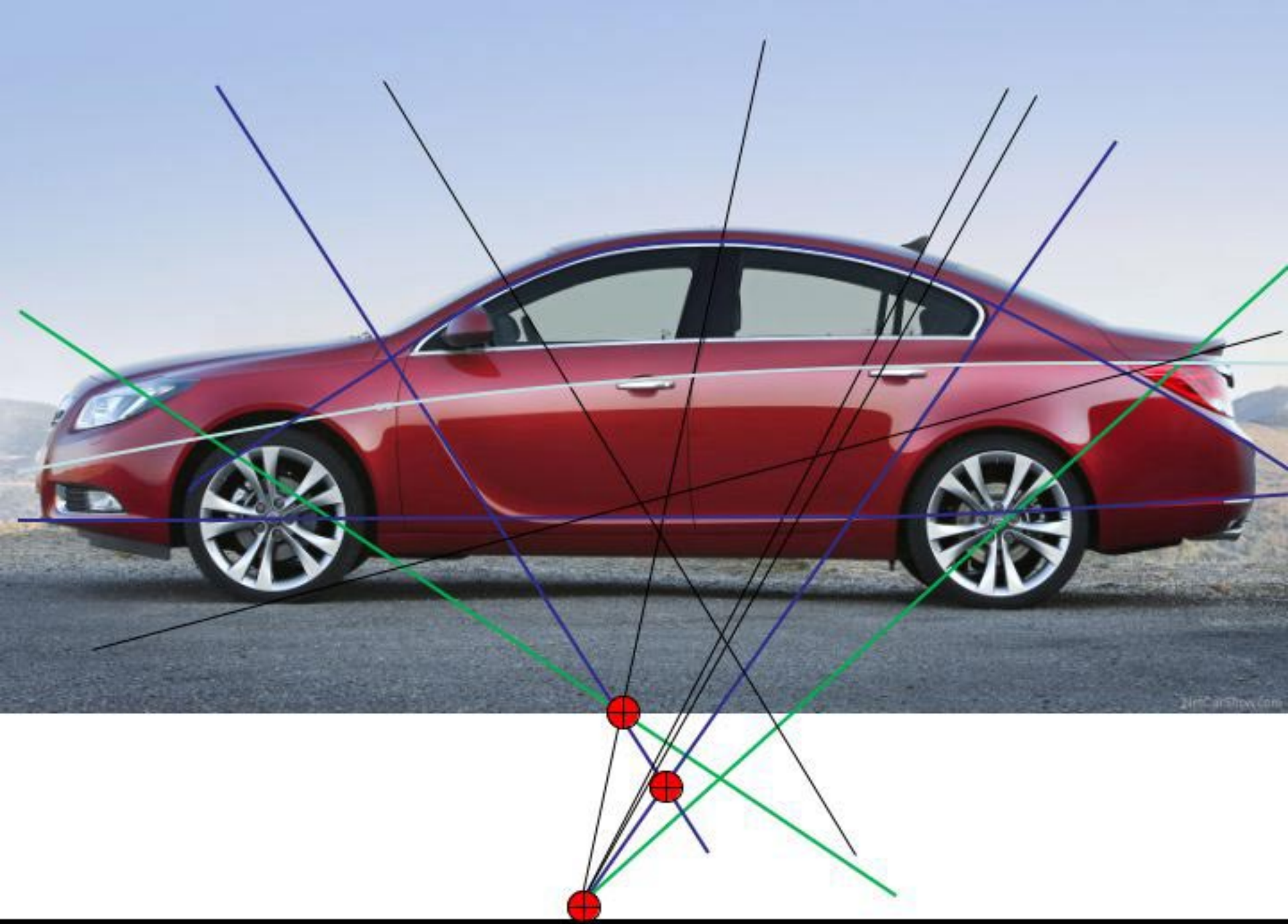
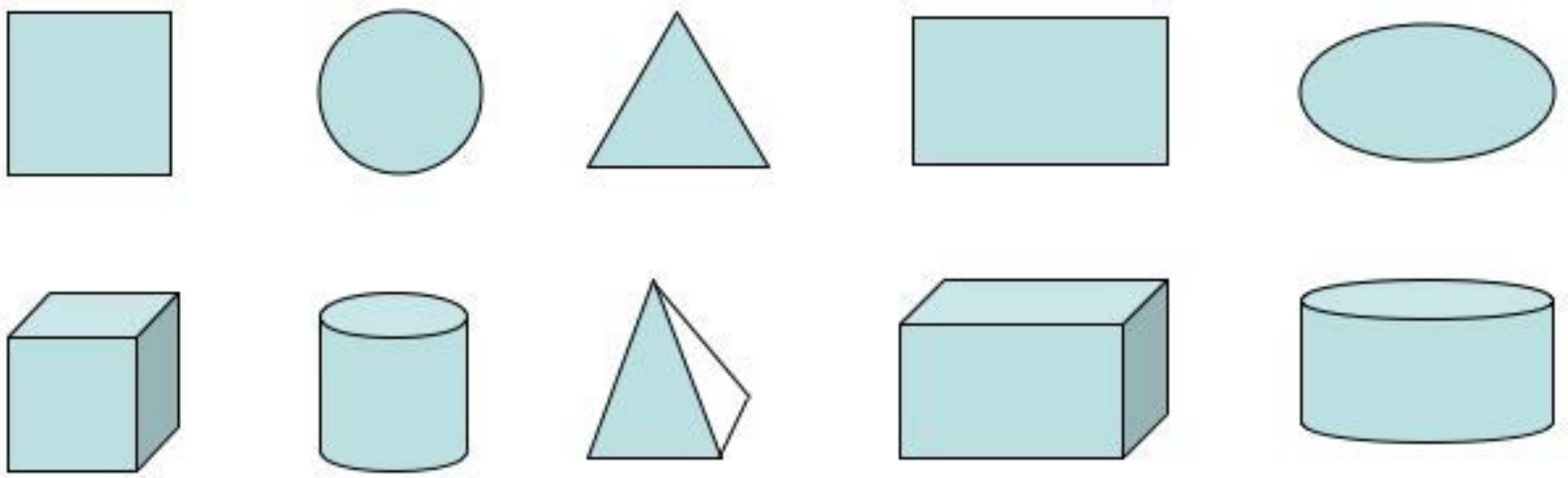


Formal LIteracy YEAR 2 2009


Harald Klingelholler
Contemporary Arts Museum Portp 2007
'constructed linguistic expressions'

Formal Literacy Project

The project is devised to explore the relationships between a range of two-dimensional geometric objects. Out of this exploration, identify visually interesting patterns and three-dimensional structures. Construct an nonfunctional object which illustrates your most remarkable and attractive findings.



Aims

Stage 1

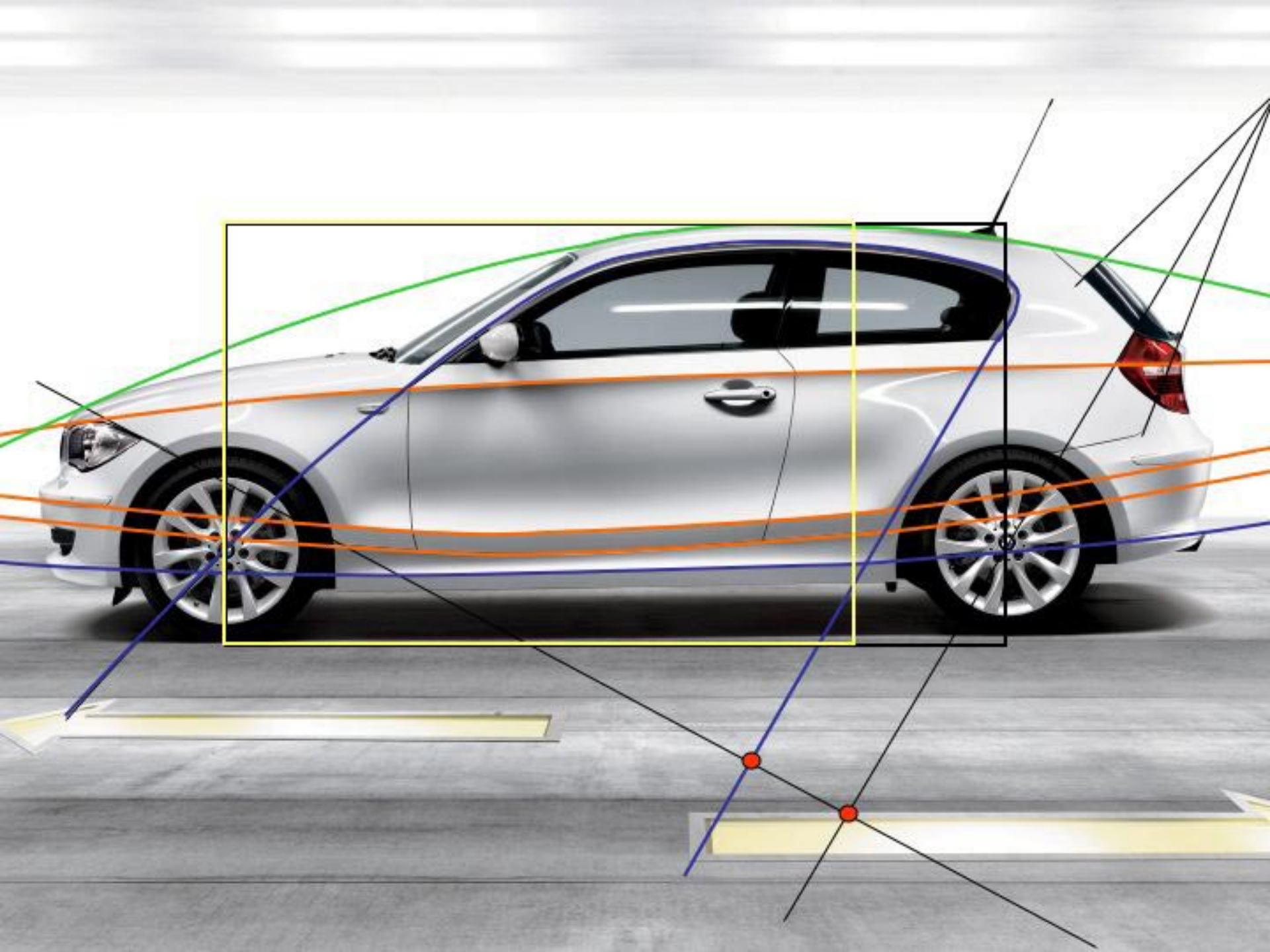
To study simple proportioning systems and apply them in three-dimensional structures

To explore three-dimensional forms resulting from a study of the relationship between geometric planes and solids

To see the form of an object as an expression of its components, its composition and its proportions

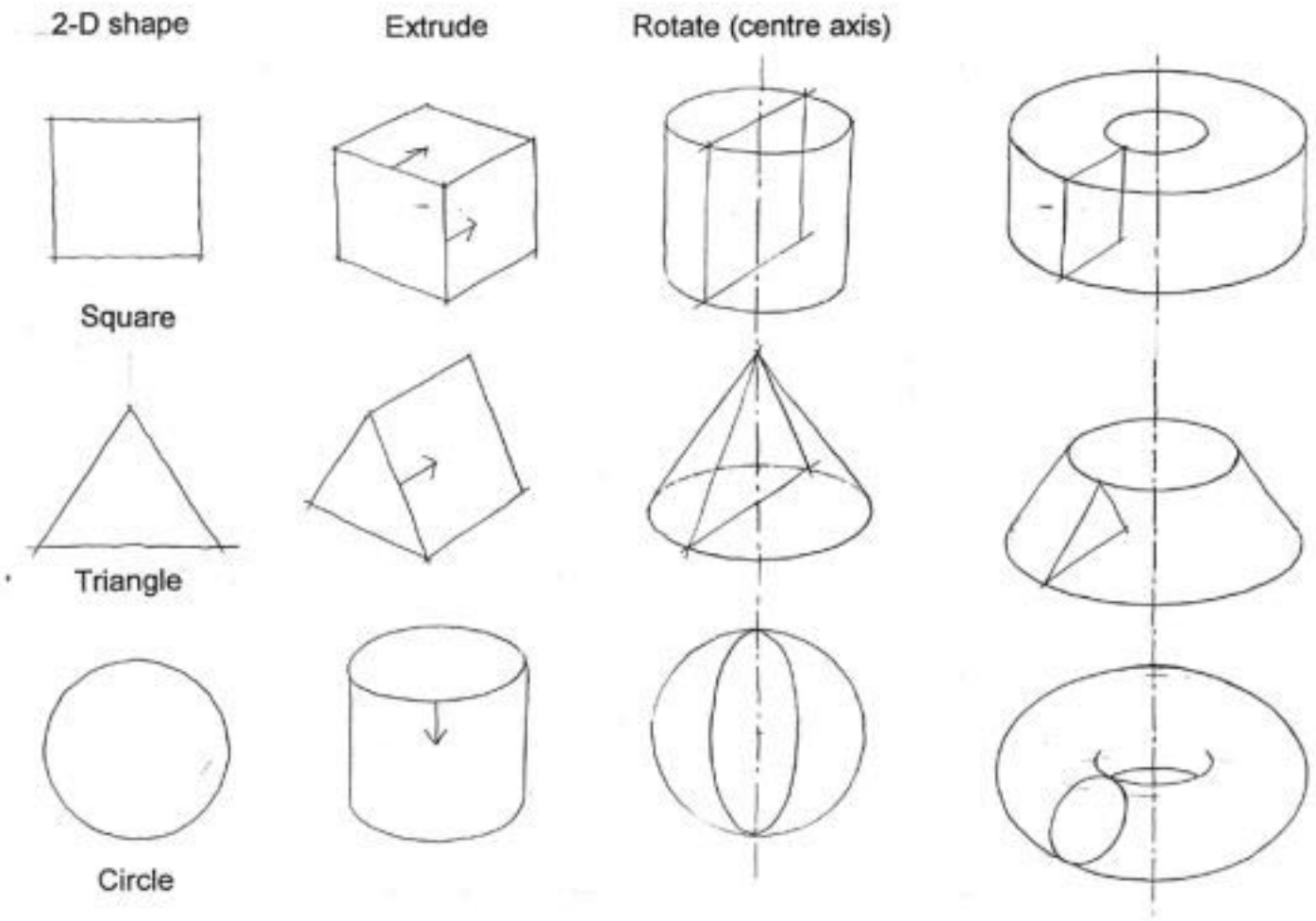
Stage 2

To apply this method in the design of a sample functional product

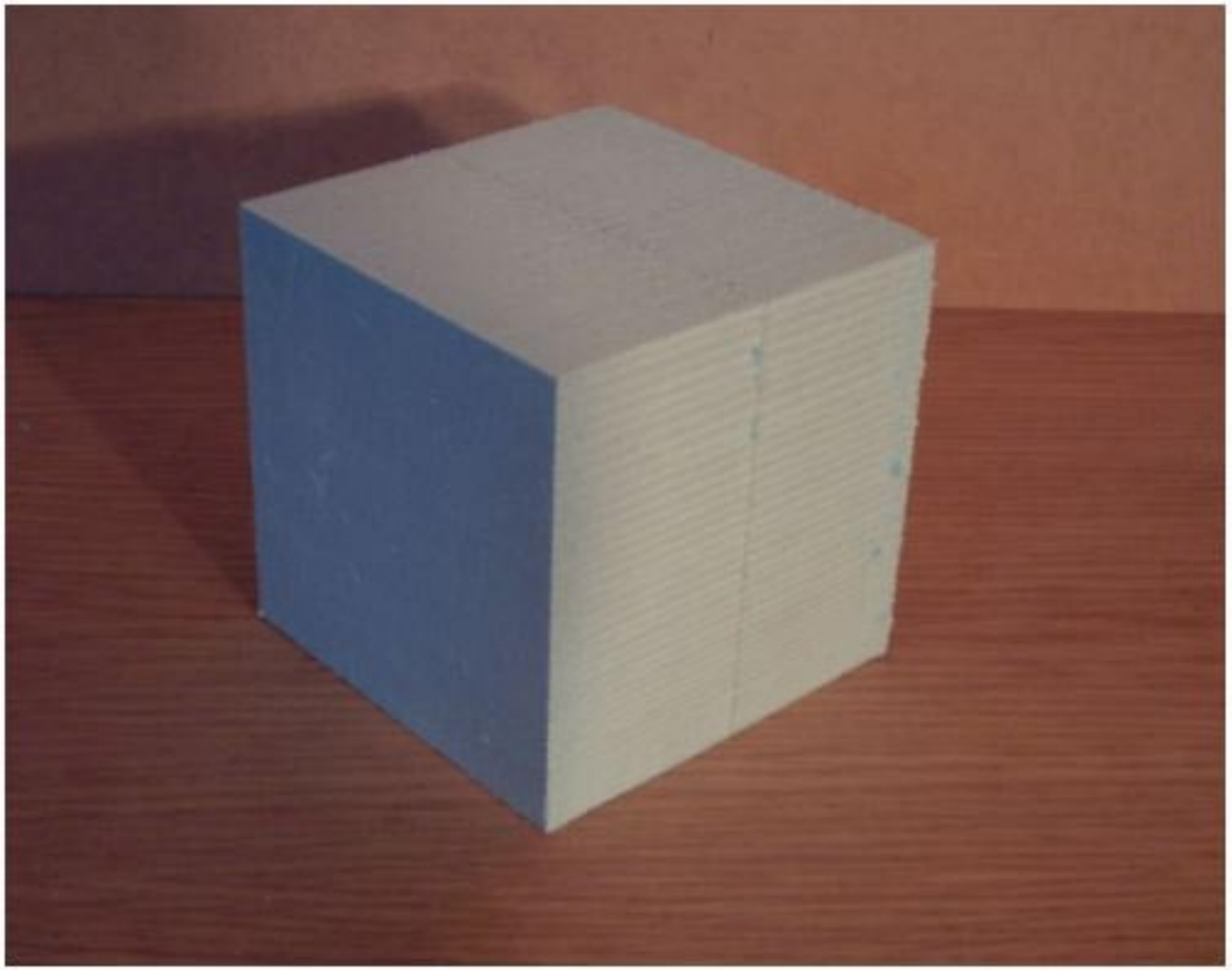


Structure

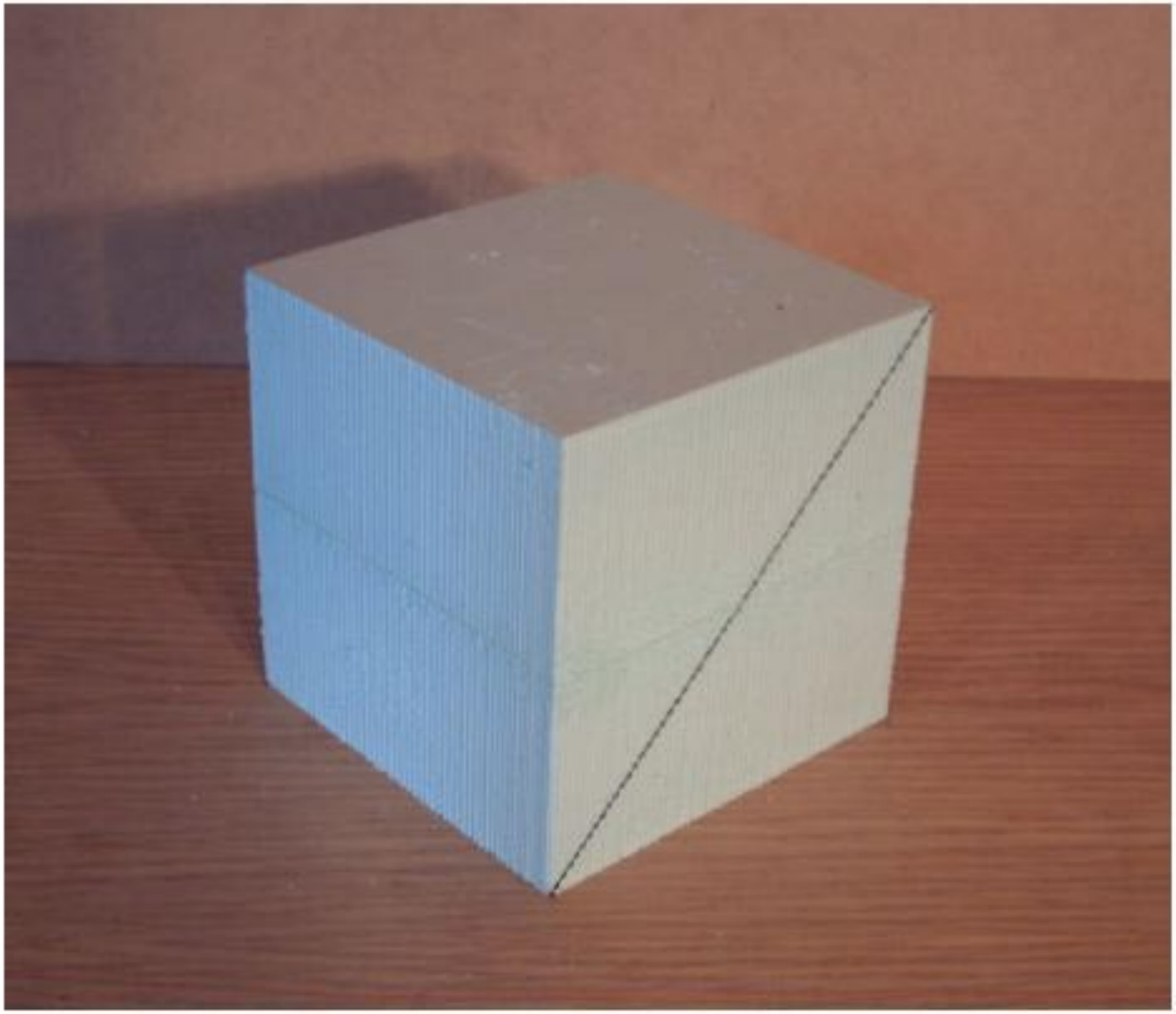
Generate 3-D geometric forms



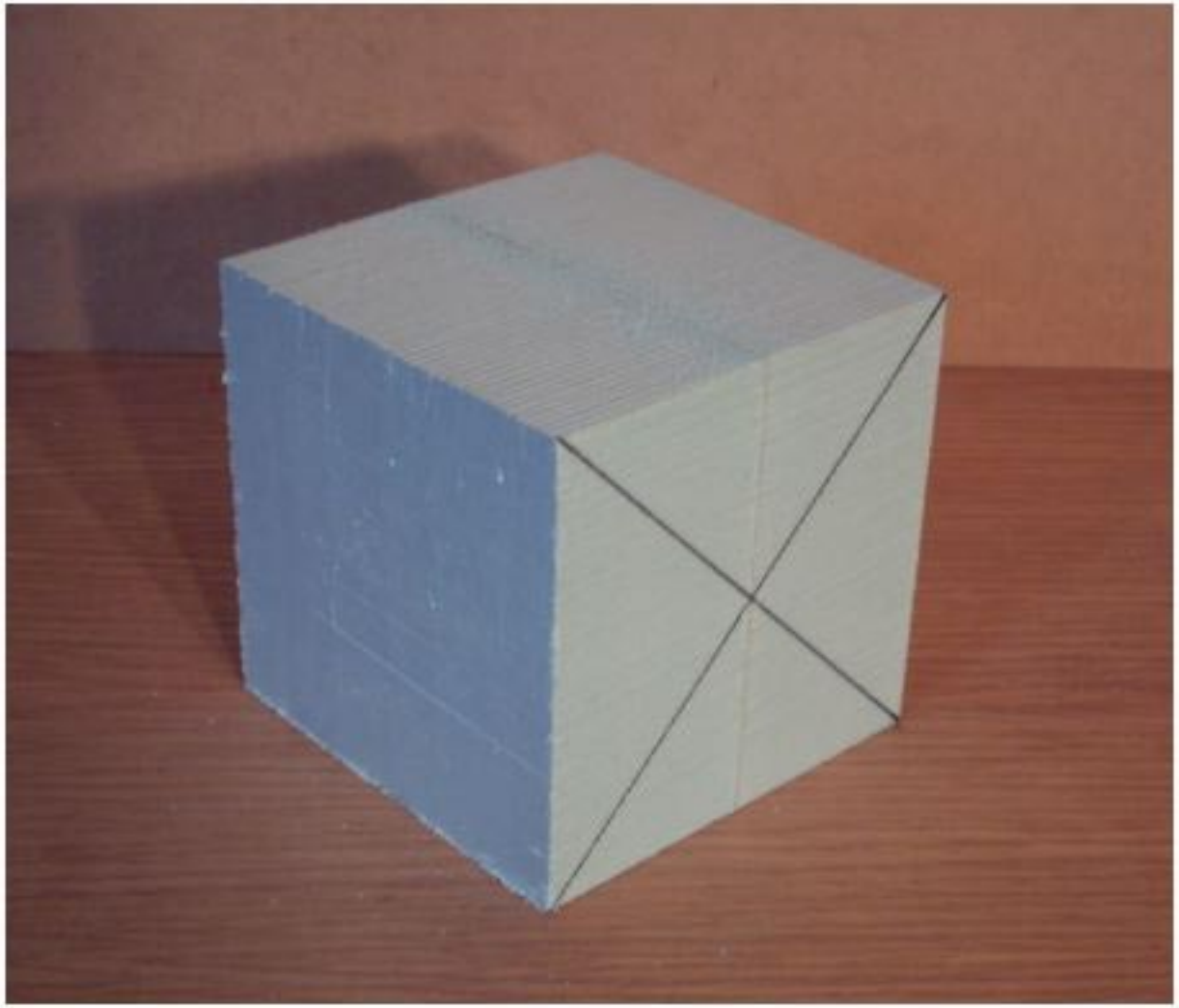
Solid 100mm Cube



Solid 100mm Cube - No 2



Solid 100mm Cube - No 3



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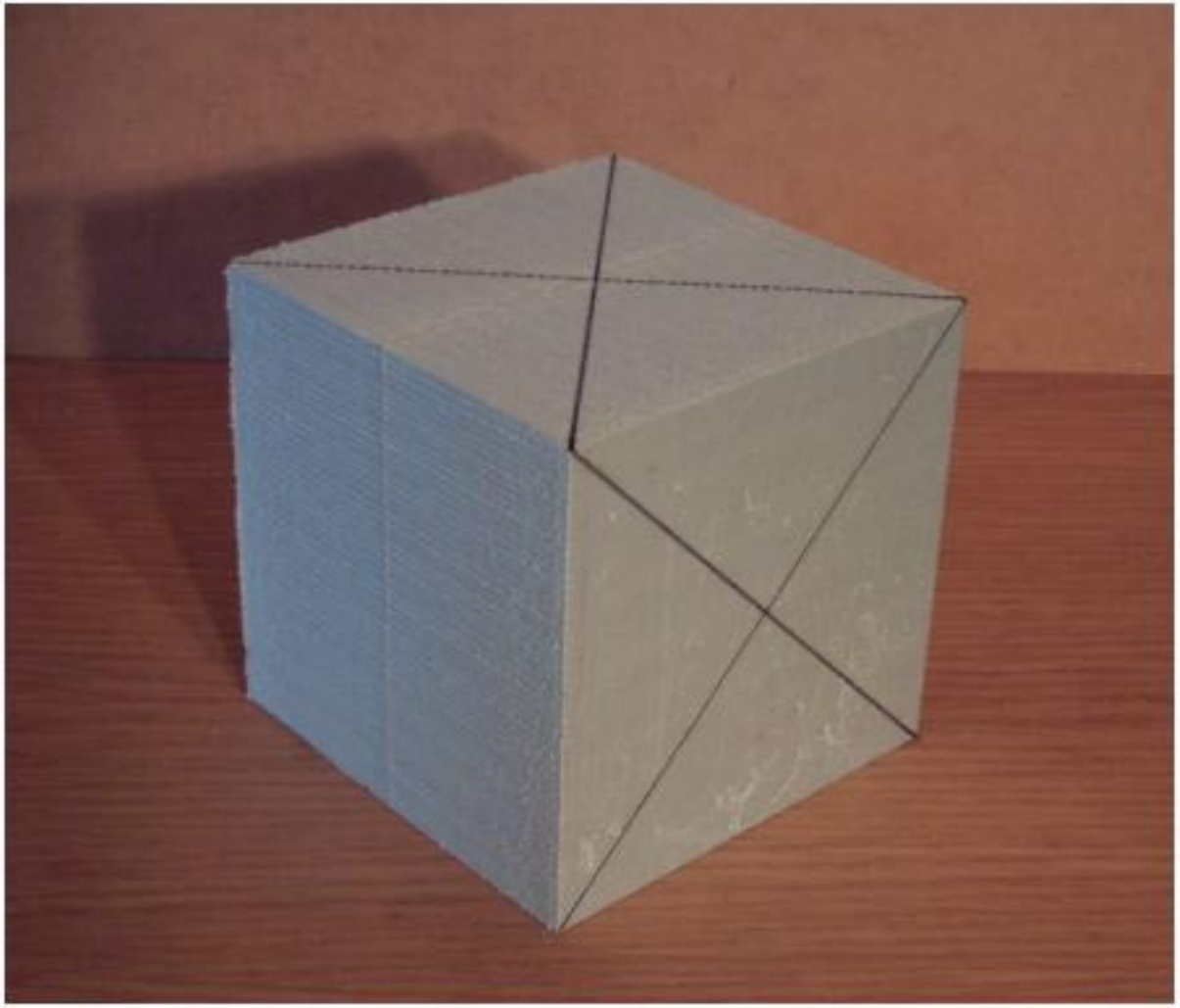

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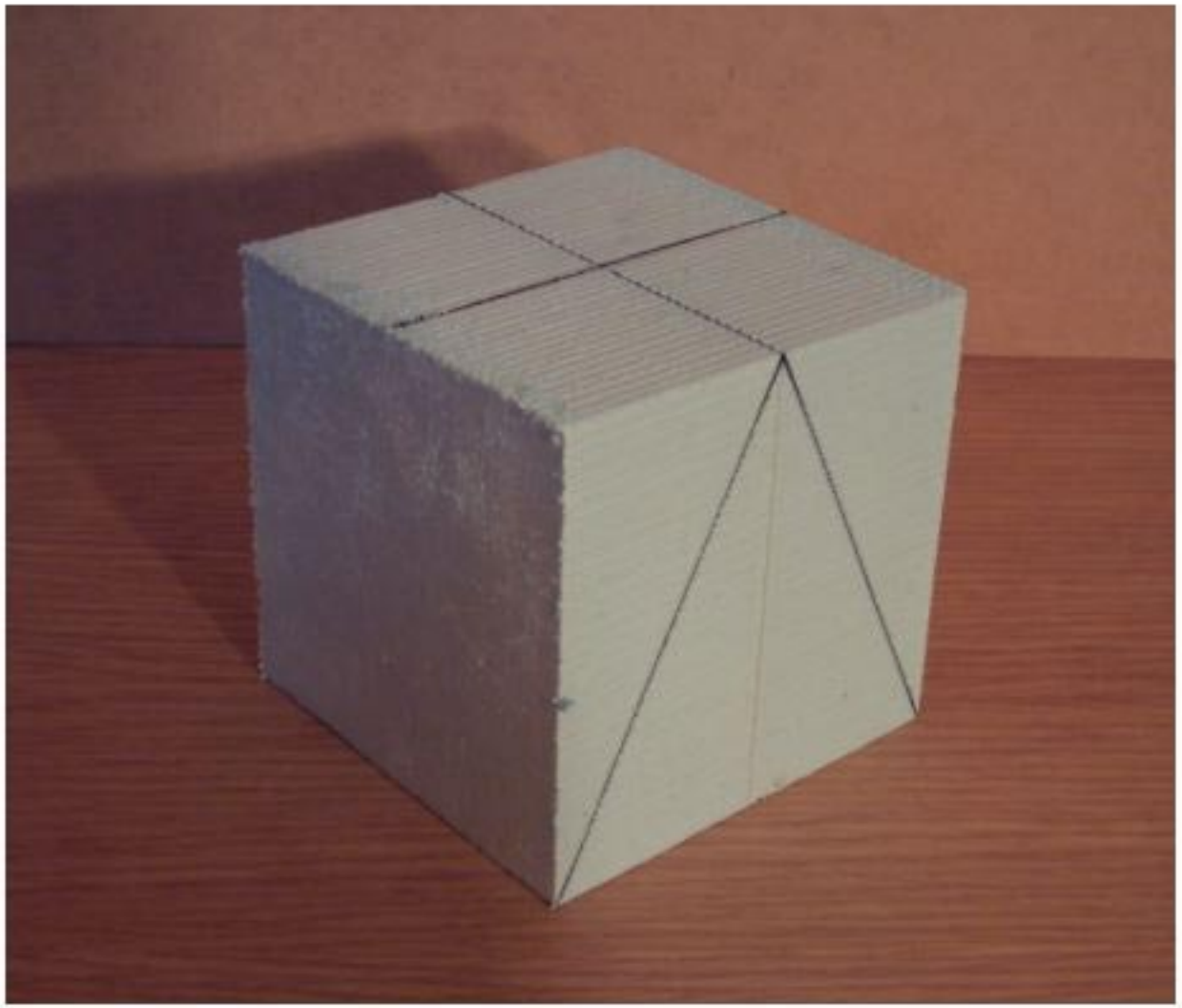
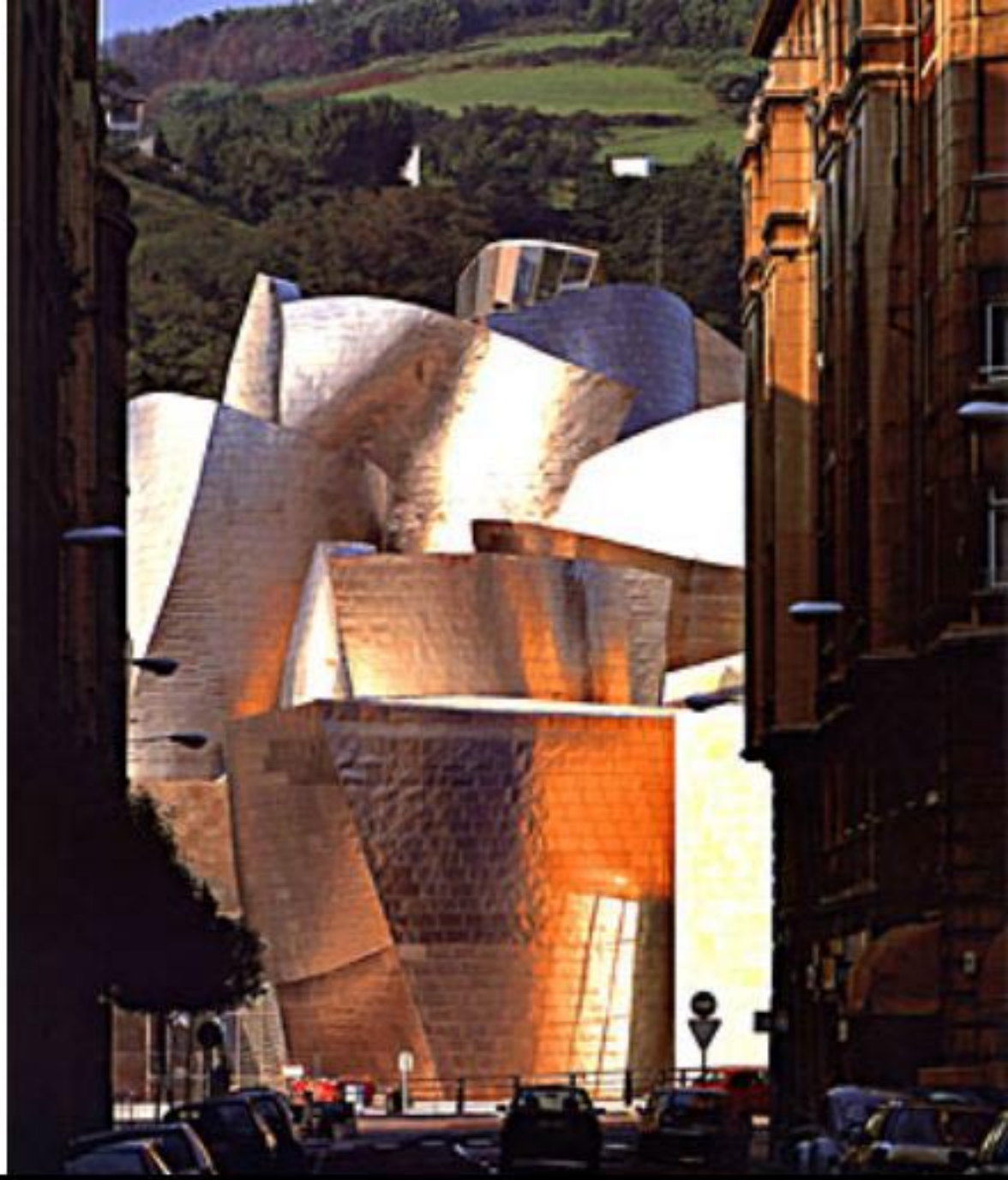


Frank Gehry's Guggenheim Bilbao



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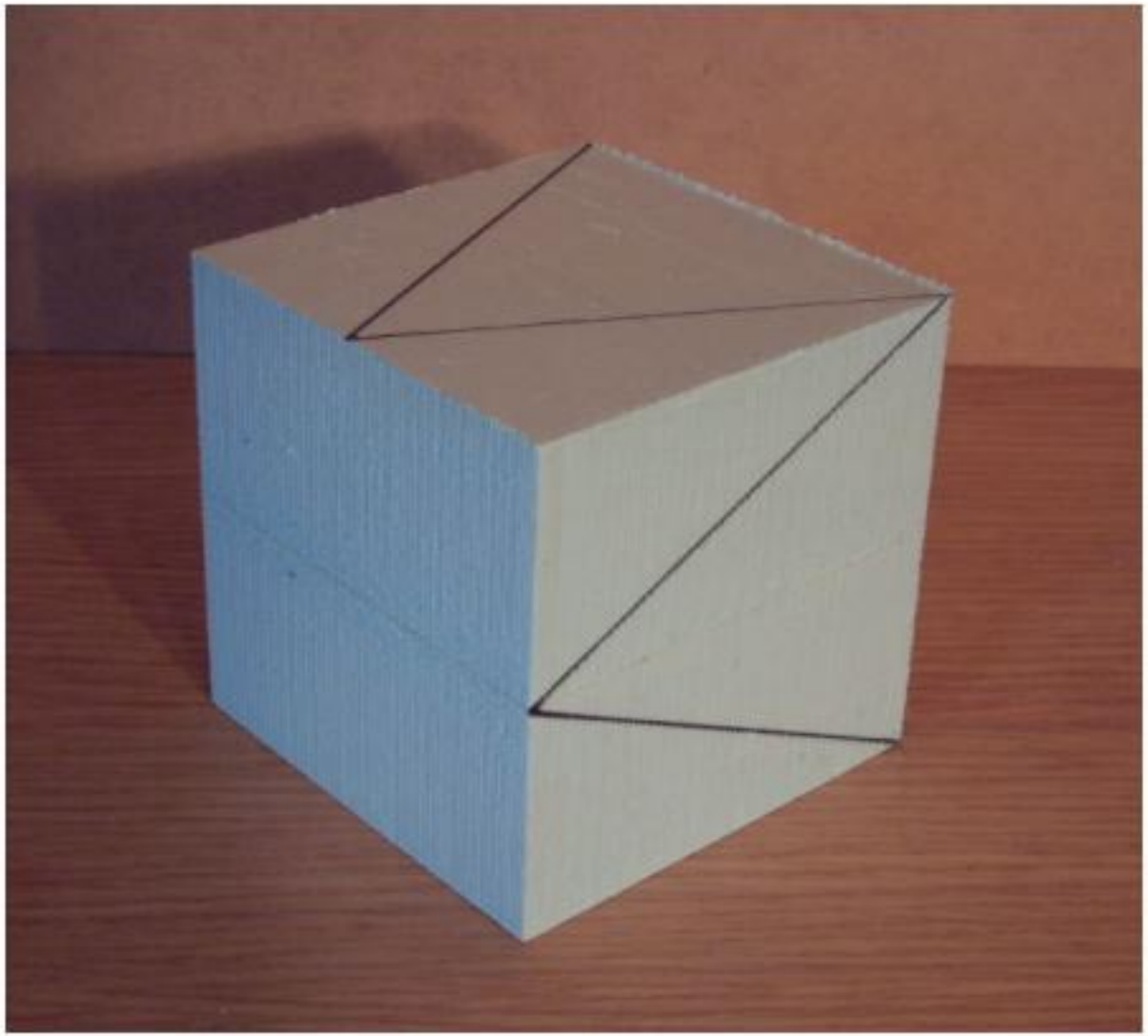

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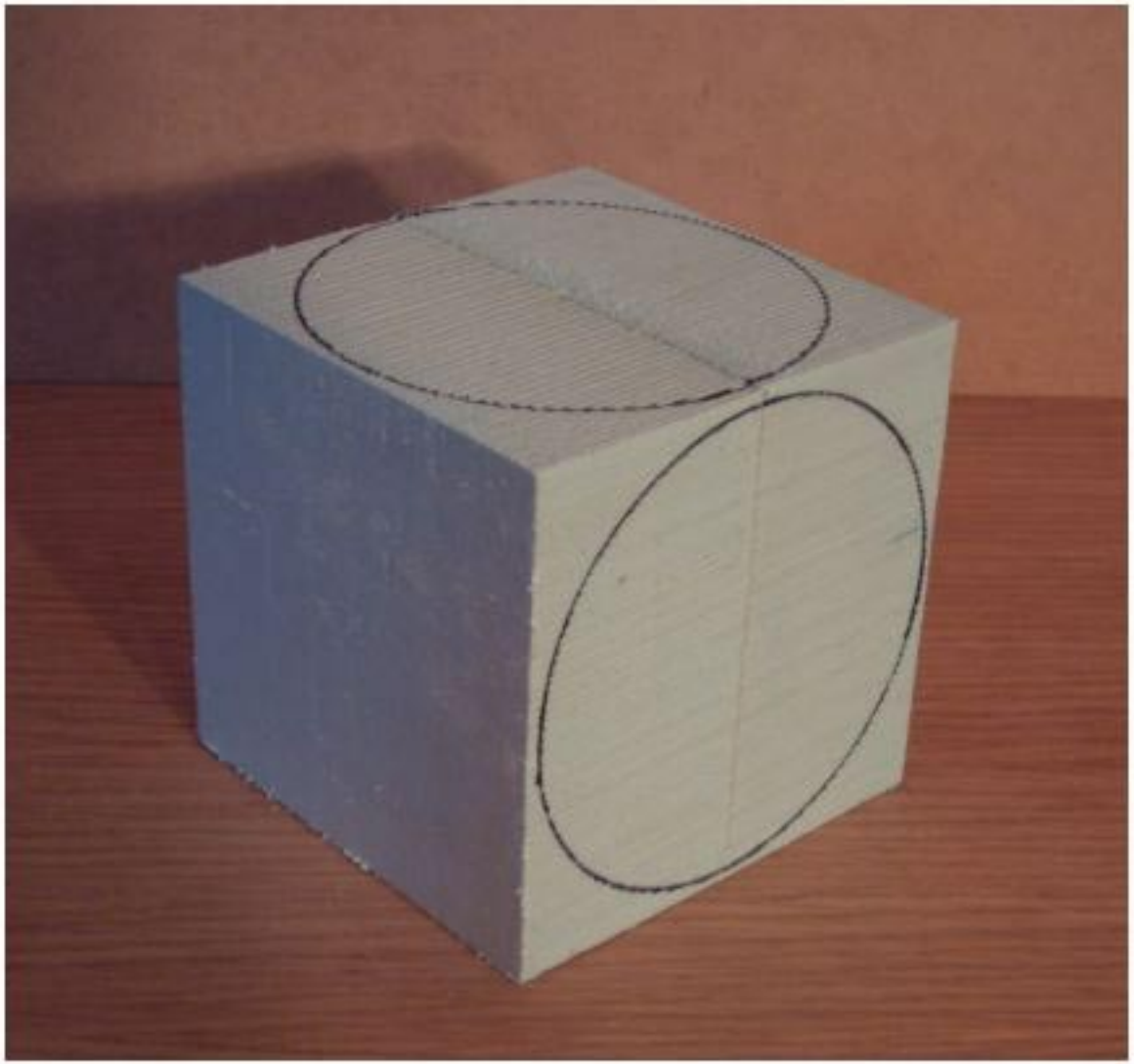

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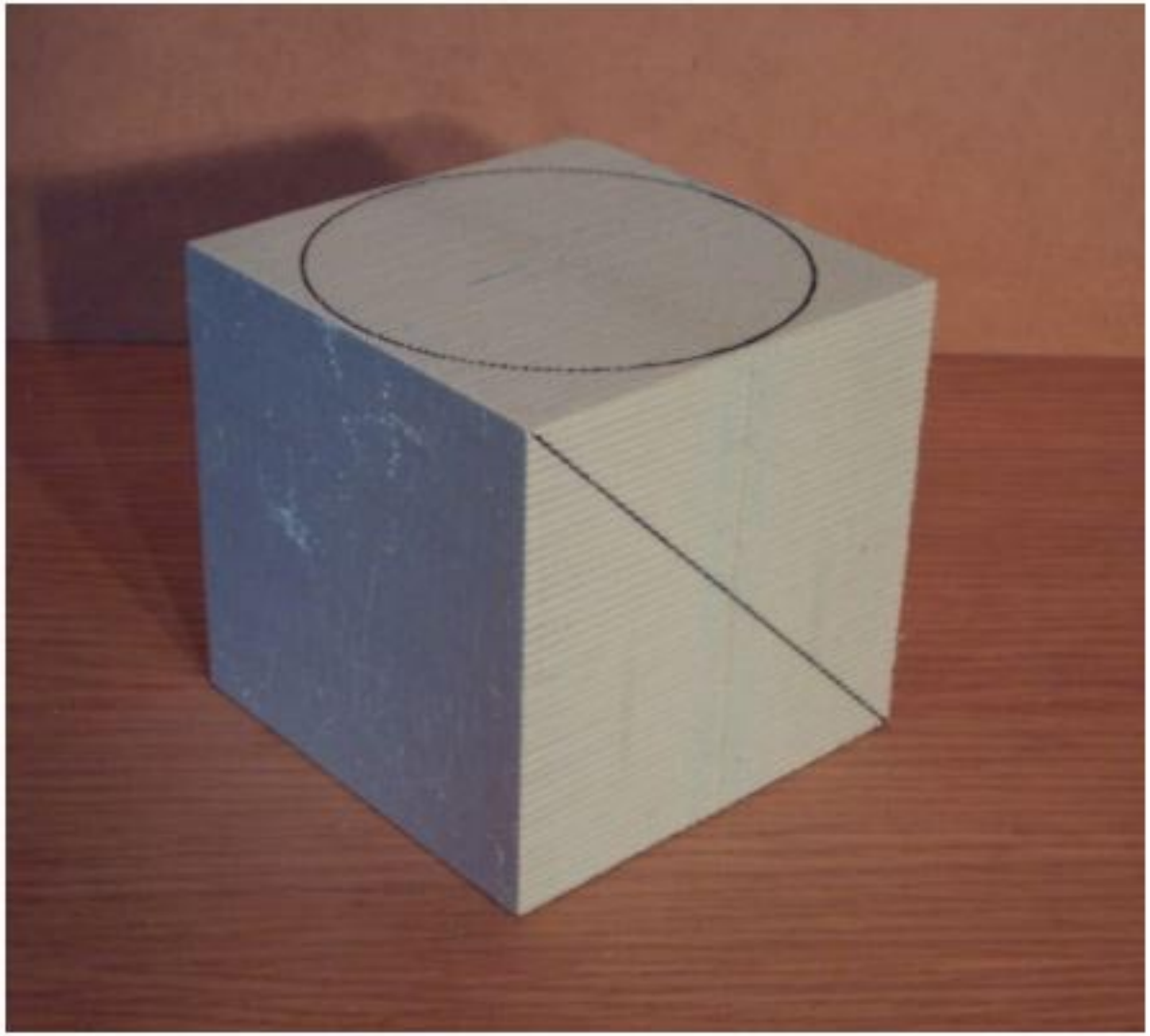

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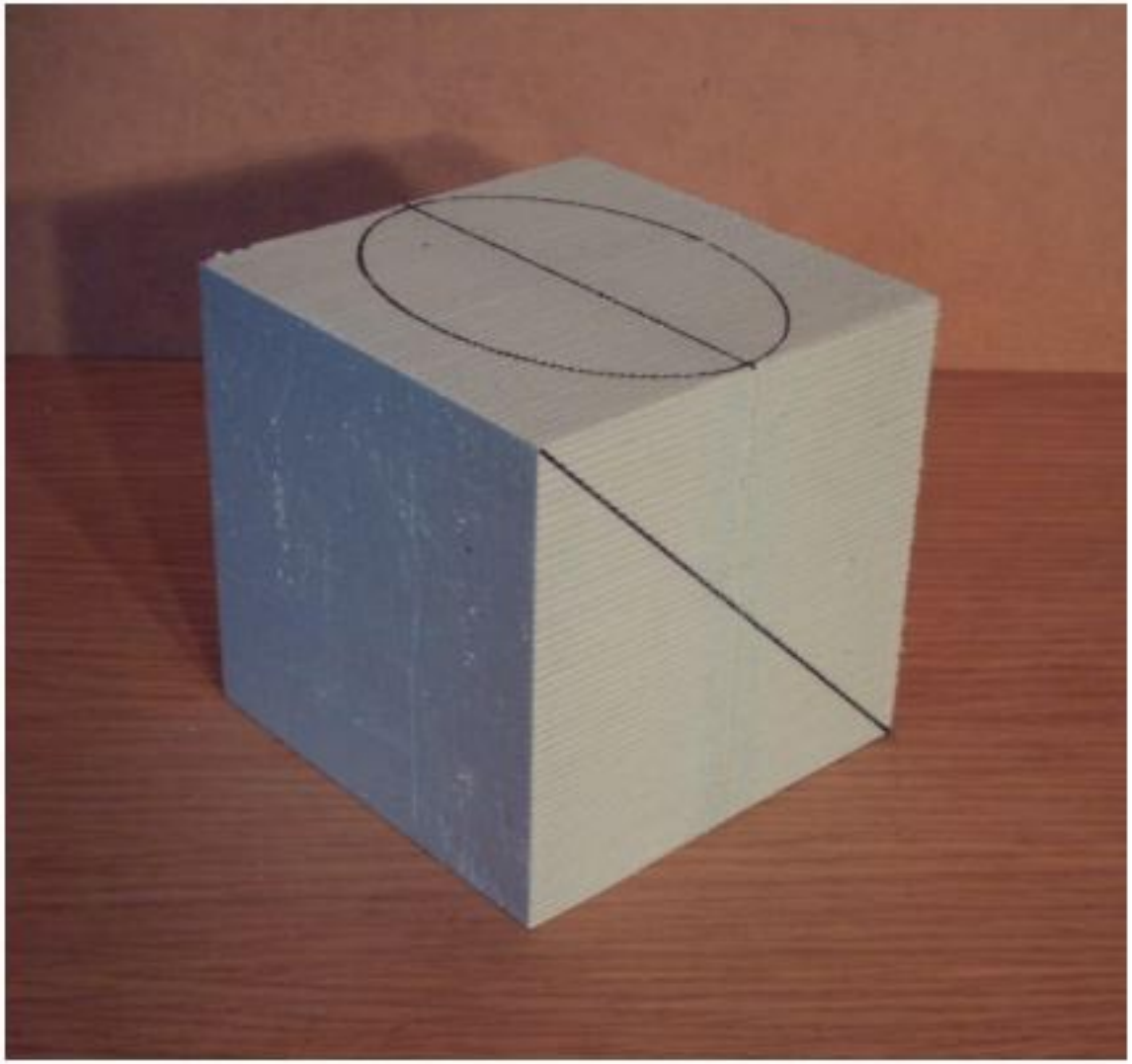
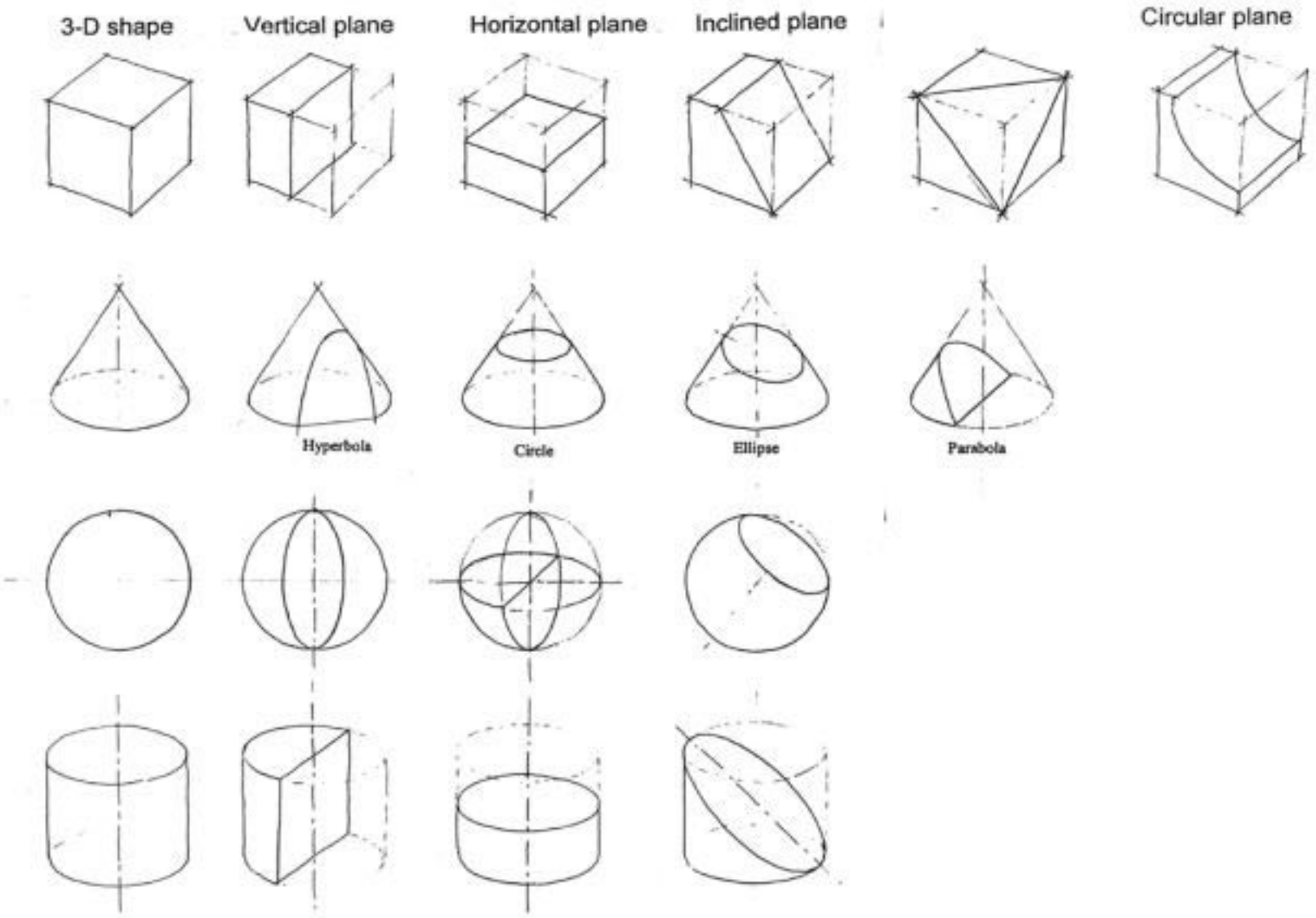
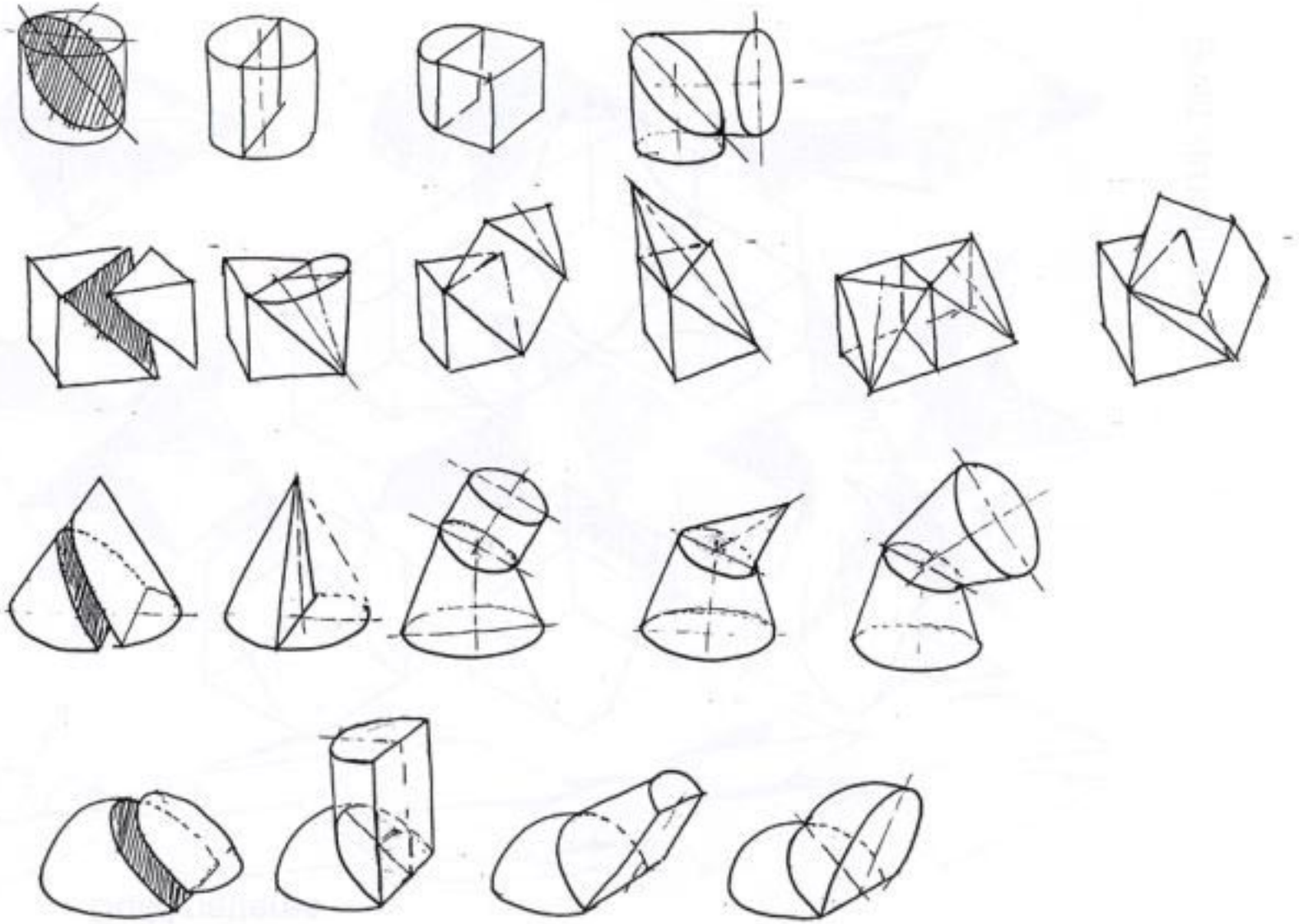


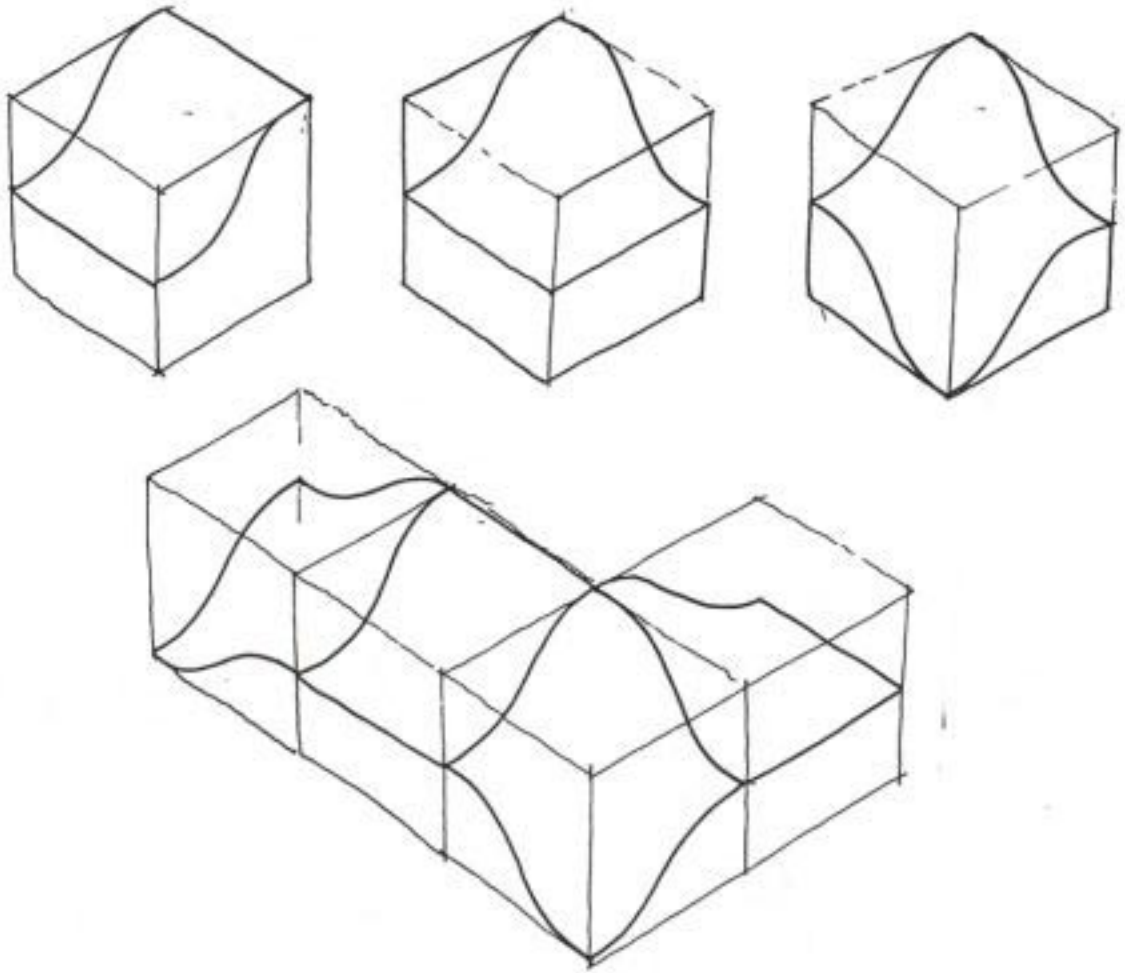
Slice through geometric solids



Interesting solids



Build patterns



Build structures