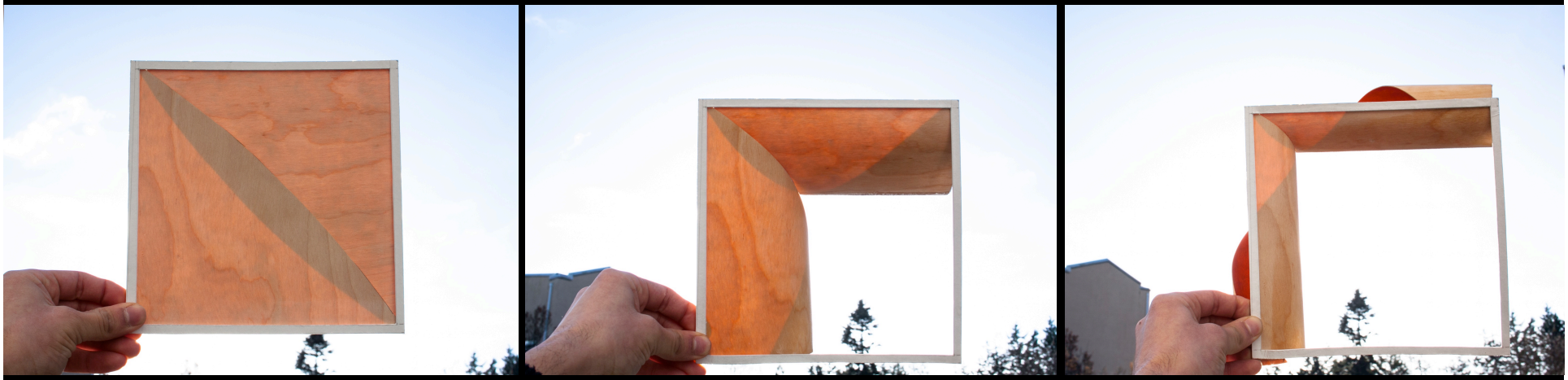
# Adaptively Responsive Architectural Facades




Chad SINCLAIR

Department of Materials Engineering

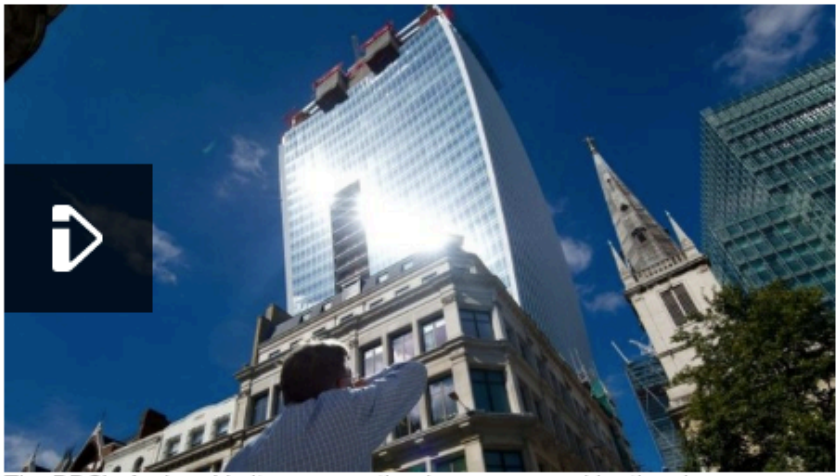
Blair SATTERFIELD

School of Architecture and Landscape Architecture

BBC News Sport

NEWS MAGAZINE

# Who, what, why: How does a skyscraper melt a car?



The BBC's Andrew Verity surveys the damage caused by the skyscraper

**A London skyscraper dubbed the Walkie-Talkie has been blamed for reflecting light which melted parts of a car parked on a nearby street. What happened?**

In today's Magazine

BBC News Sport

NEWS MAGAZINE

# Who, what, why melt a car?

The BBC's Andrew Verity surveys the damage caused by the

**A London skyscraper dubbed the Walkie-Talkie has for reflecting light which melted parts of a car parke street. What happened?**

The New York Times

Art & Design

## Dallas Museum Simmers in a Neighbor's Glare

Brandon Thibodeaux for The New York Times

At the Nasher museum in Dallas, Rodin's "Age of Bronze" sits in dappled light as glare streams through a patterned screen.

By ROBIN POGREBIN
Published: May 1, 2012

DALLAS — Two things were supposed to happen when the Nasher Sculpture Center opened here in 2003. Famous works like Rodin's

FACEBOOK

TWITTER

What if your house could get goose bumps?

Self-regulation of temperature

Protection

*"Within contemporary architectural design, a significant shift in emphasis can be detected – a move away from an architecture based on purely visual concerns towards an architecture justified by its performance.*

*The emphasis is therefore on material performance over appearance, and on processes over representation."*

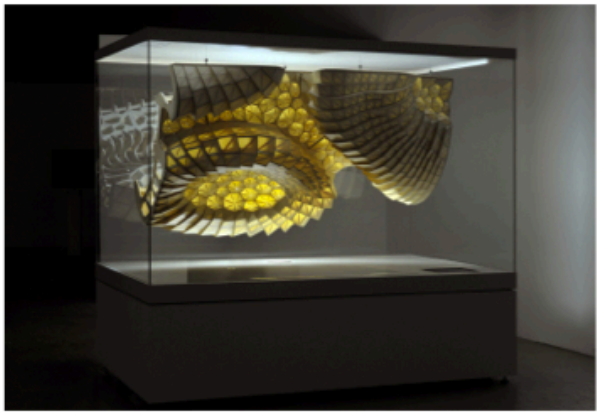
Leach, "Digital Morphogenesis"

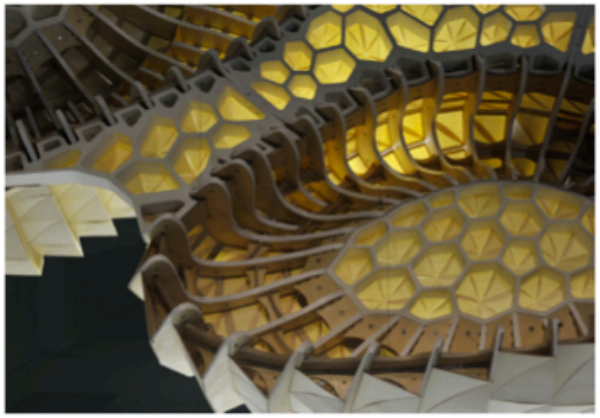
# Achim Menges

## Hygroscope - Centre Pompidou

# Precedents

## Achime Menges - Hygroscope



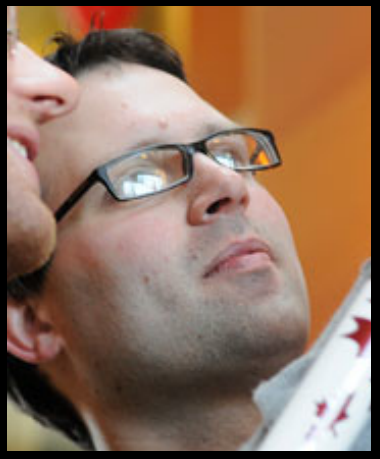


## Studio Roosegaarde - Lotus

## Doris Kim Sung - Metal Breathes

B. Satterfield
School of Architecture and Landscape Architecture

houminn practice



C. W. Sinclair
Department of Materials Engineering

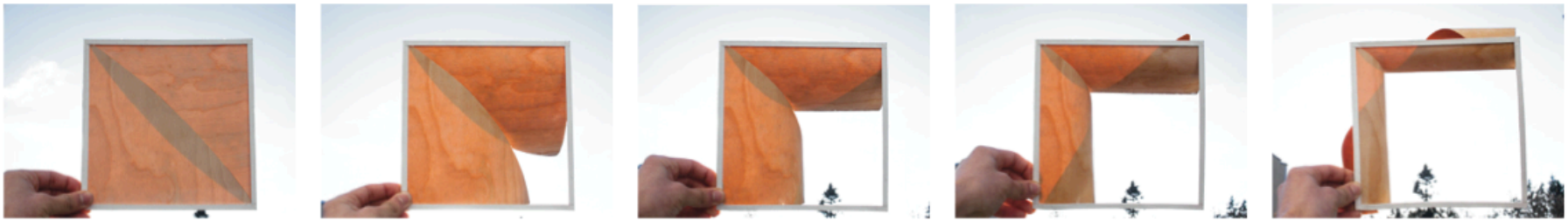
# OSHouse > resolution > function

# Climate Responsive Openings

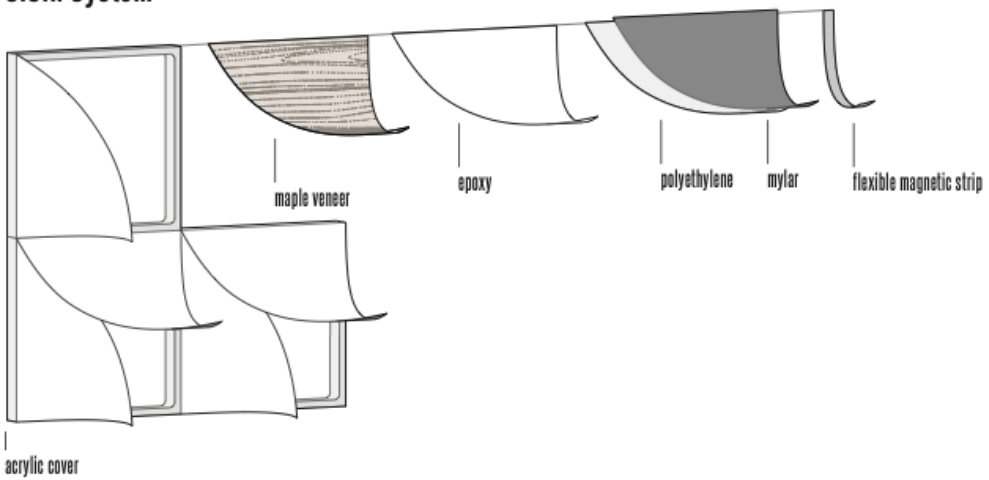
## Center Opening

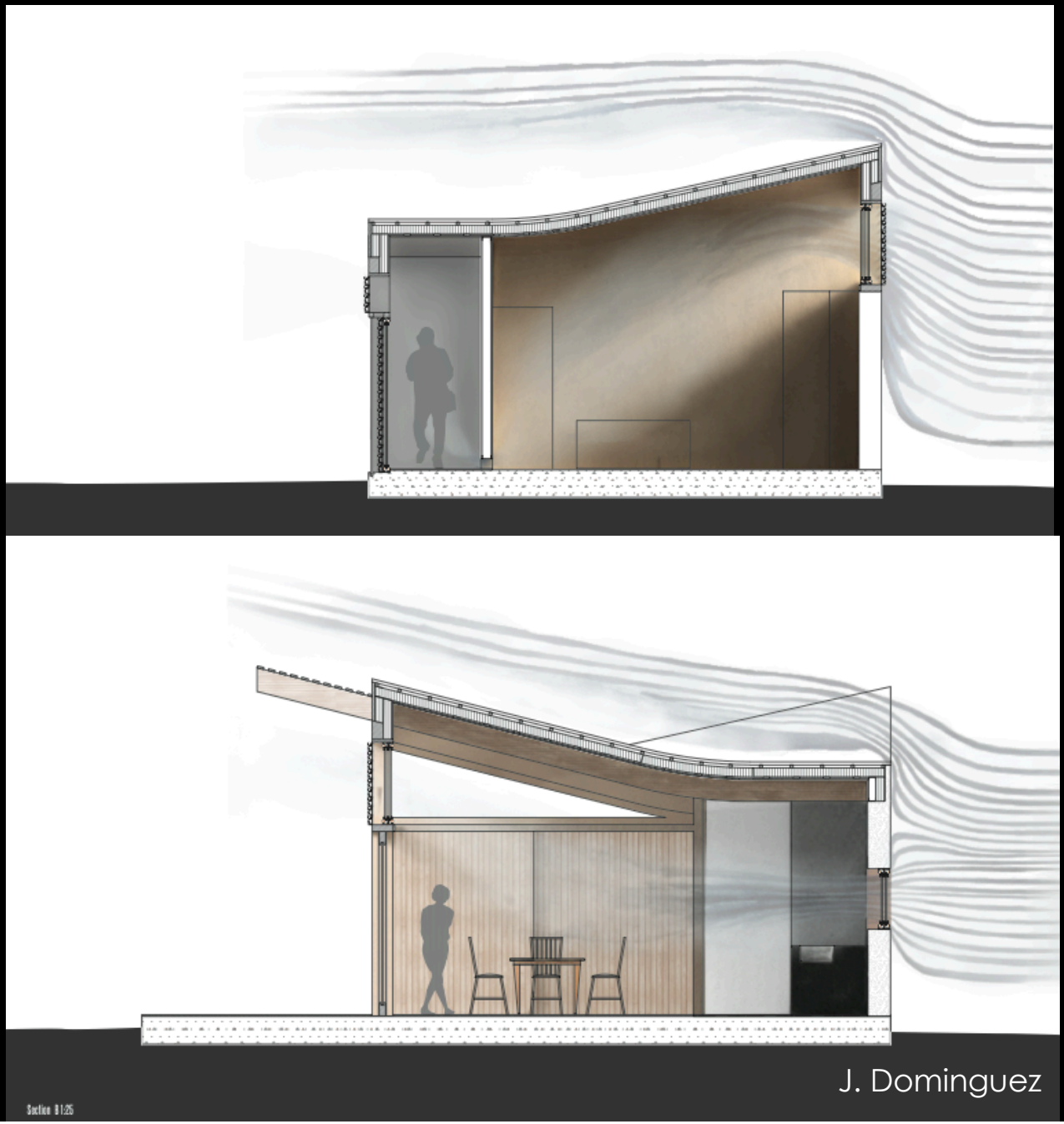
## Diagonal Opening

## 8in Test

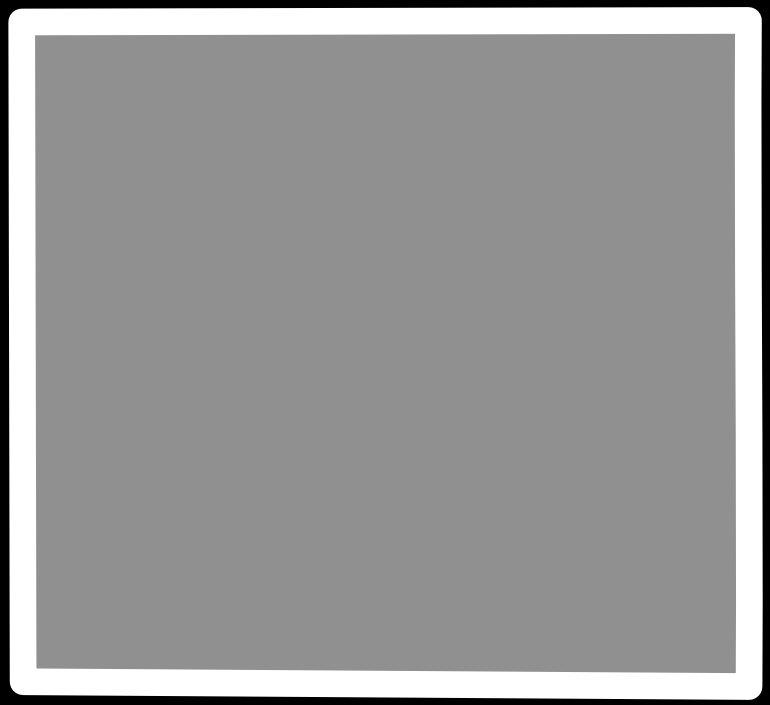


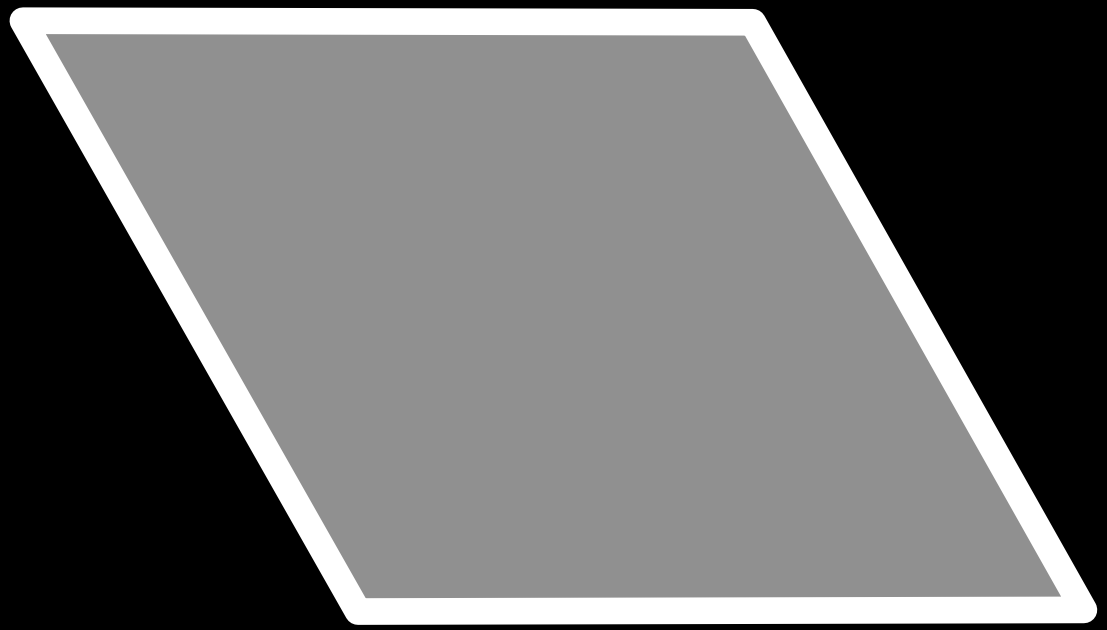
## 5.5in System

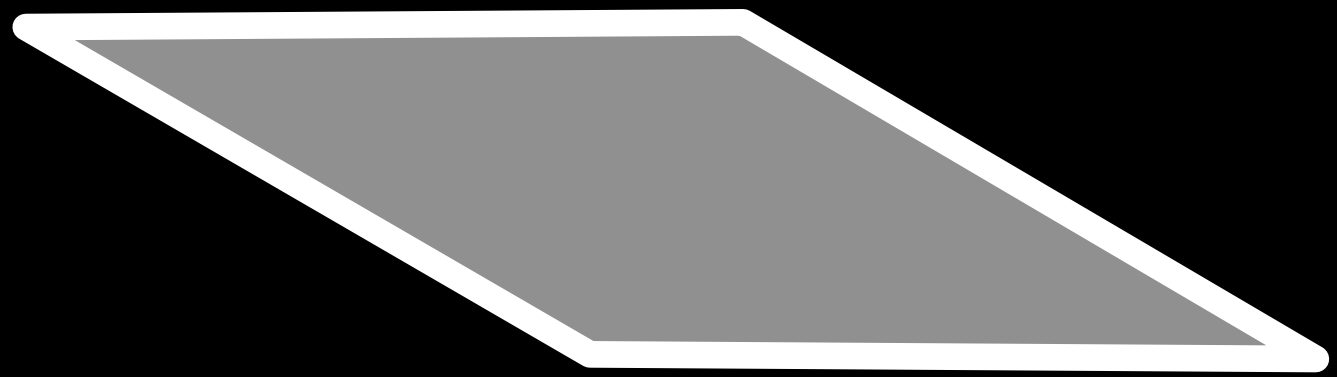


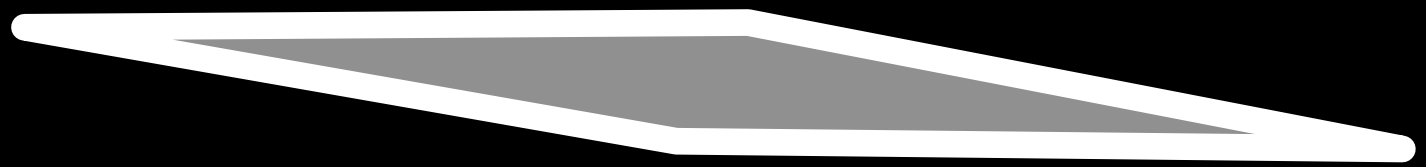

J. Dominguez
Section B 1:25

# Concept:

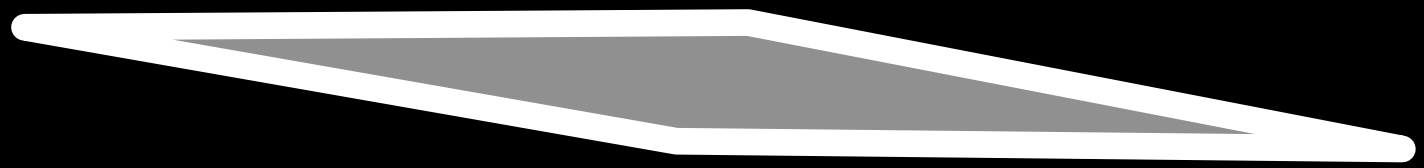


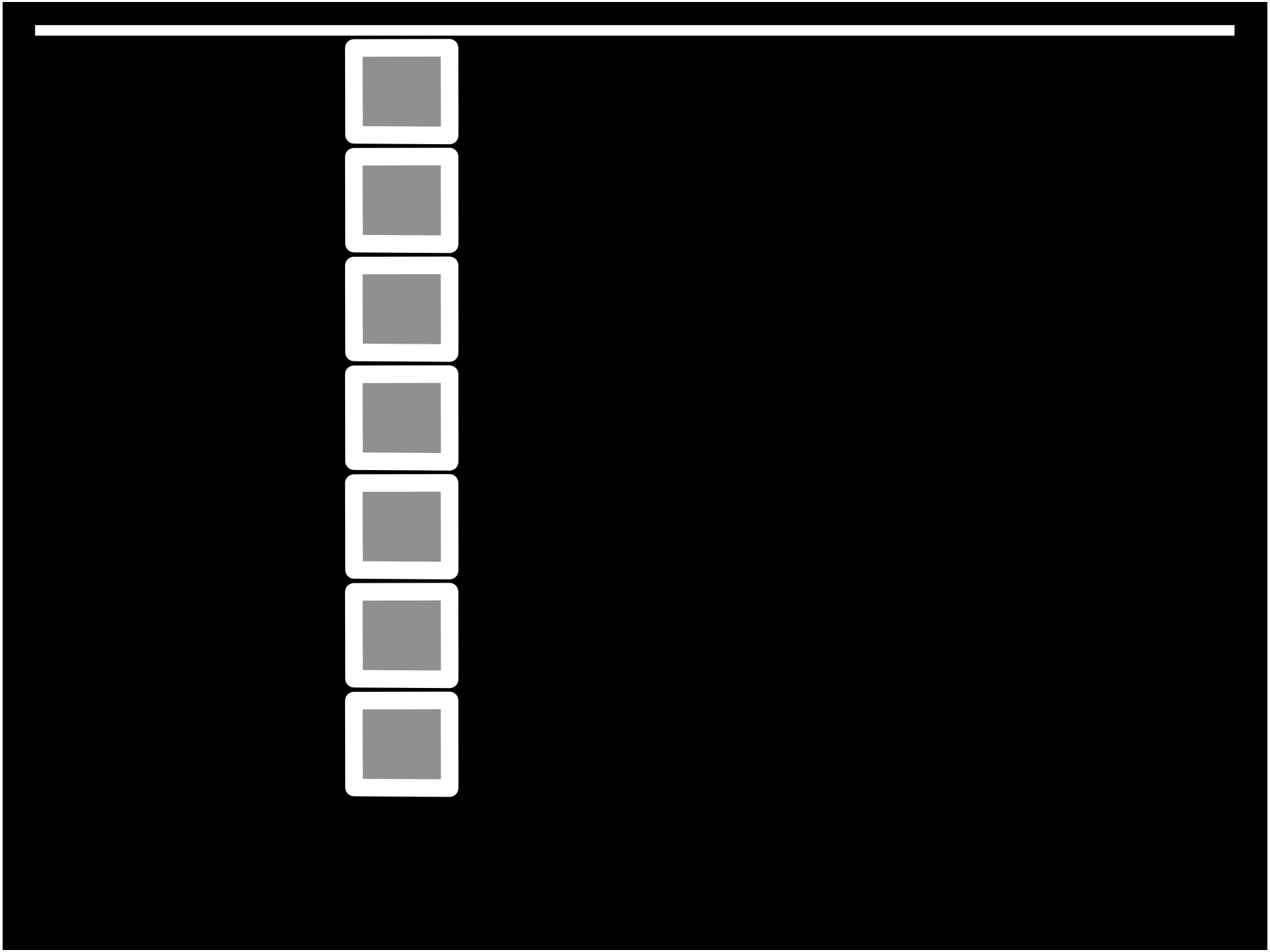


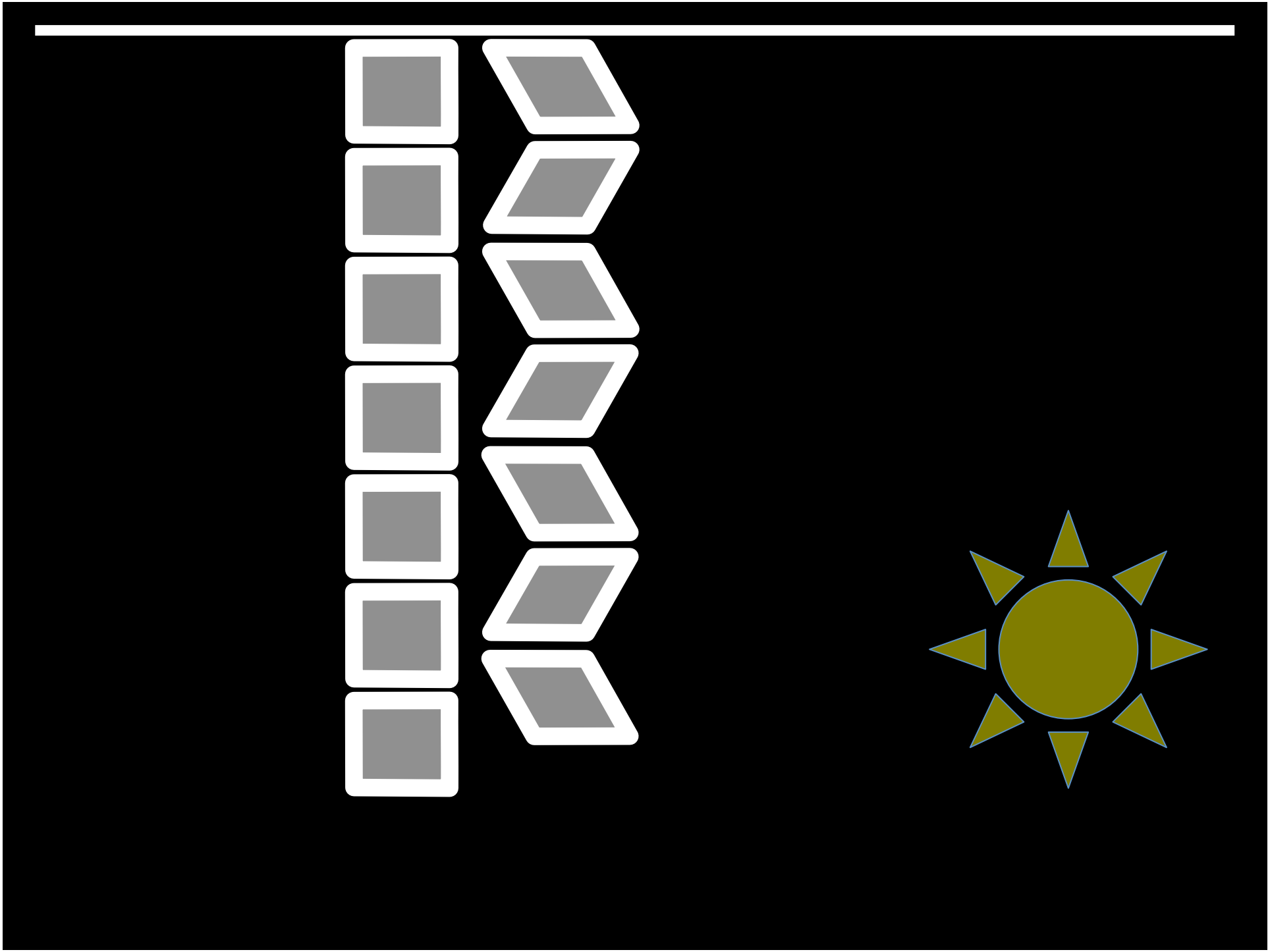


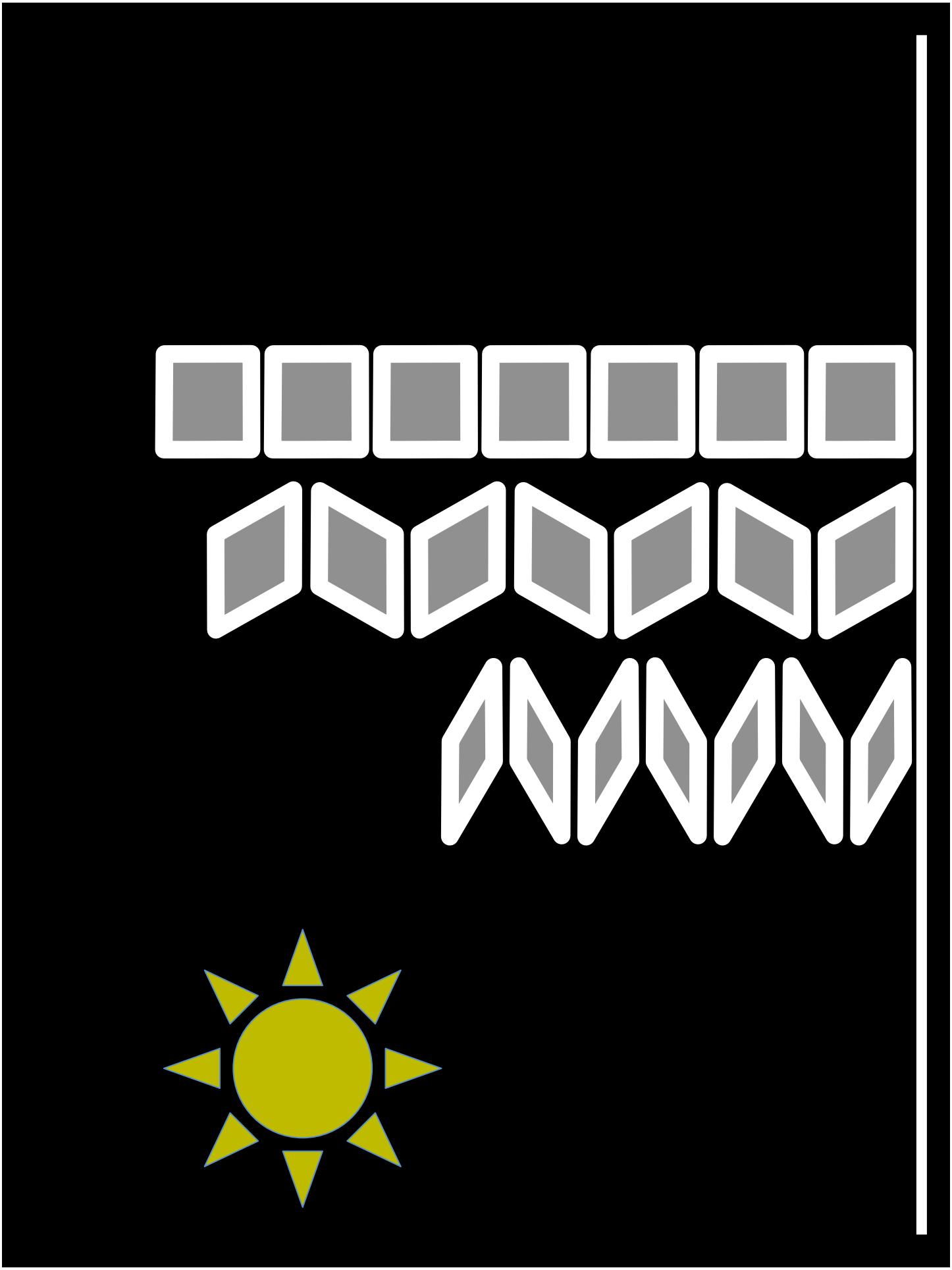


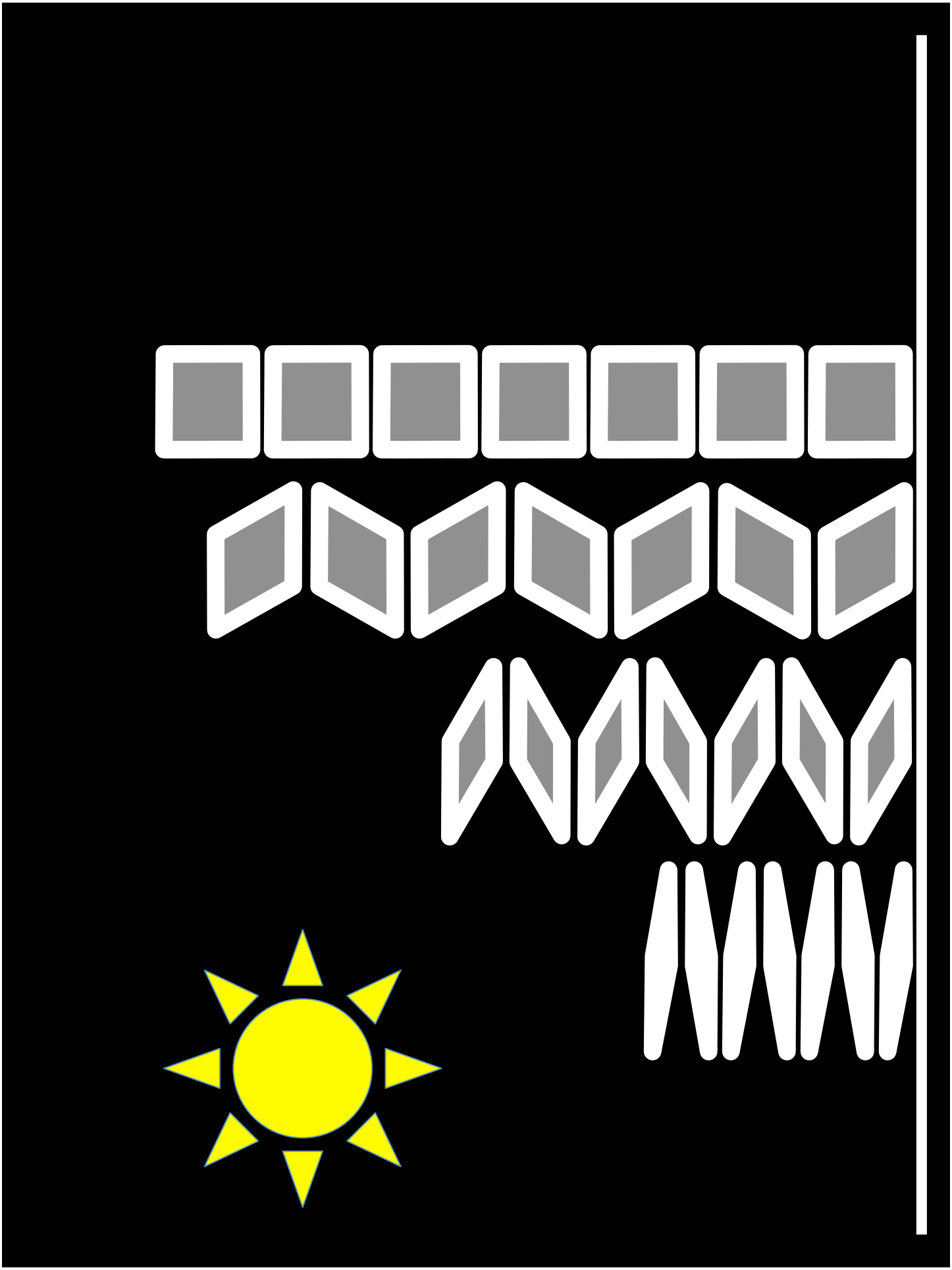
# Twinning



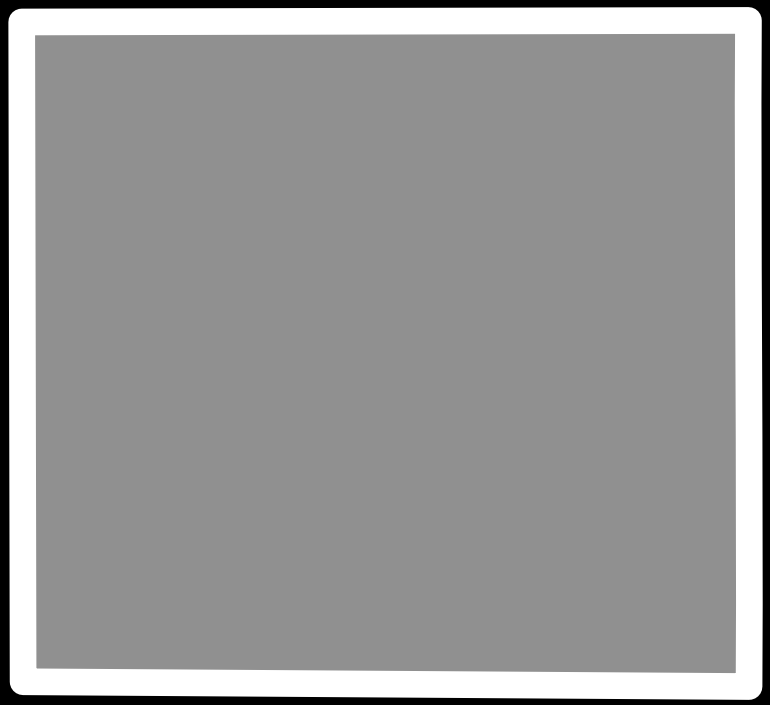


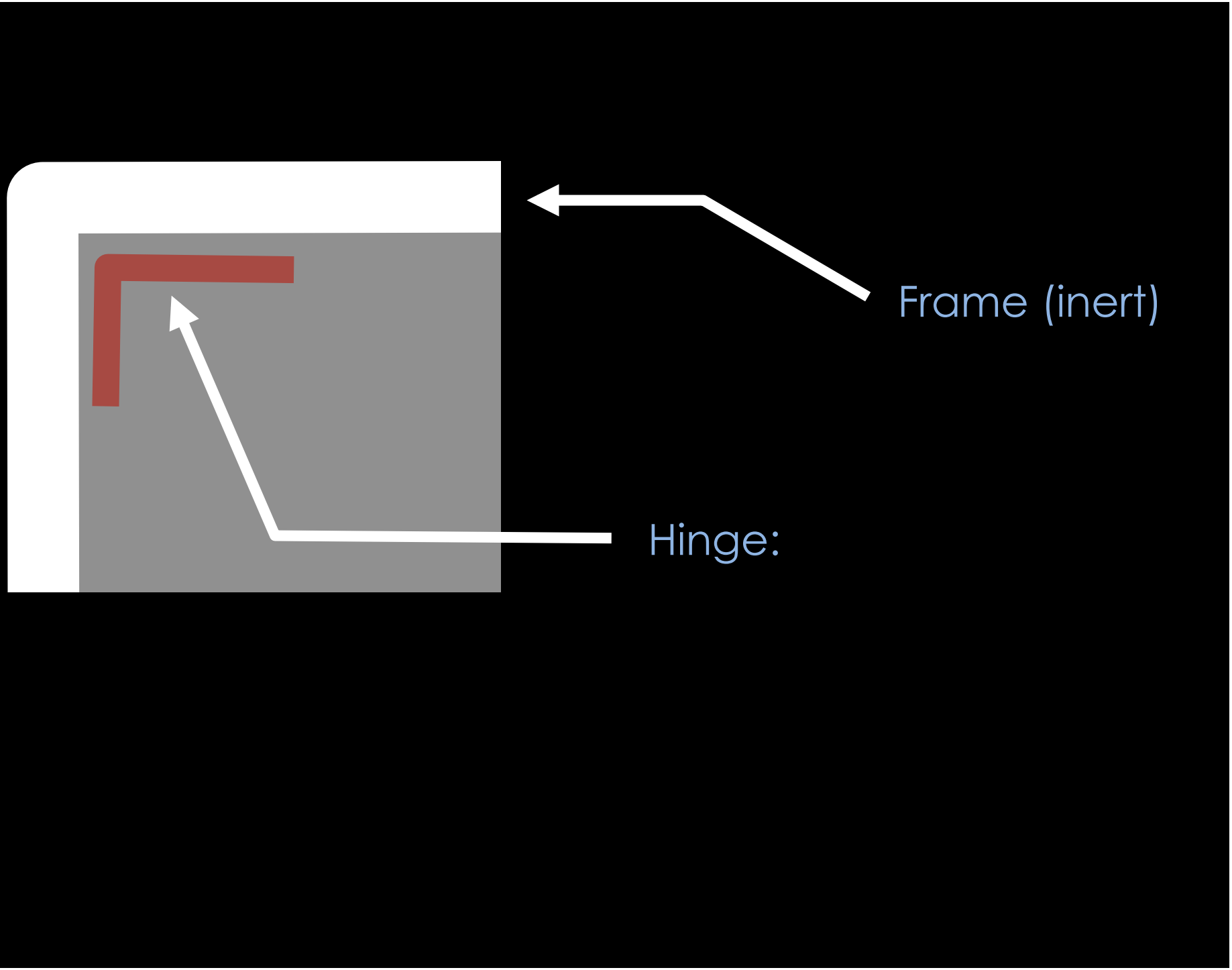


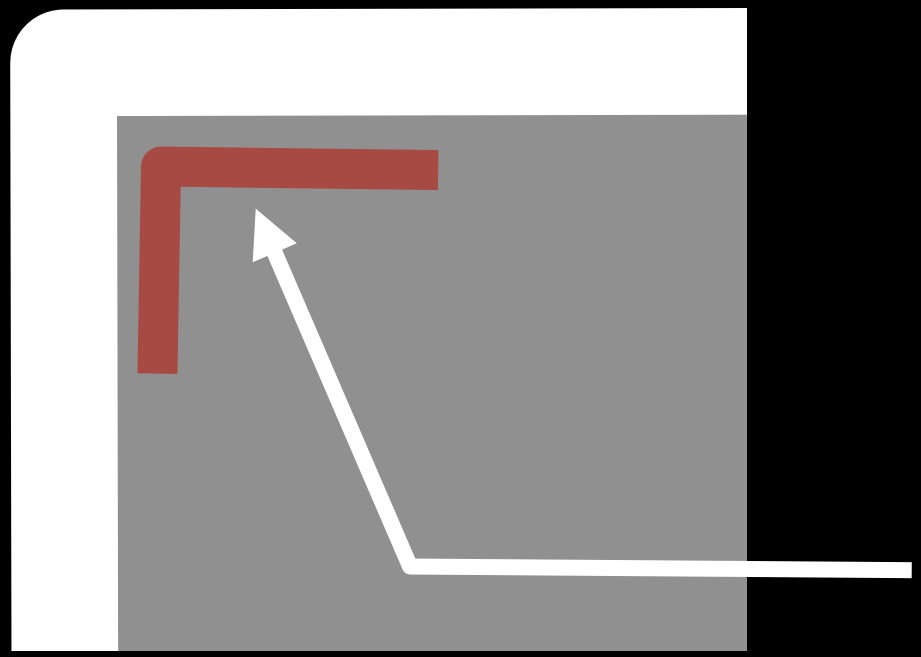




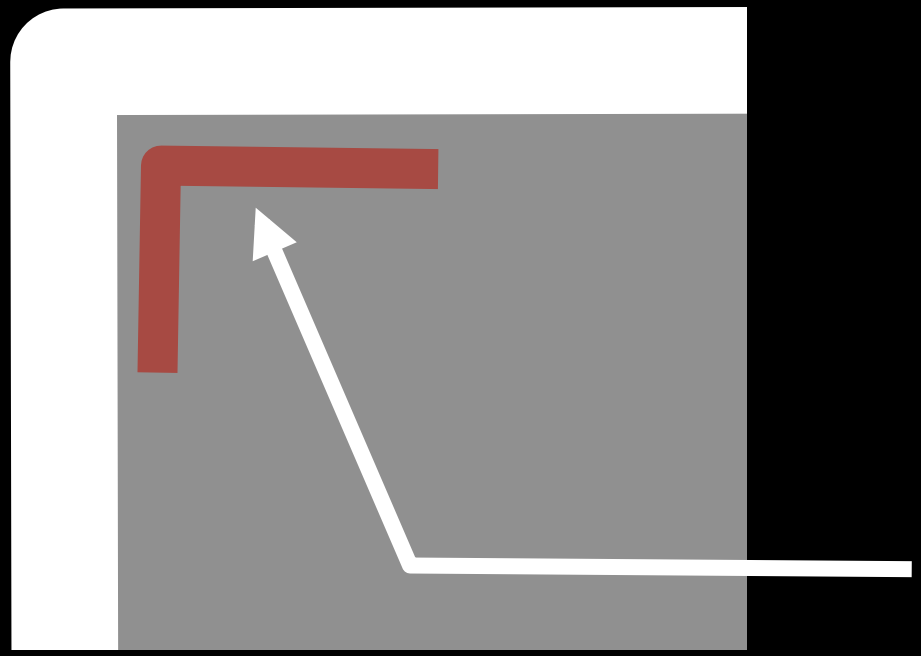
# Building Block:



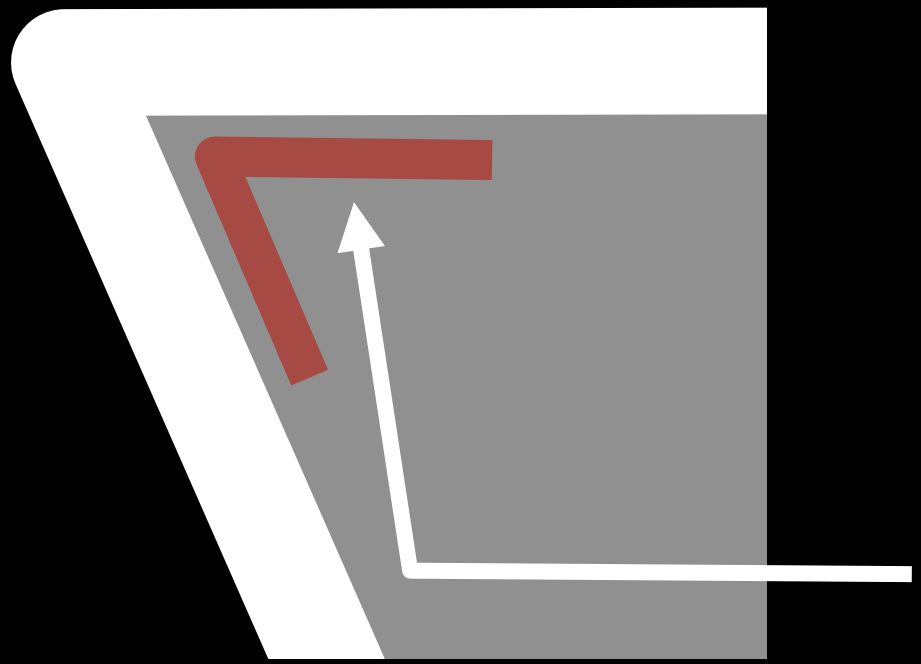

Frame (inert)
Hinge:



Hinge:
1. Thermal Bi-material



Hinge:
1. Thermal Bi-material
2. Shape Memory Material



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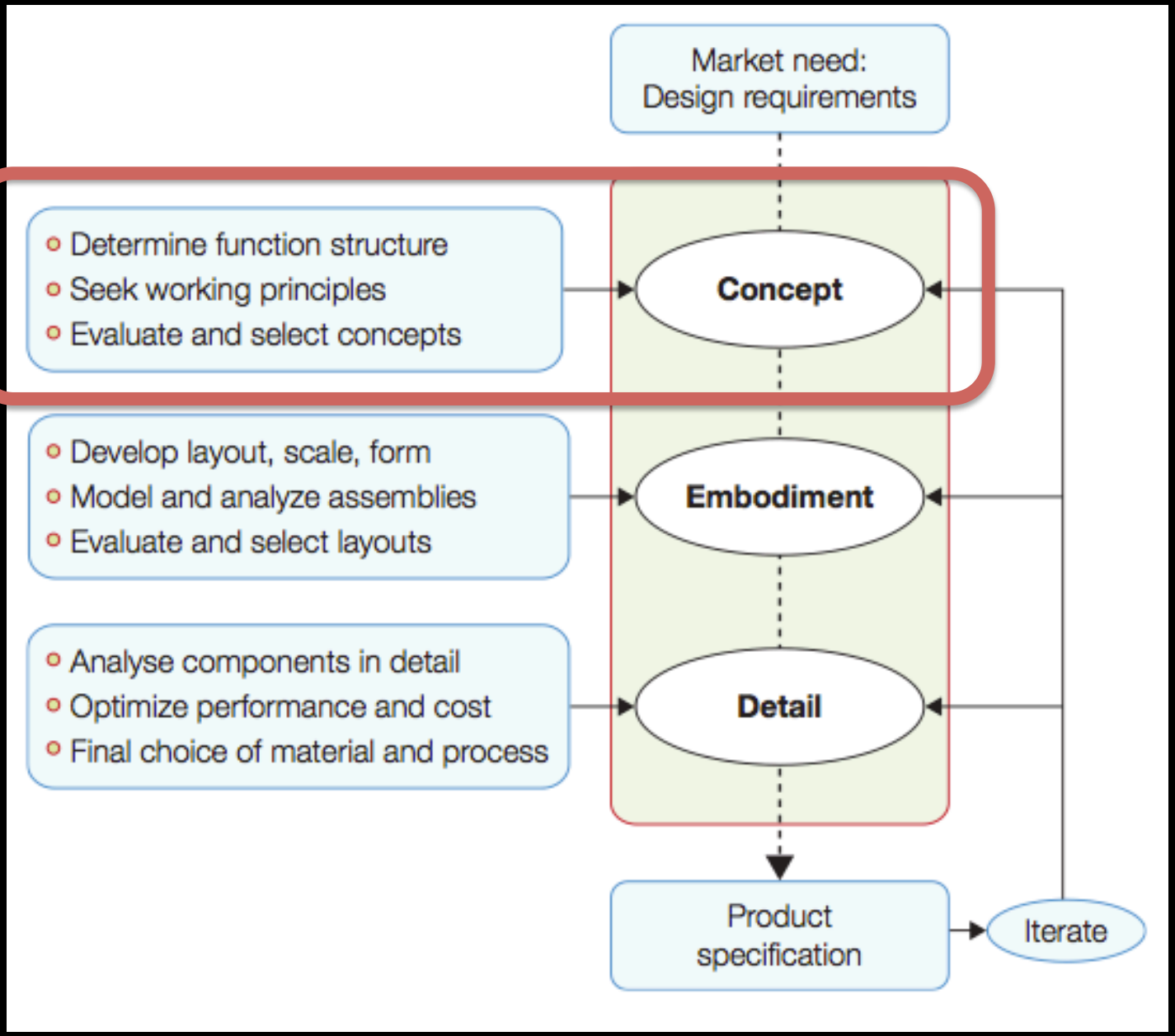
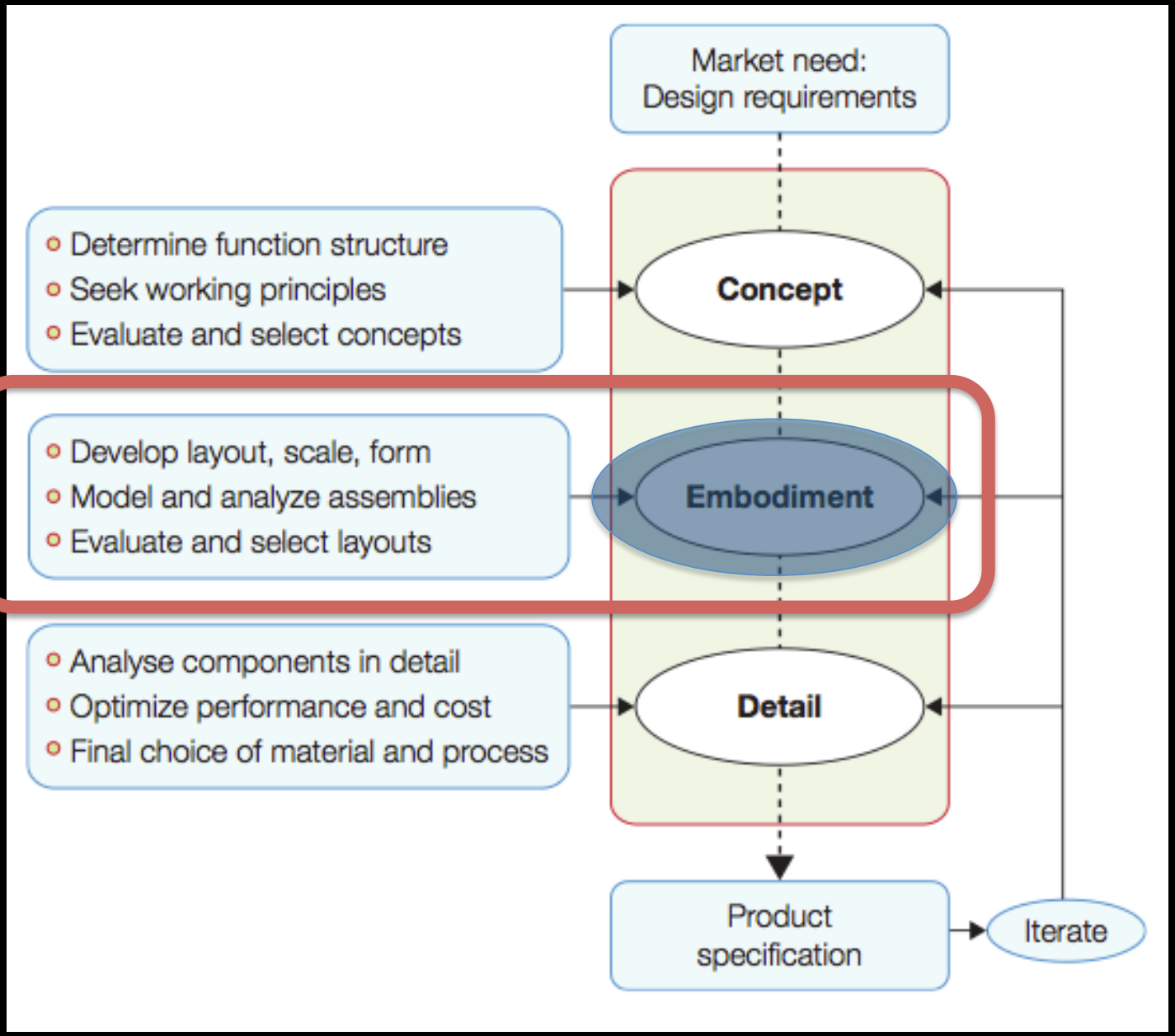

Market need:
Design requirements
Determine function structure
Seek working principles
Evaluate and select concepts
Concept
Develop layout, scale, form
Model and analyze assemblies
Evaluate and select layouts
Embodiment
Analyse components in detail
Optimize performance and cost
Final choice of material and process
Detail
Product
specification
Iterate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# Goal

Given a specific location and building type:

1. Compare and contrast the technical feasibility of bimaterial and shape memory solutions
   - Propose (select) materials
   - Can these work under proposed conditions?
   - Can these be adequately controlled (robust)?

2. The rationale for this is environmental + economic
   - Perform a (simple) life cycle analysis to determine the net energy efficiency of the design (including materials)
   - Perform a basic economic analysis (time for cost recovery)

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