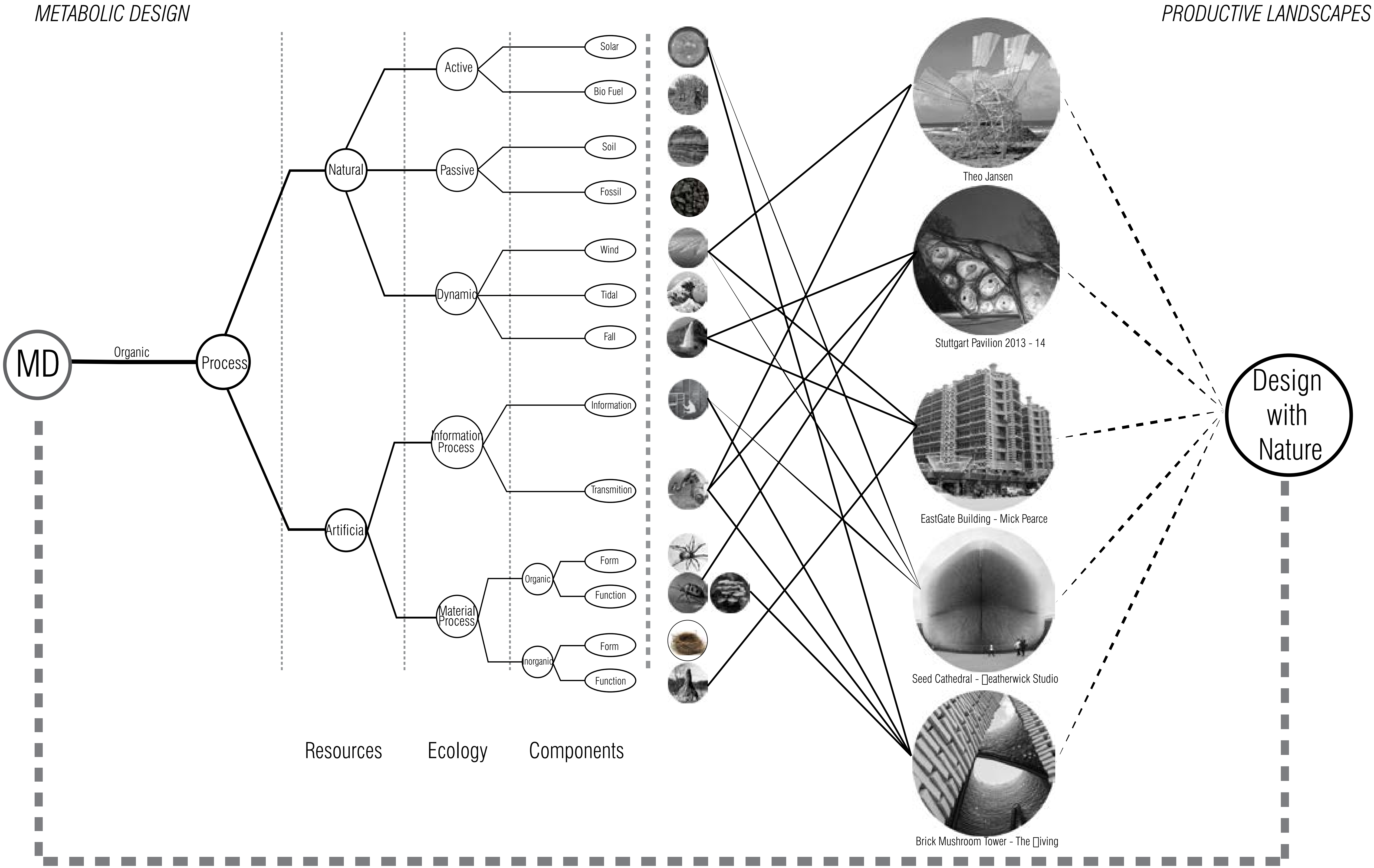
METABOLISM

"Once there was a nation that went to war, but after they conquered a continent their own country was destroyed by atom bombs... then the victors imposed democracy on the vanquished. For a group of apprentice architects, artists, and designers, led by a visionary, the dire situation of their country was not an obstacle but an inspiration to plan and think… although they were very different characters, the architects worked closely together to realize their dreams, staunchly supported by a super-creative bureaucracy and an activist state... after 15 years of incubation, they surprised the world with a new architecture—Metabolism—that proposed a radical makeover of the entire land... Then newspapers, magazines, and TV turned the architects into heroes: thinkers and doers, thoroughly modern men… Through sheer hard work, discipline, and the integration of all forms of creativity, their country, Japan, became a shining example... when the oil crisis initiated the end of the West, the architects of Japan spread out over the world to define the contours of a post-Western aesthetic...." —Rem Koolhaas / Hans Ulrich Obrist

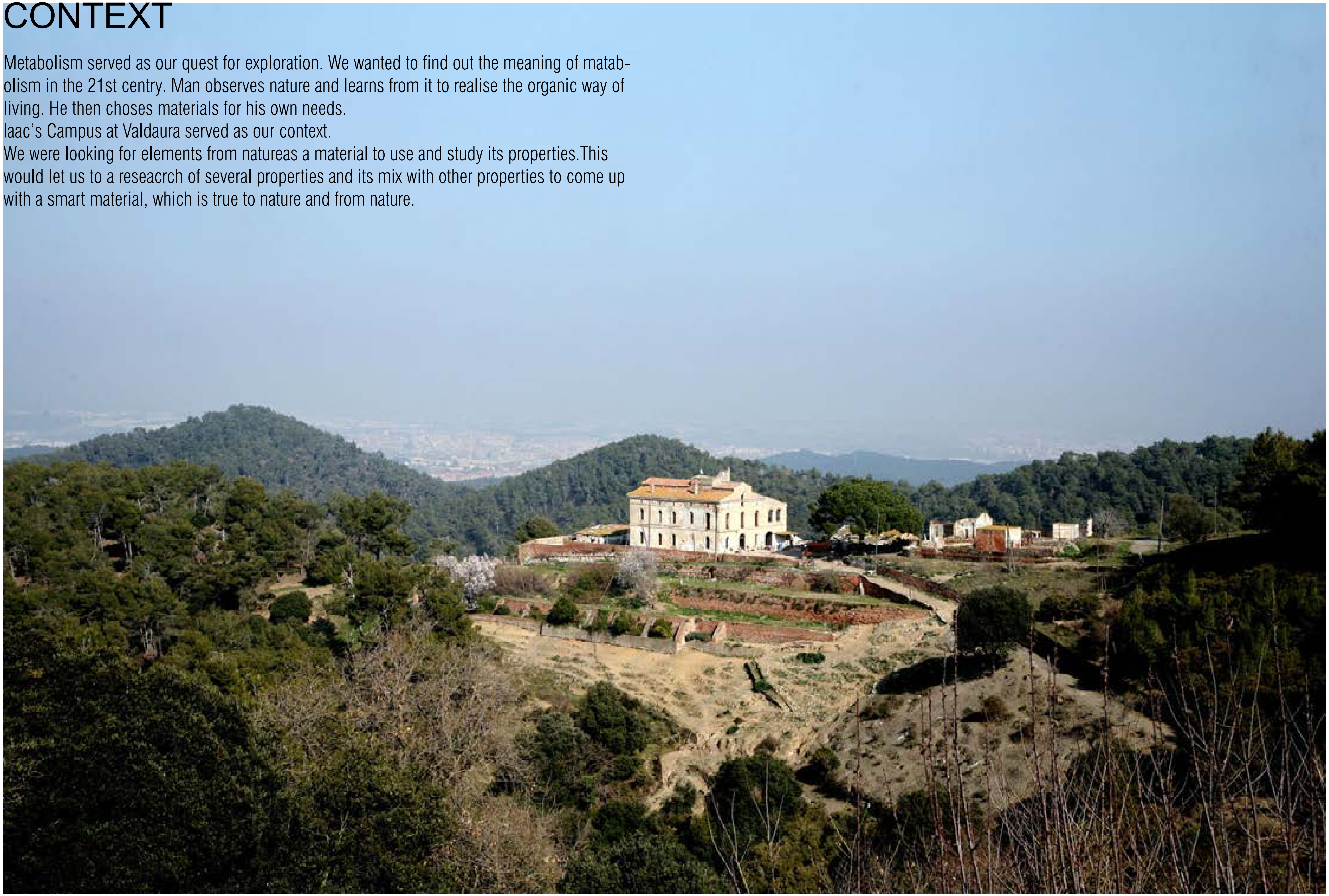
re_ruined hiroshima_arata isozaki

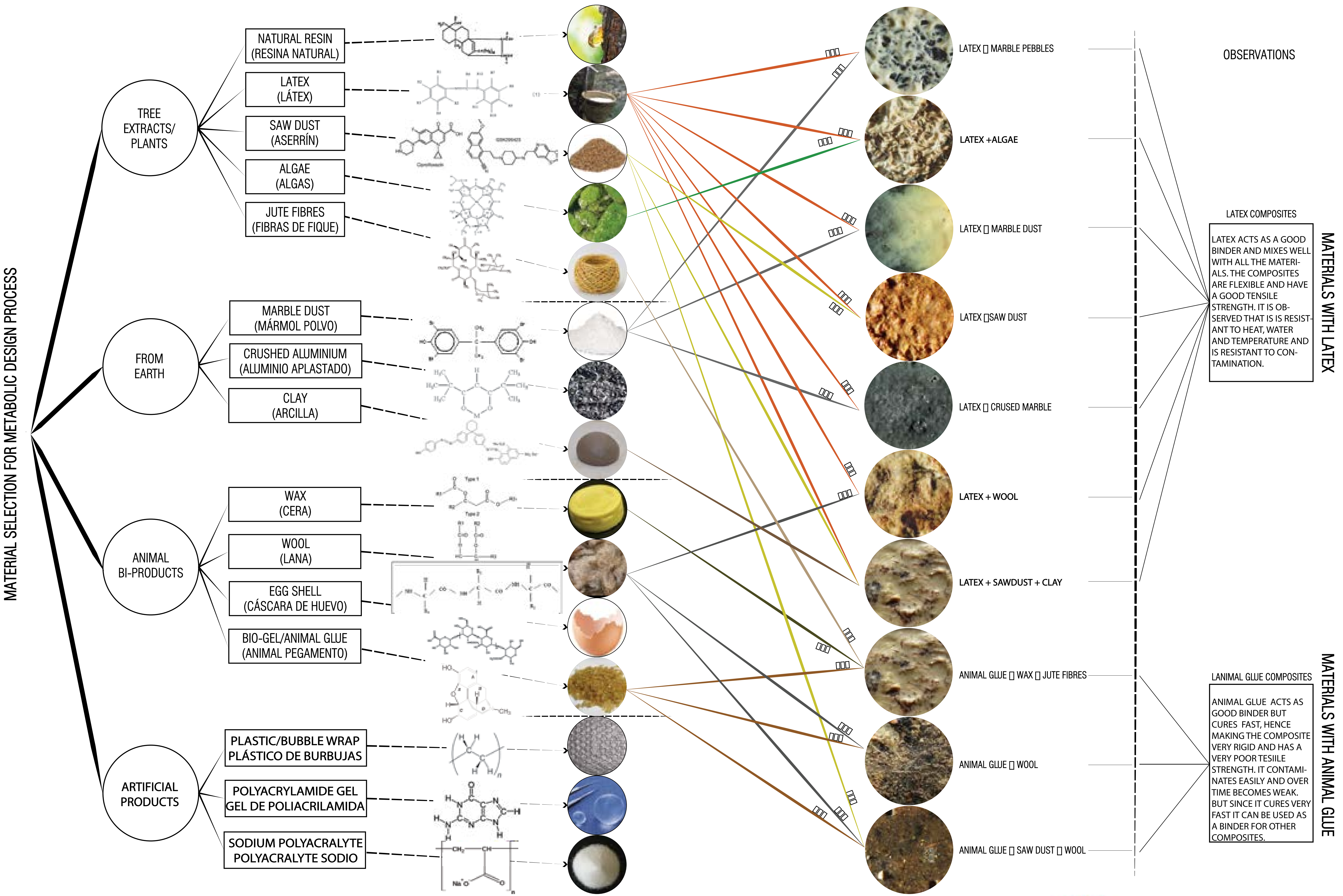
Metabolic Phylogenesis



CONTEXT

Metabolism served as our quest for exploration. We wanted to find out the meaning of matab-olism in the 21st centry. Man observes nature and learns from it to realise the organic way of living. He then choses materials for his own needs.
Iaac's Campus at Valdaura served as our context.
We were looking for elements from natureas a material to use and study its properties.This would let us to a reseacrch of several properties and its mix with other properties to come up with a smart material, which is true to nature and from nature.





Iaac Institute for advanced architecture of Catalonia BARCELONA

DESIGN WITH NATURE
Prof. Javier Peña
Prof. Rodrigo Rubio
Prof. OriolCarrasco
Alessio Verdolino

Group # | COLINDIA
Shashank | Neel | Felipe

LATEX COMPOSITE

OBSERVATIONS

LATEX + MARBLE PEBBLES

LATEX + CRUSED MARBLE

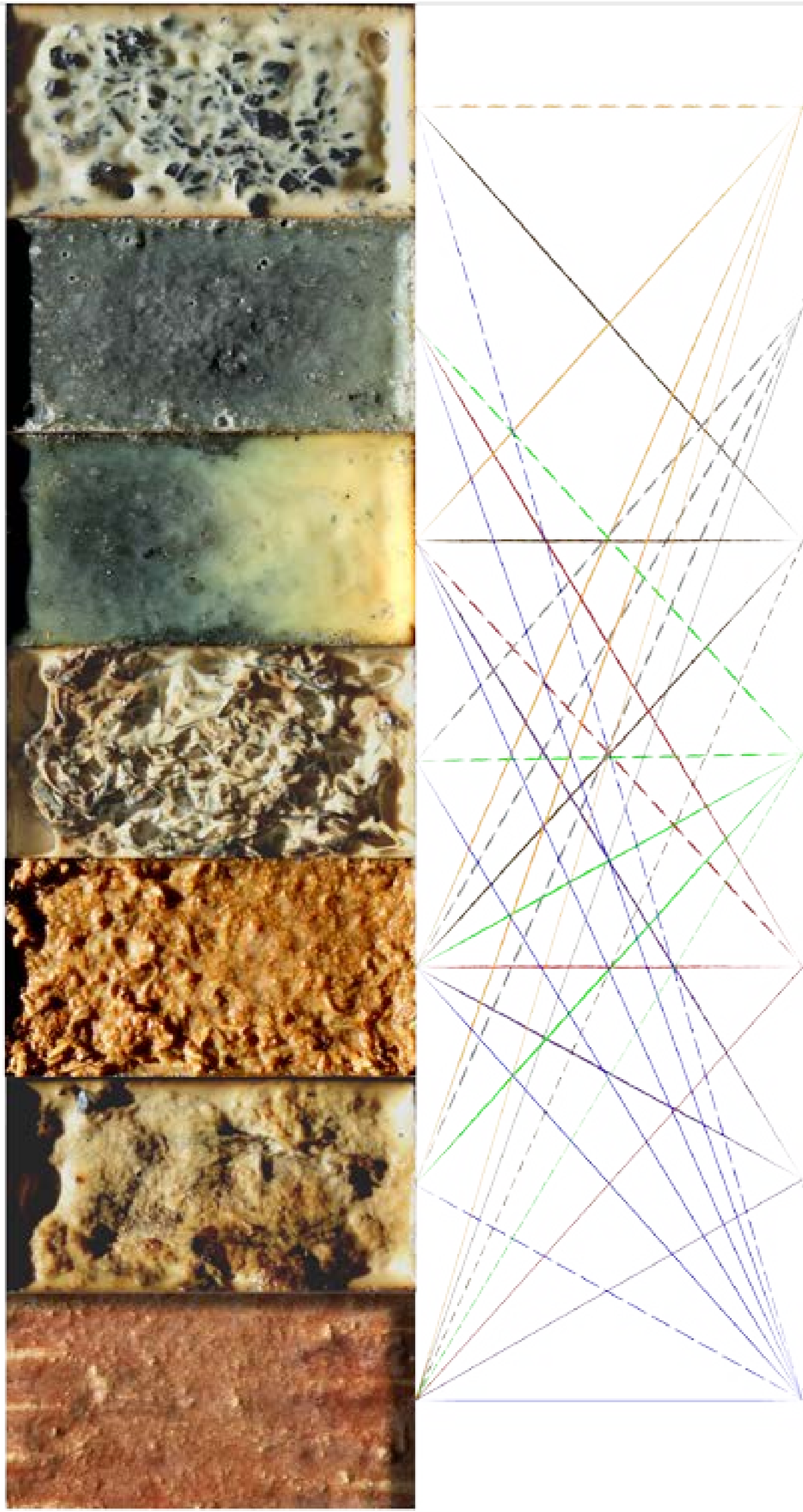
LATEX + MARBLE DUST

LATEX +ALGAE

LATEX + SAW DUST

LATEX + WOOL

LATEX + CLAY



ELASTIC

VERY BAD MIX. THE COMPOSITE DISINTEGRATES WHEN APPLIED TO THE TENSILE FORCES.

TRANSCERANCY

THE COMPOSITE DOES NOT PERFORM WELL WITH HEAT AND TEMPRATURE.

MATERIAL STRENGTH

THE COMPOSITE MIXES WELL AND HAS A GOOD RESISTANCE TO THE TENSILE FORCES BUT HAS A LOW TRANPARENCY.

FLEXIBILITY

THE COMPOSITE DOES NOT MIX WELL. IT HAS A VERY LOW TENSILE STRENGH AND DETEORATES VERY FAST AND HAS VERY POOR THERMAL RESISTANCE

HEAT RESISTENT

THE COMPOSITE MIXES WELL AND HAS A GOOD RESISTANCE TO THE TENSILE FORCES AND HAS A GOOD THERMAL RESISTANCE.

AMALGAMATION

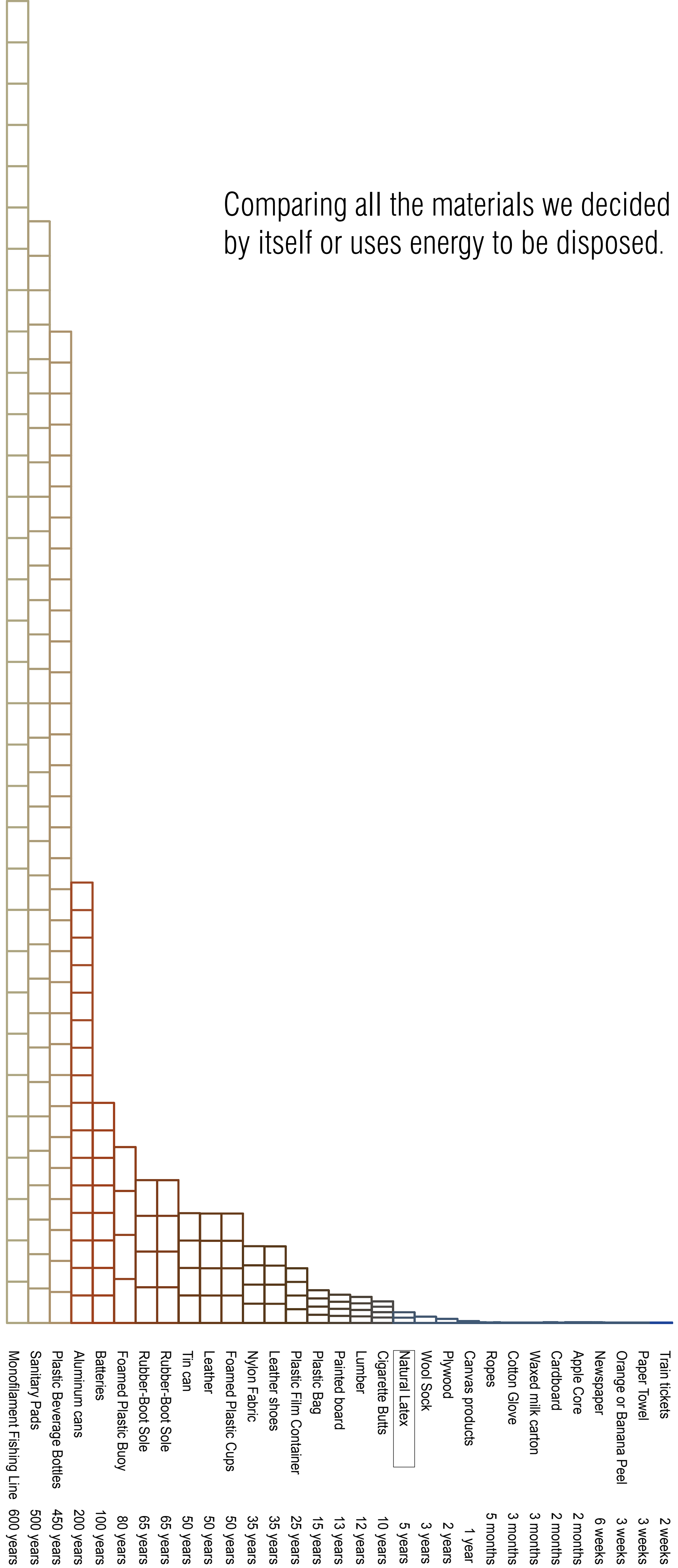
THE COMPOSITE DOES NOT MIX WELL. IT HAS A VERY LOW TENSILE STRENGH AND VERY LOW RESISTANCE TO HEAT.

WATER-RESISTANT

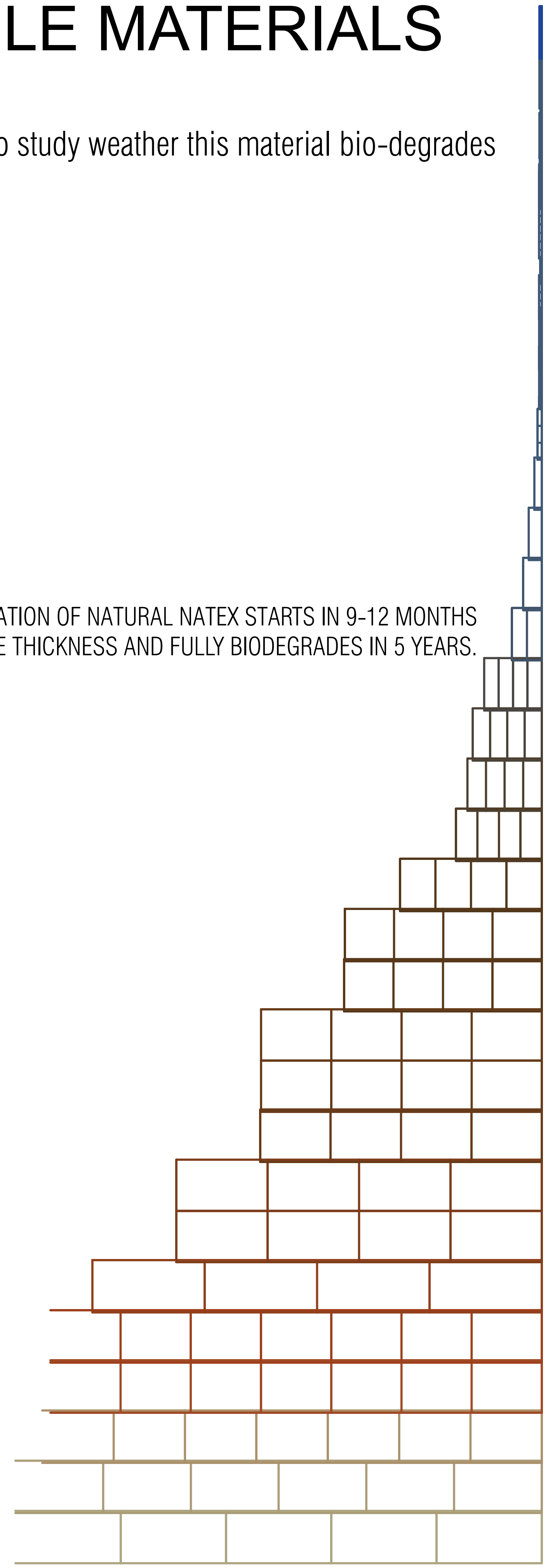
THE COMPOSITE SHOWS PERFORMS WELL HAS STRONG BONDING BETWEEN THE THREE COMPONENTS, HAS STONG TENSILE STRENGTH.

BIODEGRADABLE MATERIALS

Comparing all the materials we decided to work with latex. It is also important to study weather this material bio-degrades by itself or uses energy to be disposed.



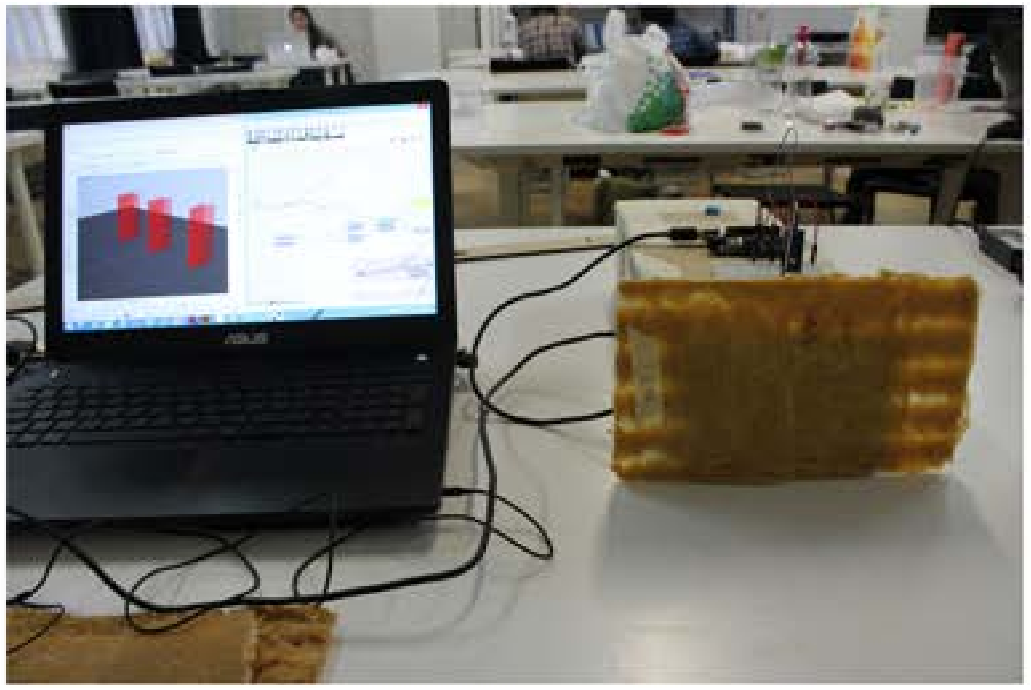
THE DEGRADATION OF NATURAL NATEX STARTS IN 9-12 MONTHS
DEPENDING ON THE THICKNESS AND FULLY BIODEGRADES IN 5 YEARS.

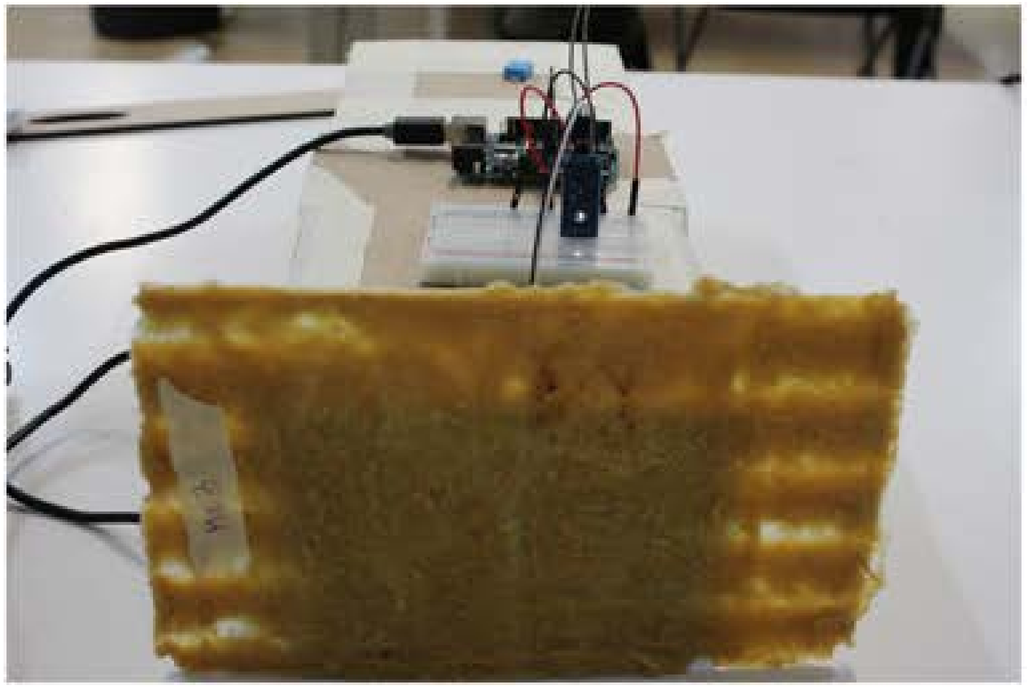


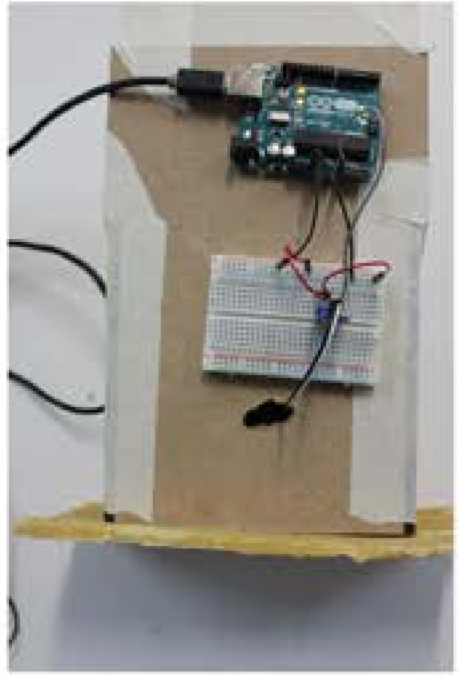
Train tickets	2 weeks
Paper Towel	3 weeks
Orange or Banana Peel	3 weeks
Newspaper	6 weeks
Apple Core	2 months
Cardboard	2 months
Waxed milk carton	3 months
Cotton Glove	3 months
Ropes	5 months
Canvas products	1 year
Plywood	2 years
Wool Sock	3 years
Natural Latex	5 years
Cigarette Butts	10 years
Lumber	12 years
Painted board	13 years
Plastic Bag	15 years
Plastic Film Container	25 years
Leather shoes	35 years
Nylon Fabric	35 years
Foamed Plastic Cups	50 years
Leather	50 years
Tin can	50 years
Rubber-Boot Sole	65 years
Rubber-Boot Sole	65 years
Foamed Plastic Buoy	80 years
Batteries	100 years
Aluminum cans	200 years
Plastic Beverage Bottles	450 years
Sanitary Pads	500 years
Monofilament Fishing Line	600 years

Iaac | Institute for advanced architecture of Catalonia | BARCELONA
DESIGN WITH NATURE
Prof. Javier Peña
Prof. Rodrigo Rubio
Prof. OriolCarrasco
Alessio Verdolino
Group # | COLINDIA
Shashank | Neel | Felipe

TEMPRATURE TEST OF THE MIX







PARAMETERS

TIME - 5 MINUTES

ROOM TEMPRATURE - 19 DEGREES

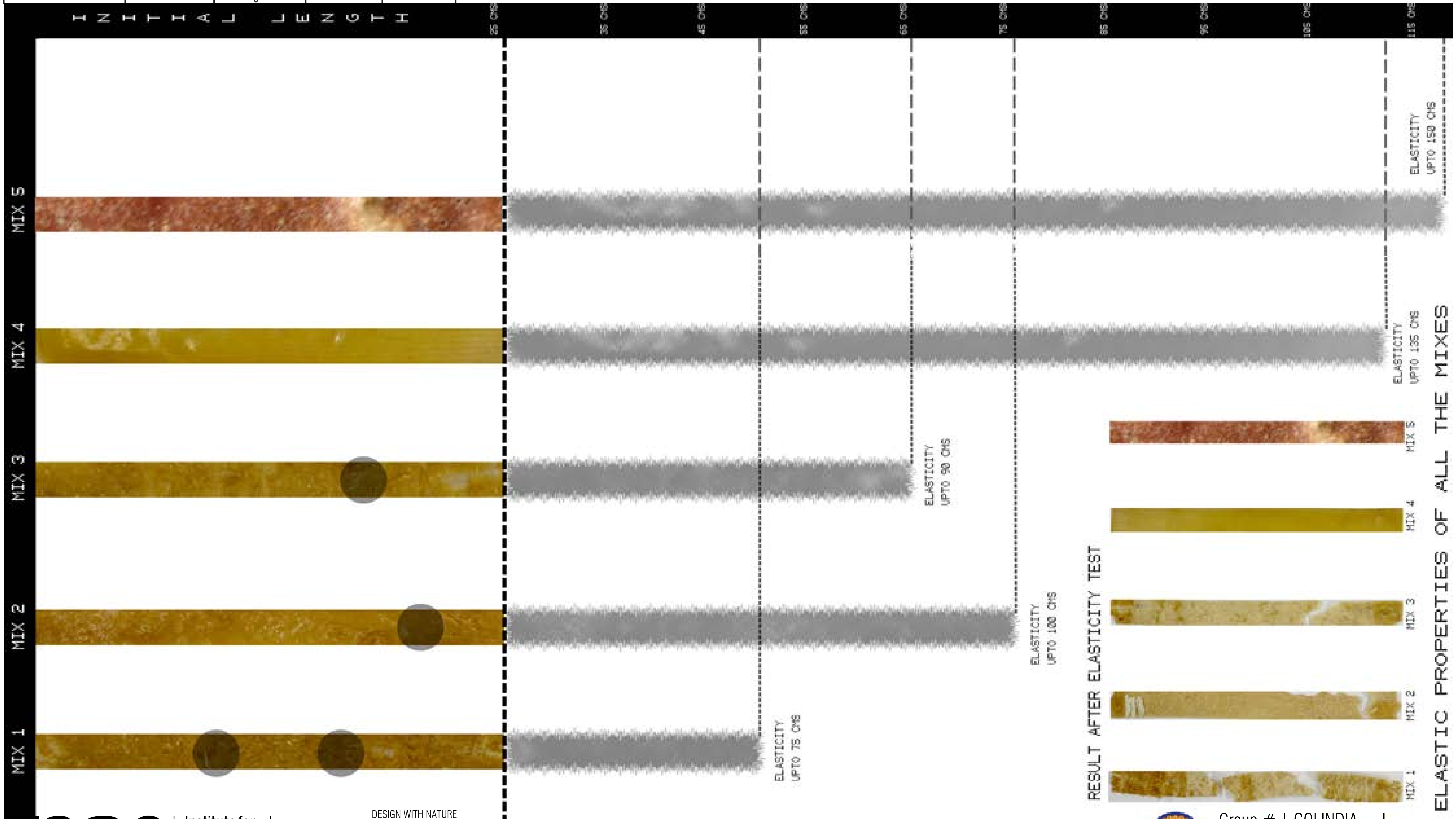
SENSOR TYPE - DHT 11

TEST TEMPRATURE - 30 DEGRESS

We did several test on the composites we made. This one is the study of varying temperatures in indoor and ourdoor areas. The theory of this exoeriment is based on , when the sun hits the material on the outersurface- the temoerature is recorded and we study how much heat is penerated behind the surface. This would determine wheather this material effectively keeps the indoor areas warm or cold depending on the conditions.

EXPERIMENTS	LATEX (ml)	SAW-DUST		ratio
material 1	150	75 grams	100ml-WATER	6:3:4
materail 2	150	25 grams		6:1
materail 3	150	50 grams		3:1
materail 4	150	0		
materail 5	150	25 grams	25GRAMS-CLAY	6:1:1

ELASTIC STRENGTH



RESULTS MIX 1 @ 30 DEGREES

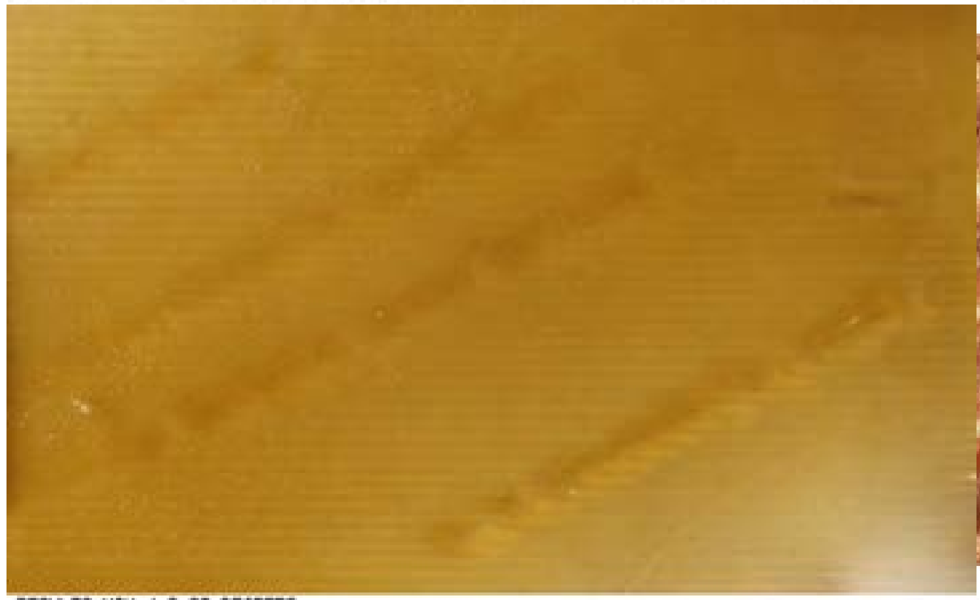
0-1 MIN-----) 28.996 DEG. (1.004↓)   1-5 MIN-----) 28.790 DEG. (1.21↓)

RESULTS MIX 2 @ 30 DEGREES

0-1 MIN-----) 28.992 DEG. (1.008↓)   1-5 MIN-----) 28.850 DEG. (1.15↓)

RESULTS MIX 3 @ 30 DEGREES

0-1 MIN-----) 28.974 DEG. (1.026↓)   1-5 MIN-----) 28.990 DEG. (1.09↓)



RESULTS MIX 4 @ 30 DEGREES

0-1 MIN-----) 28.995 DEG. (1.005↓)   1-5 MIN-----) 28.940 DEG. (1.06↓)

RESULTS LATEX+SAWDUST+CLAY @ 30 DEGREES

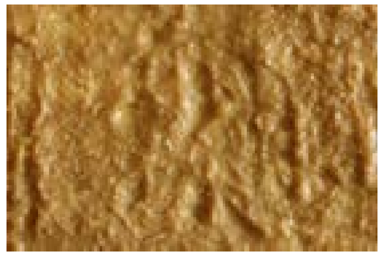
0-1 MIN-----) 28.00 DEG. (2.00 ↓)   1-5 MIN-----) 26.90 DEG. (3.10 ↓)

RESULTS BIG SAWDUST+LATEX @ 30 DEGREES

0-1 MIN-----) 19.00 DEG. (11.00 ↓)   1-5 MIN-----) 20.080 DEG. (9.92↓)

RESULTS SANDWICH MIX @ 30 DEGREES

0-1 MIN-----) 28.82 DEG. (1.18 ↓)   1-5 MIN-----) 28.92 DEG. (1.08 ↓)

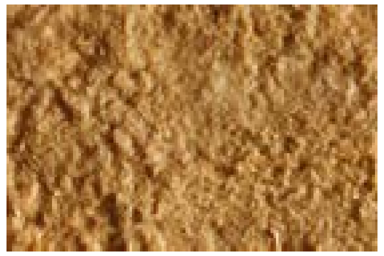


material 1

materail 2

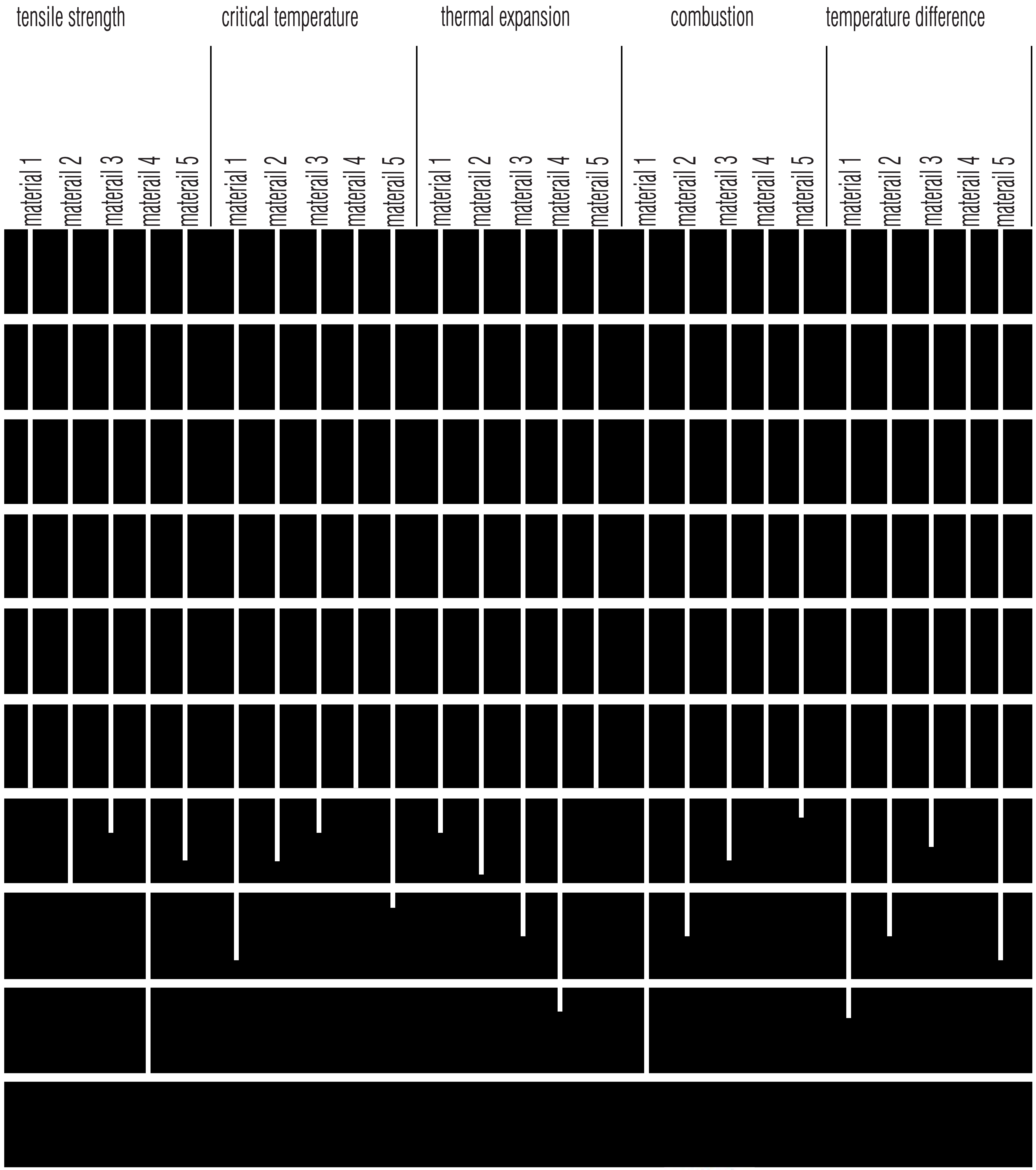
materail 3

materail 4

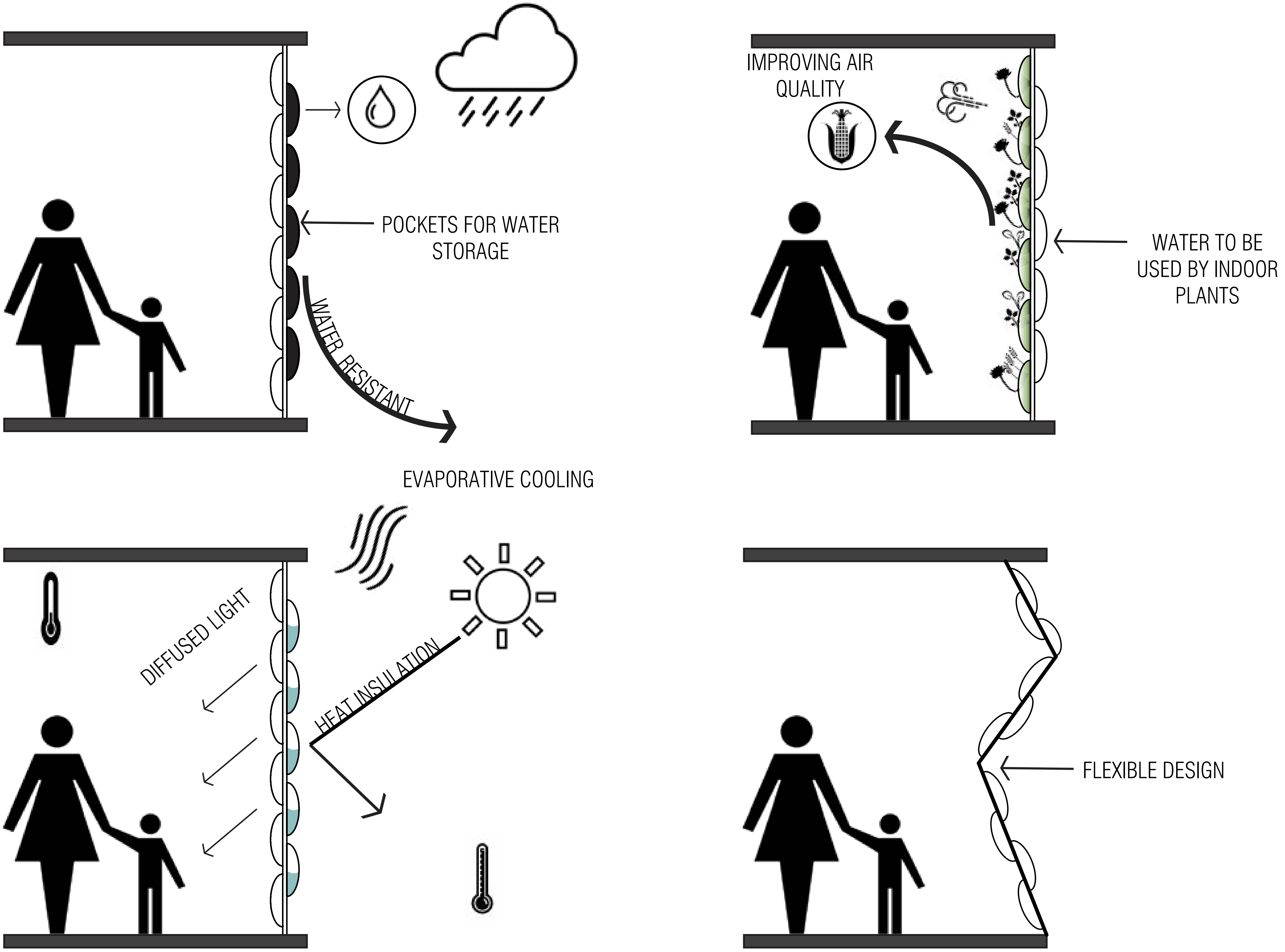


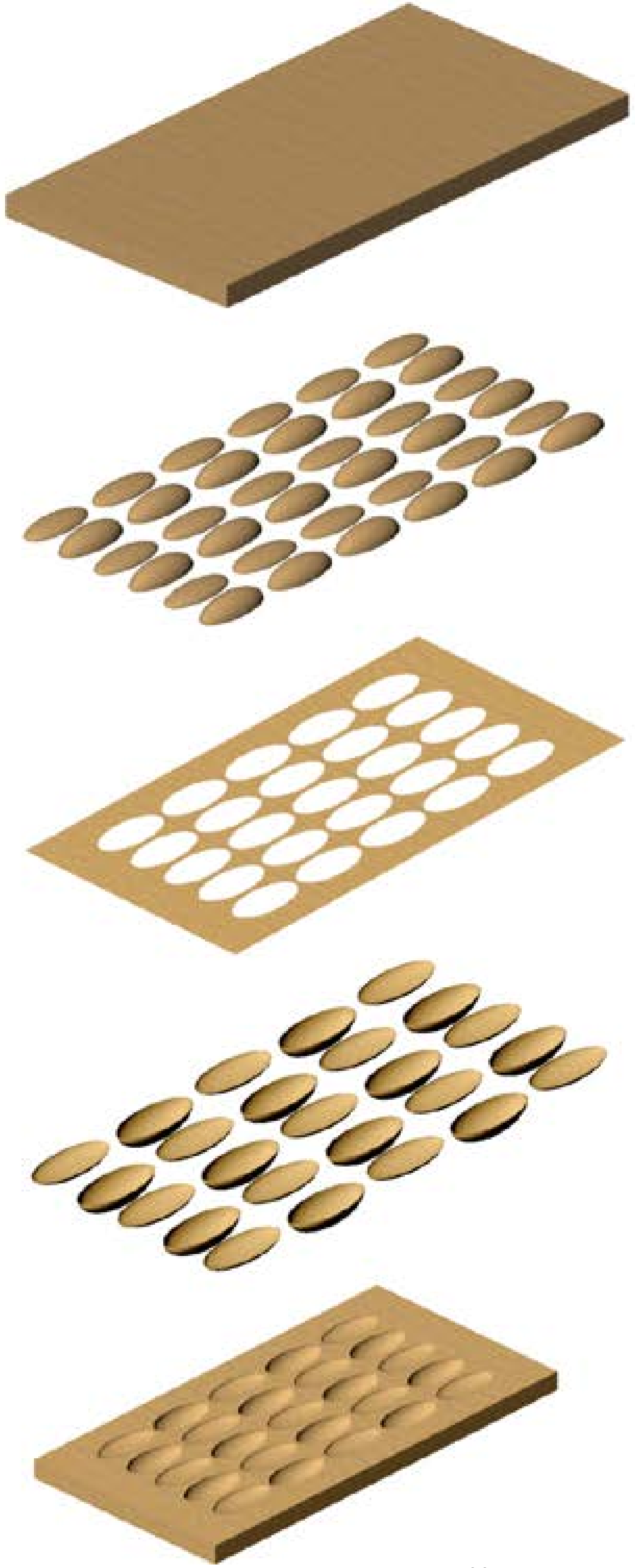
materail 5

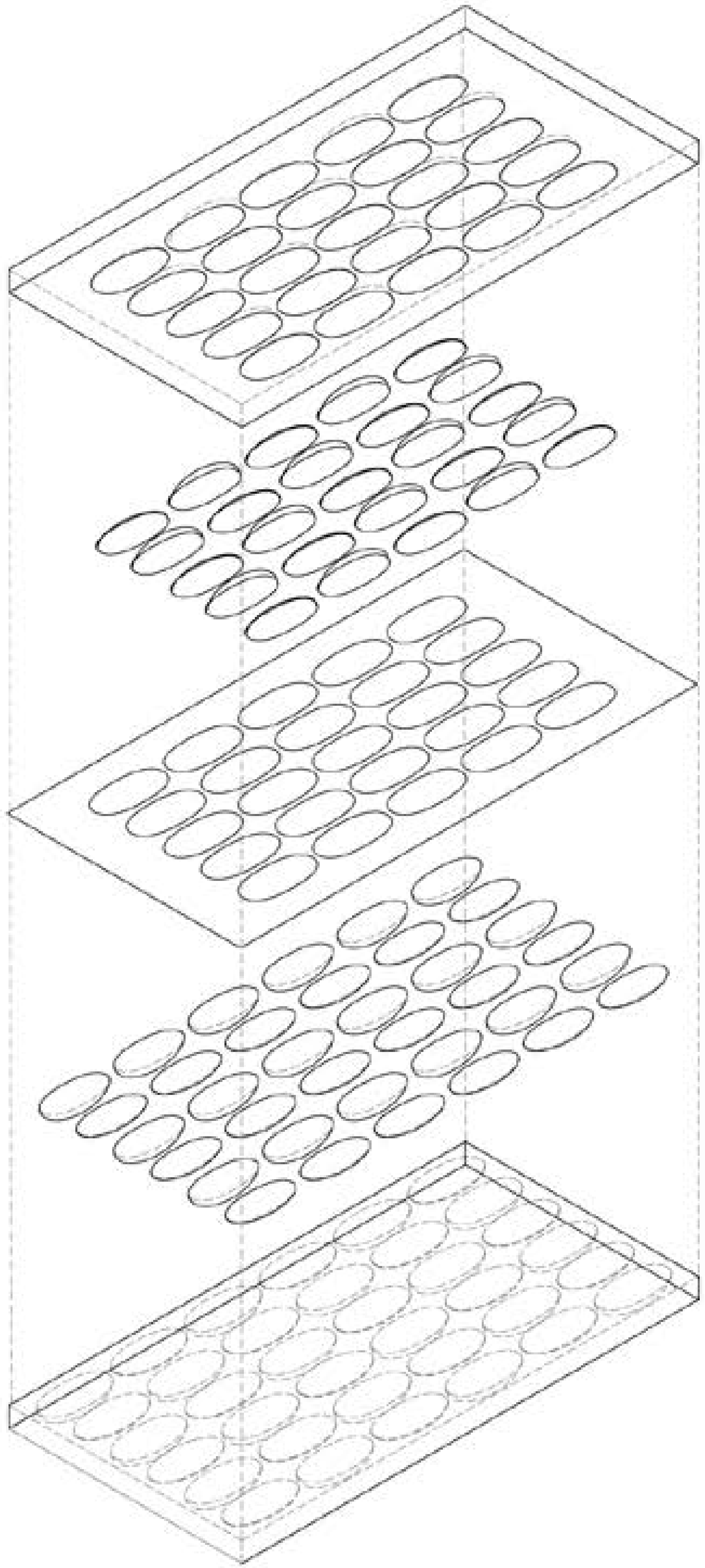
EXPERIMENTS	LATEX (ml)	SAW-DUST		ratio
material 1	150	75 grams	100ml-WATER	6:3:4
materail 2	150	25 grams		6:1
materail 3	150	50 grams		3:1
materail 4	150	0		
materail 5	150	25 grams	25GRAMS-CLAY	6:1:1



MATERIAL PROPERTIES







Top mold

The top mould is on the outer side of our skin and is supposed to collect water and transerfer it to the in-

side pocket

Pockets for water collection

The pocket is supposed to collect the rain water and transfer it to the other pocket which is oninner side of the skin

Central mold

The central mold has both the pockets attached on both the sides for achieving the thickness of 10 mm on both the pockets

Pockets for growing plants

This pocket allows to take the water from the pocket outside and grow plants on the inner side of the skin

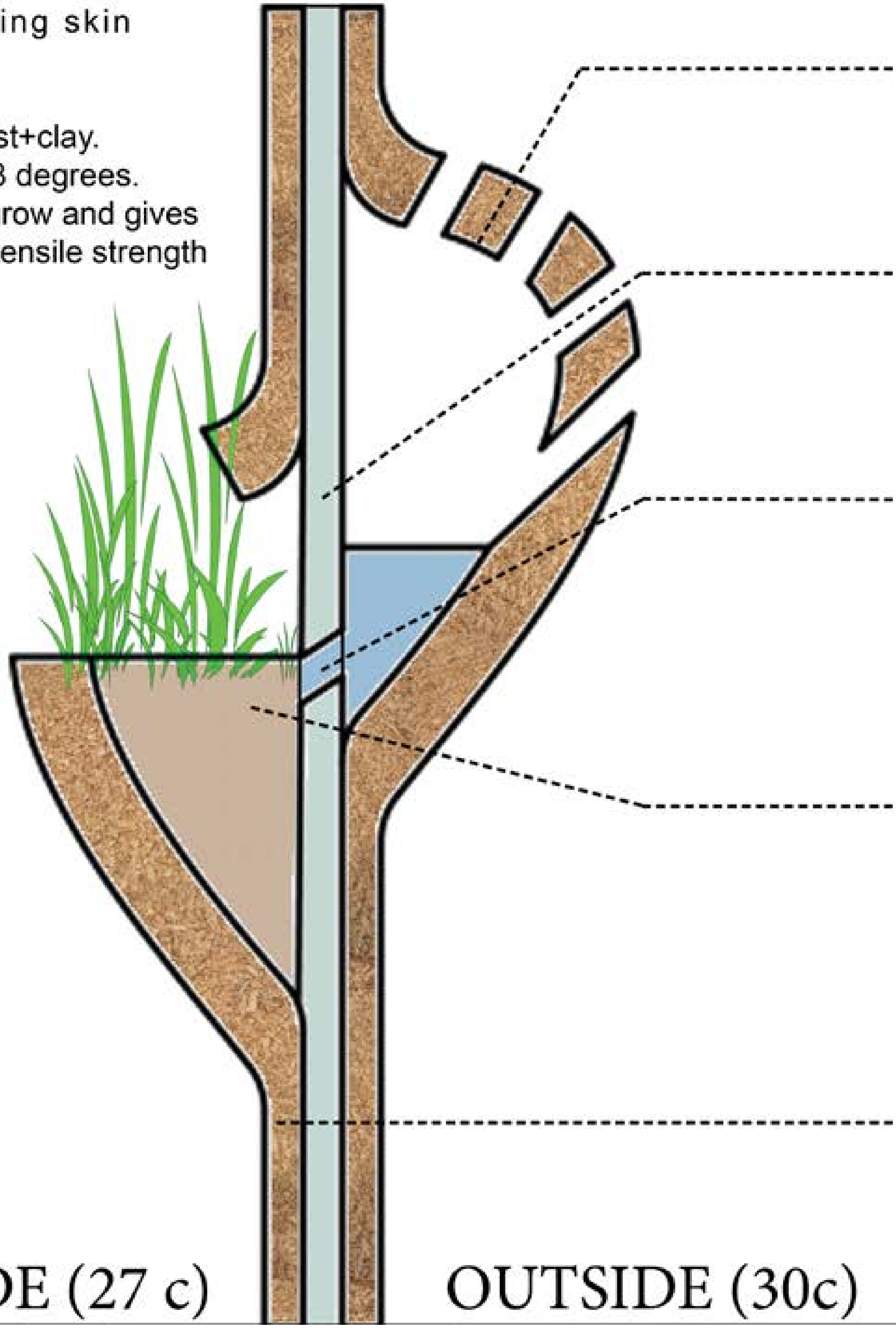
Bottom mold

The bottom mold is supposed to be on inner side of the skin which enables us to grow plants inside.

VALLDAURA

Detailed section of the breathing skin

The skin constitutes of latex+sawdust+clay.
It reduces the inside temprature by 3 degrees.
Latex and Sawdust helps plants to grow and gives strength to the latex yet keeping its tensile strength intact.



10 MM THICK OUTER POCKET FOR NATURAL WATER COLLECTION AND FOR AIR ANG LIGHT VENTILATION

WATRE PIPE MADE OF LATEX FOR MANUAL SUPPLY AND FOR REGULATING THE INSIDE TEMPRATUE.

THE WATER IS THEN TRANSFERRED TO THE INSIDE POCKET WHICH UTILISES THE WATER FOR GROWING PLANTS

INSIDE POCKET WHICH RECEIVES WATER AND FILTERED SUNLIGHT FROM OUTSIDE IS FILLED WITH SOIL FOR THE PLANTS TO GROW.

THE METABOLIC SKIN IS MADE OF LATEX + SAWDUST +CLAY AND IS 10 MM THICK WHICH REDUCES THE TEMPRATURE OF THE INSIDE SURFACE AND IS GOOD FOR PLANTS TO GROW.

METABOLIC DESIGN

PRODUCTIVE LANDSCAPES