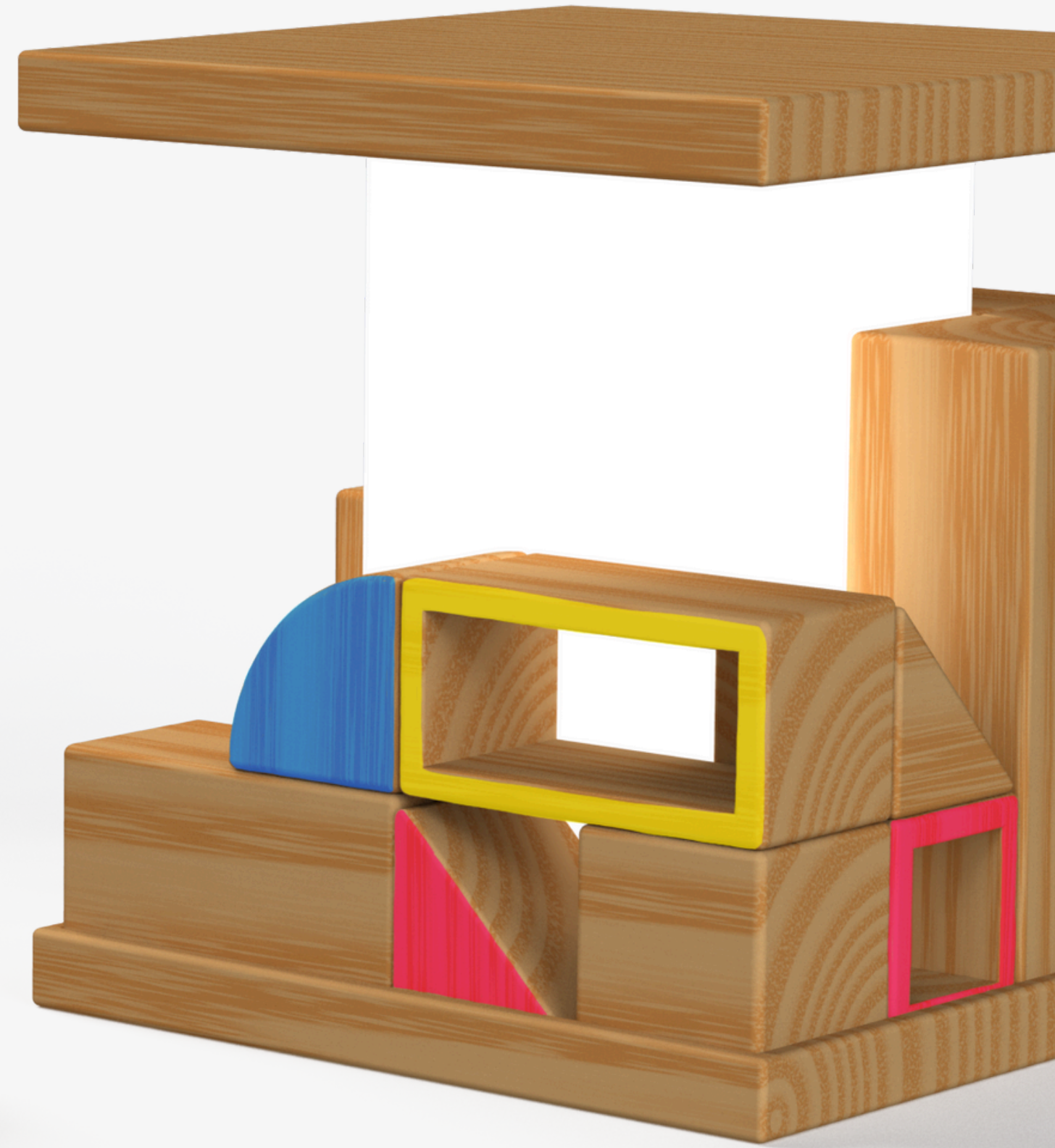




# cymbox

a modular toy block set, game, and lighting feature made to grow with and be a part of every home







**3 billion** toys sold annually in the U.S.  
generate approximately **\$40 billion**





# PLASTIC MAKES UP **90%** OF THE **TOY** INDUSTRY

Yale Environment Review





# plastics in toys

Some of the most common safe plastics used in toy manufacturing are Polyethylene Terephthalate, Polypropylene, Polyvinyl Chloride, Acrylonitrile Butadiene Styrene, and Polyurethane Foam, which all have various types and grades used in production. These materials are used for a wide ranges of toys including soft toys, board games, figurines, outdoor toys and more. Due to the many variations of plastics being used, the time it takes for each type of plastic and product to break down varies greatly.

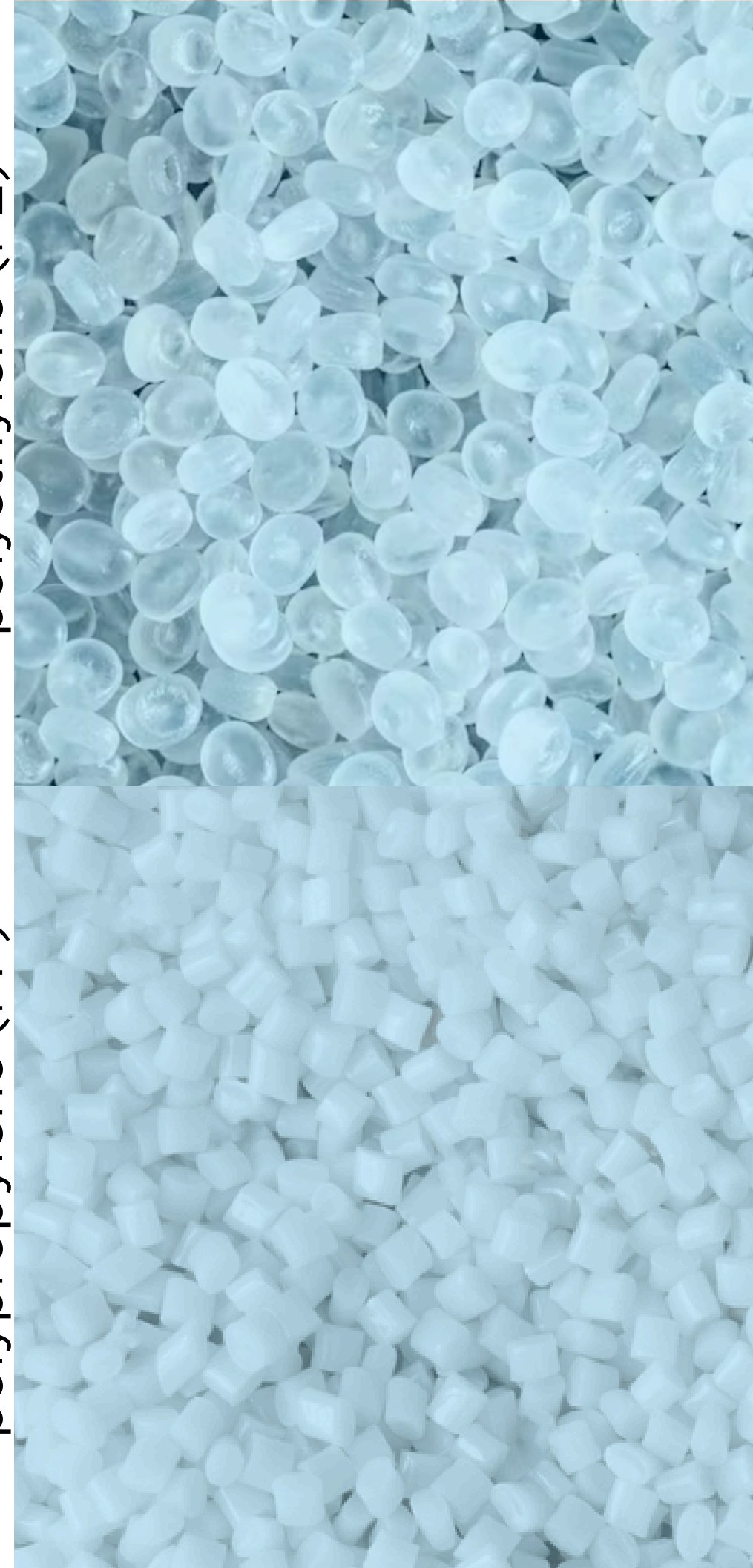
[Plastivision.org](http://Plastivision.org)

“**Plastic waste** can take anywhere from **20 to 500 years to decompose**, and even then, it never fully disappears”

United Nations

polyethylene (PE)

polypropylene (PP)







80% of all toys end their  
life cycles in landfills,  
incinerators, or the ocean

ScienceDirect.com





# traditional toys

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The Forbes article *Connected Toys Need to Learn Longevity from Traditional Toy Makers* emphasizes how older traditional toys have had analog toys or stuffed animals that also include interactive elements like books or stories that children have enjoyed throughout the years and still enjoy today.

“But more than that, I’m looking forward to this space maturing and **learning from what traditional toy makers have done through the ages: make beautiful objects that mean something**”

This line of thought reminded me of the longevity and durable quality that many traditional toys have. This is in part due to them being constructed from quality materials and simple designs that were easier for younger children to interact with and understand.

I began to think of the growing necessity for modern and technological toys and gadgets to remain sustainable, durable, and relevant throughout the years after their release to avoid discardment. This became a leading idea for my research, ideation, and development.



# why are toys being discarded?



low quality  
materials + design



made for specific  
age ranges



visually unappealing  
for the home

*This results in a **low emotional connection from users**, in which then the **toys end of life is not valued or considered***

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# research insights

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When toys are made from low-quality materials, the user experience can be negatively affected by the products breaking, malfunctioning, or deteriorating quickly. ***When products are not made to last, they simply will not.*** In addition, many toys and games are appropriately designed and created for specific age groups and developmental levels which children grow out of quickly. In turn, many families often rotate various toys in and out of their homes to keep up with their children's needs and abilities. Finally, many toys and games are marketed toward children and heavily involve bold, saturated, and bright patterns, colors, and designs. Most games spend the majority of their lives in game closets or playrooms as they aren't appealing visually to display as a part of the home and appeal to multiple decoration styles. *Is it possible to design a toy that is attractive to both adults and children?*



**How can toys be designed in a sustainable way that centers:**

**durability,**

**multi-generational engagement,**

**and an emotional connection with the user?**



**multi-generational**

**ages with users**

durability

organic material

**engaging**

**strong emotional connection**

developmentally appropriate

**longevity**

entertaining

sustainable

home decor

**repairability**



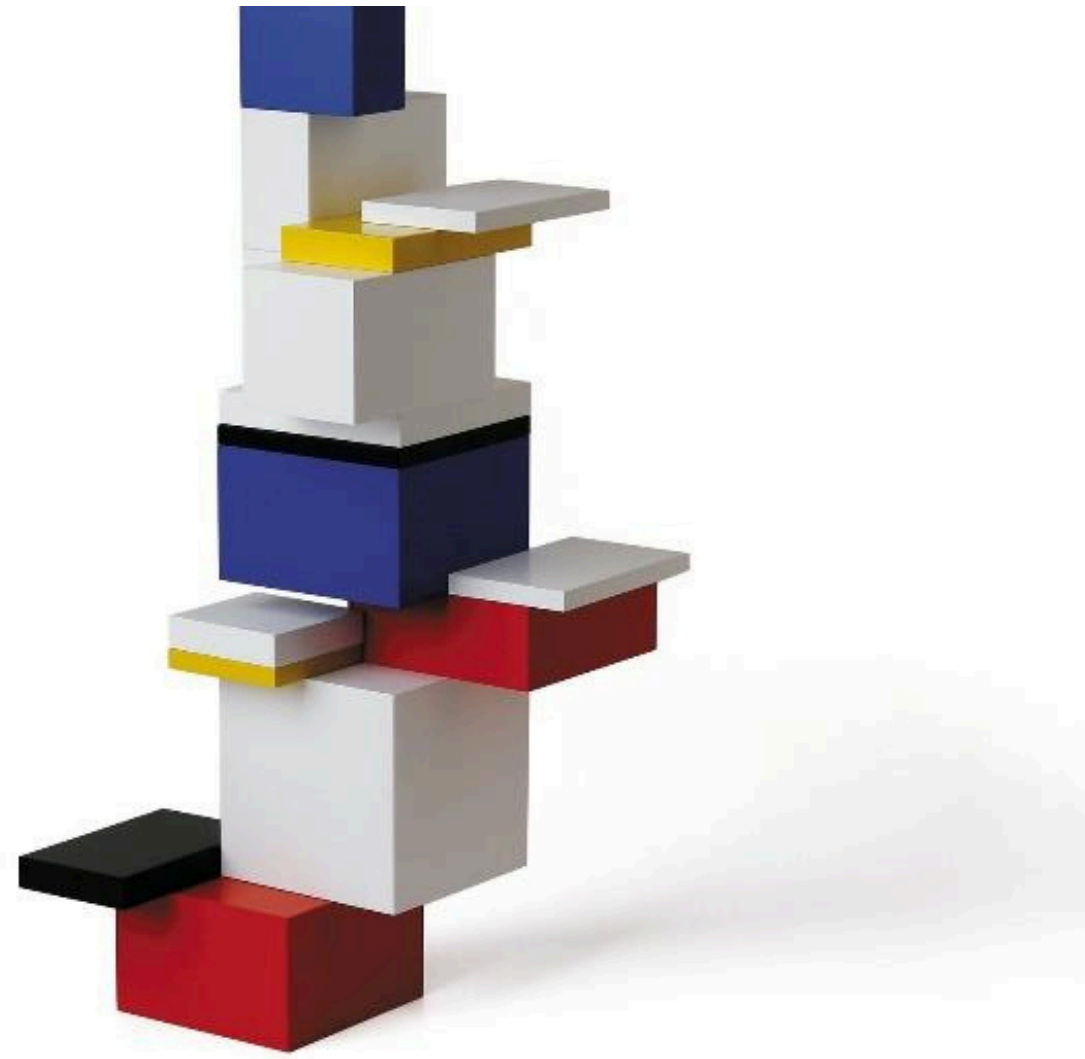


**nesting**

**home decor**

**compact storage**

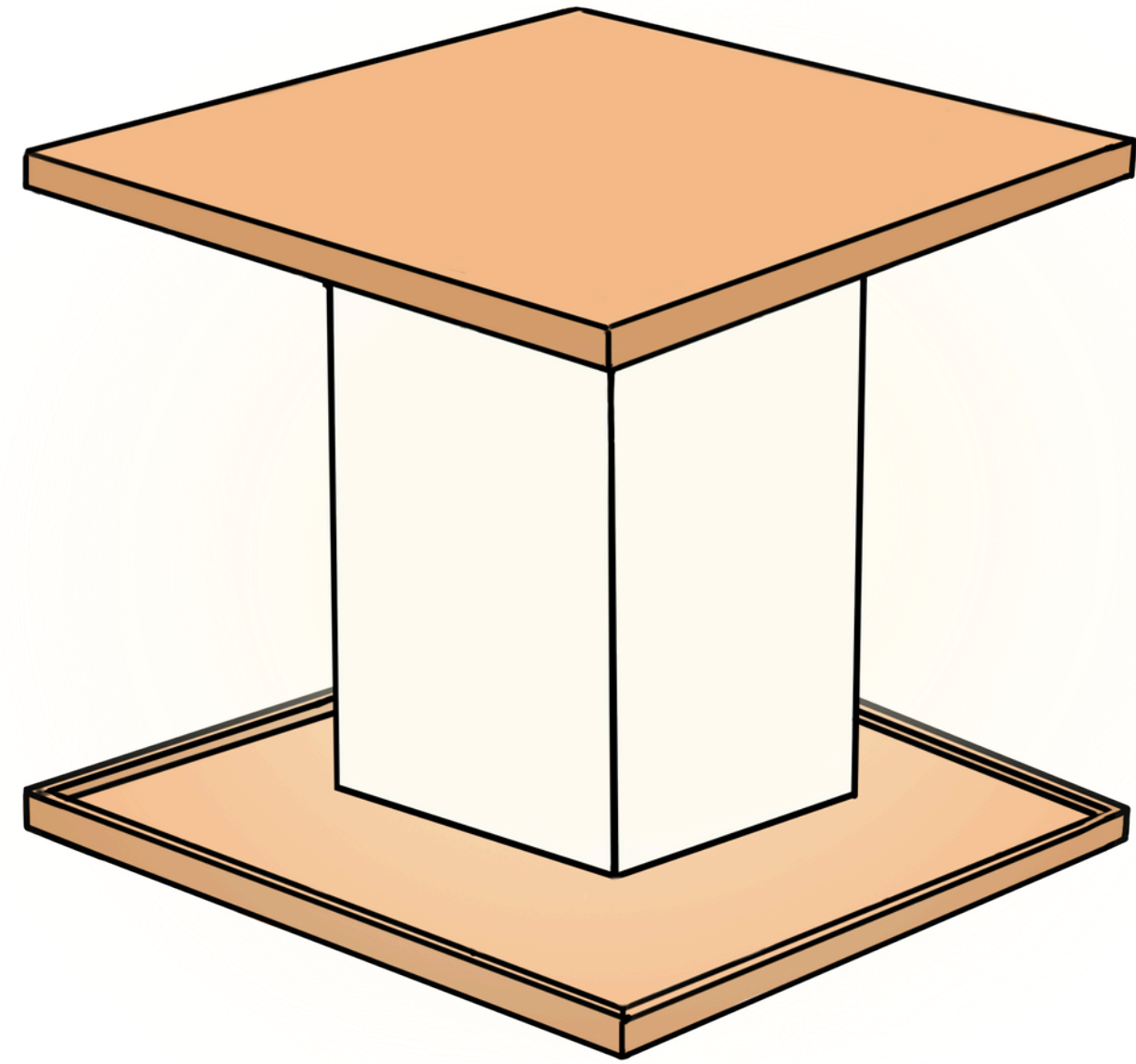
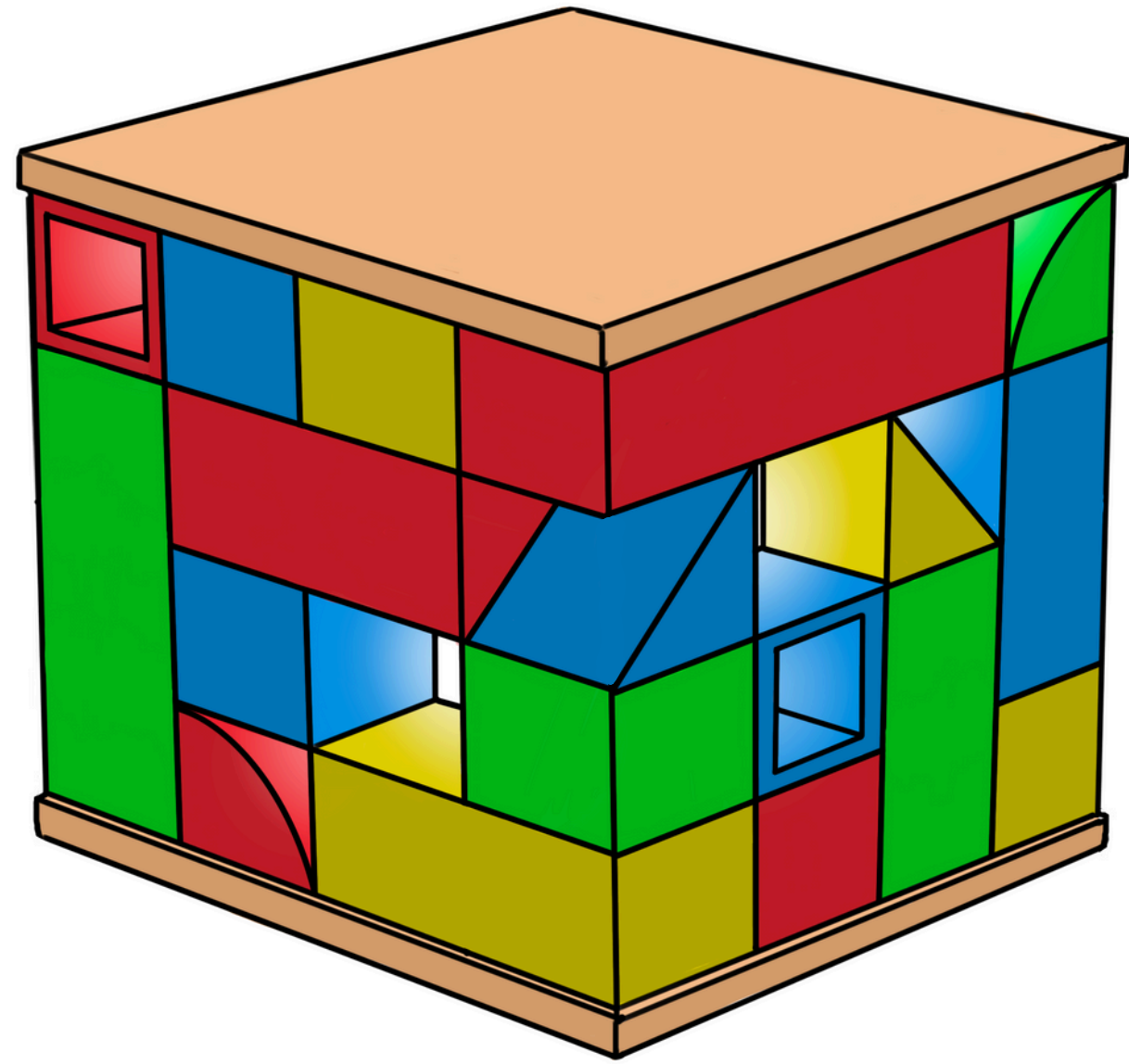
These toys are examples of play that can be adaptable and appealing to multiple generations because they act as home decor and beautiful pieces for the home.





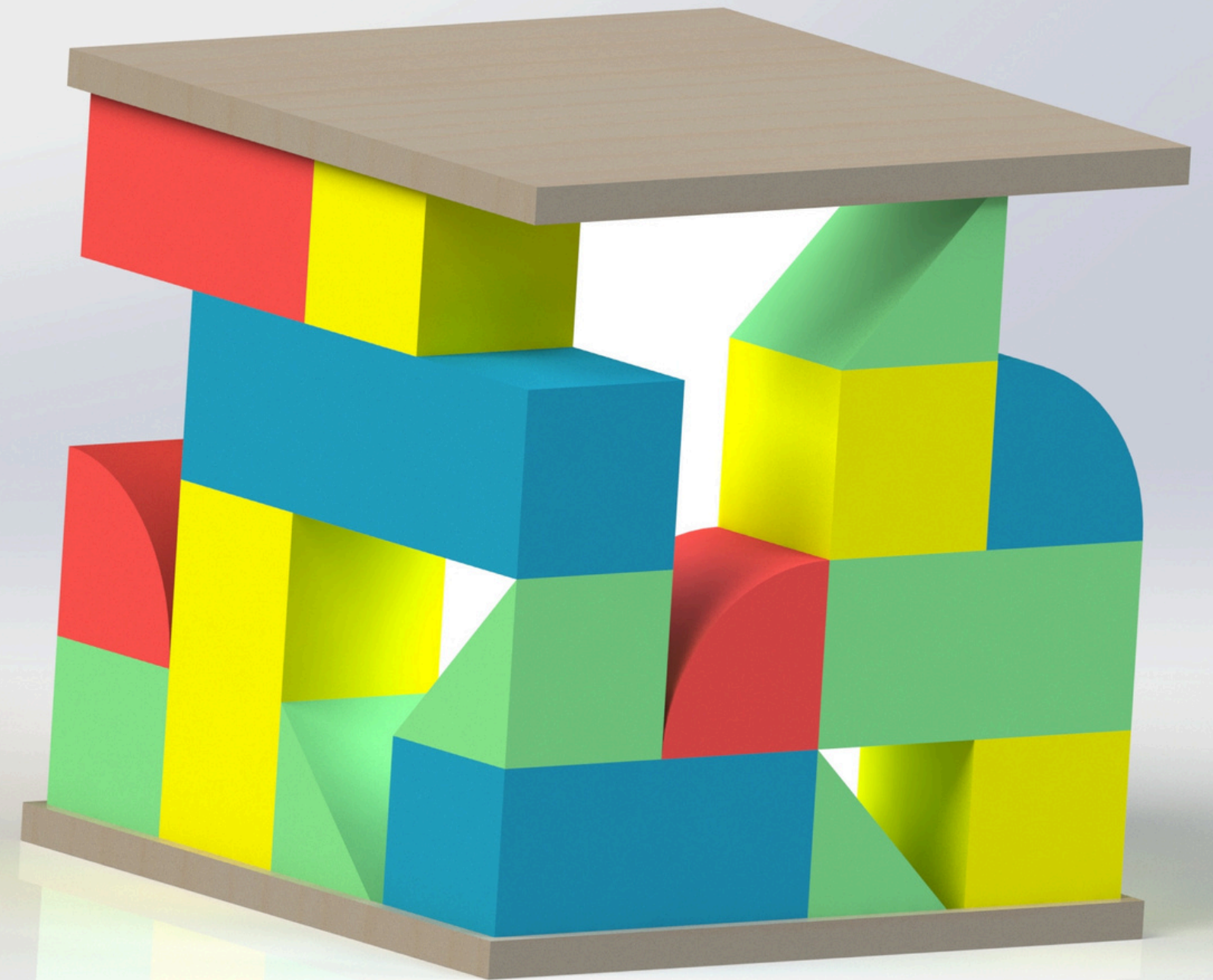






concept ideation





initial concept modeling



# physical prototyping



9.5"

scale: too large  
uncomfortable to hold

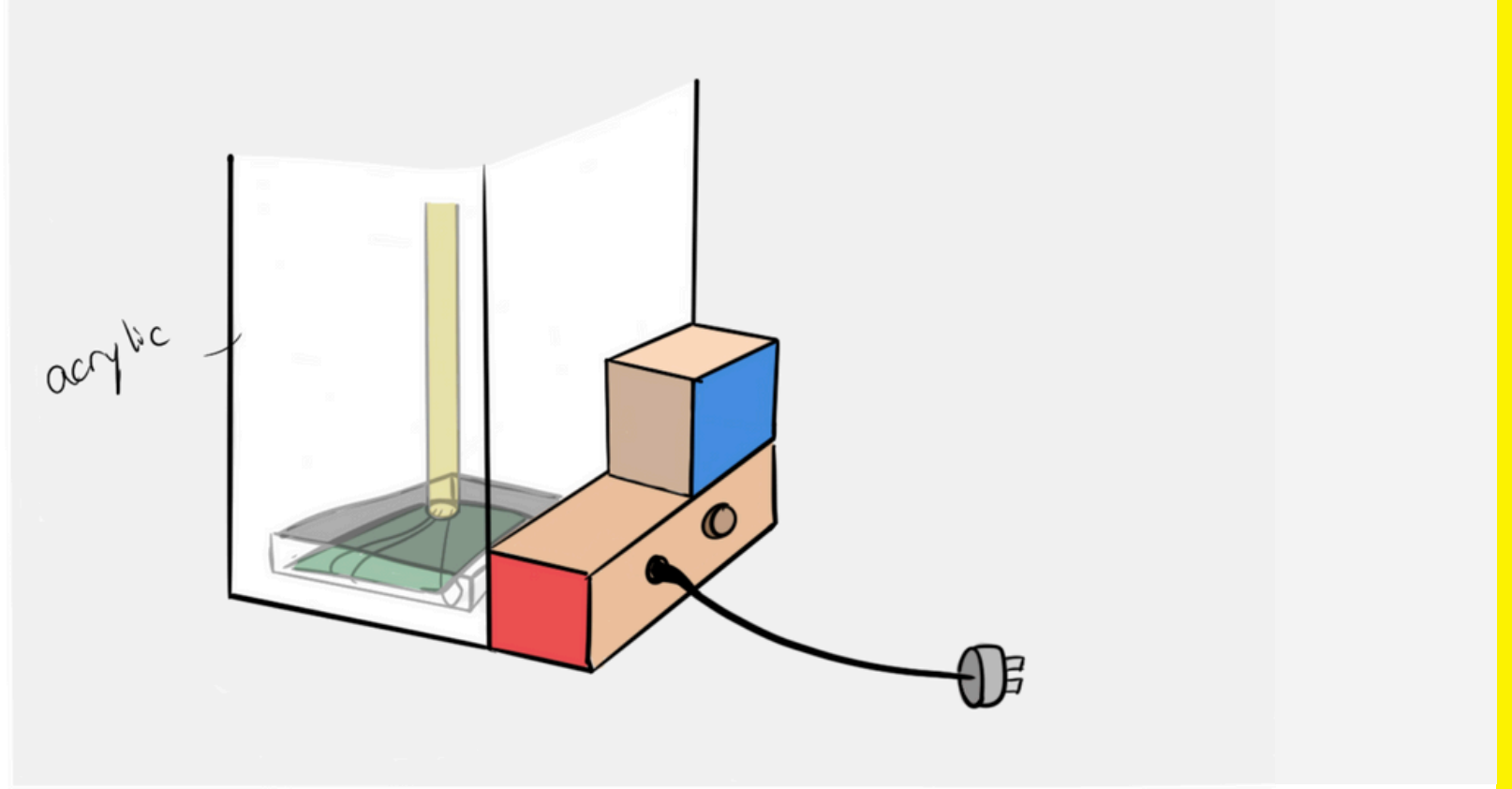
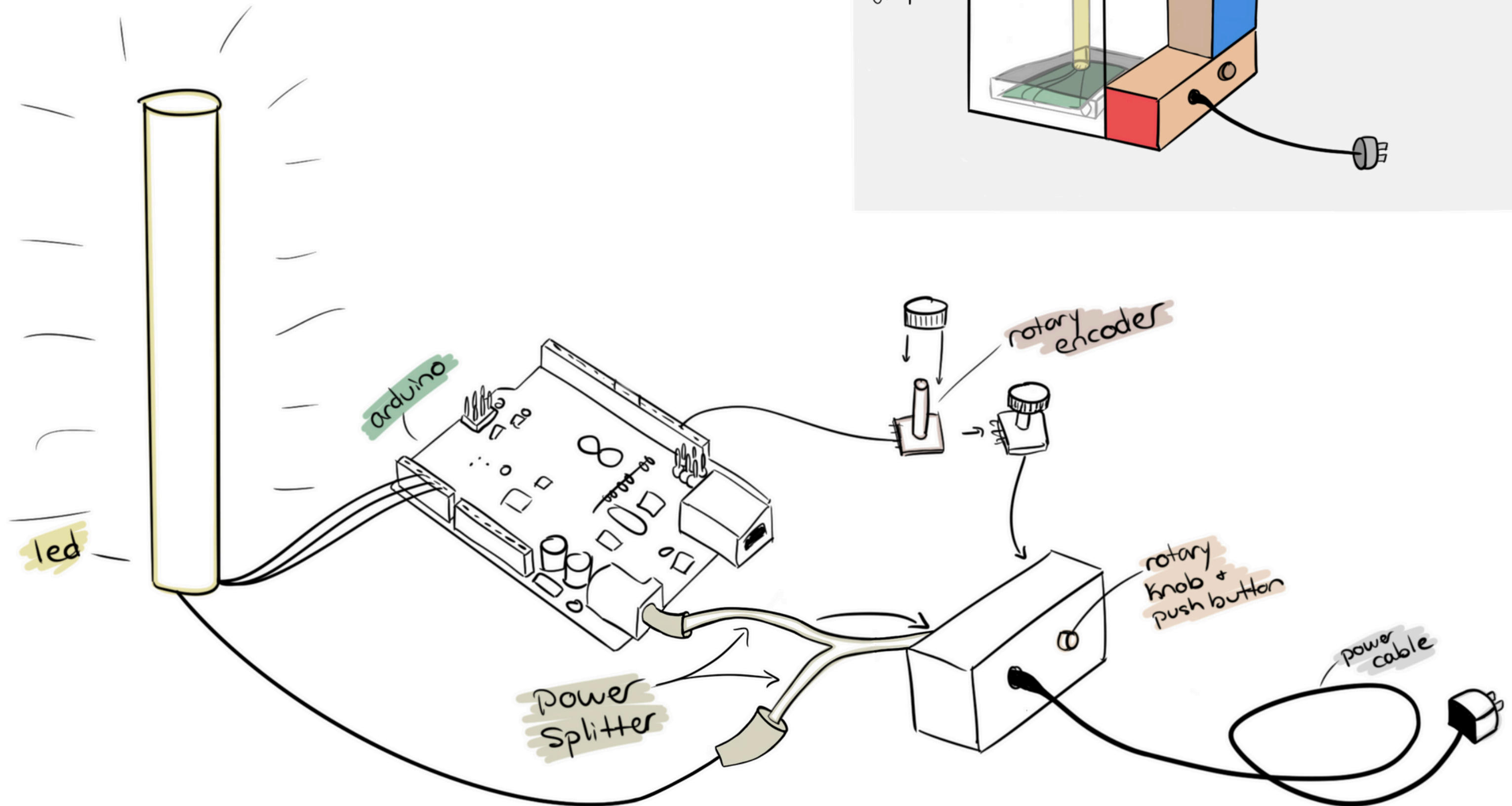


8.375"

scaled down  
initial light testing



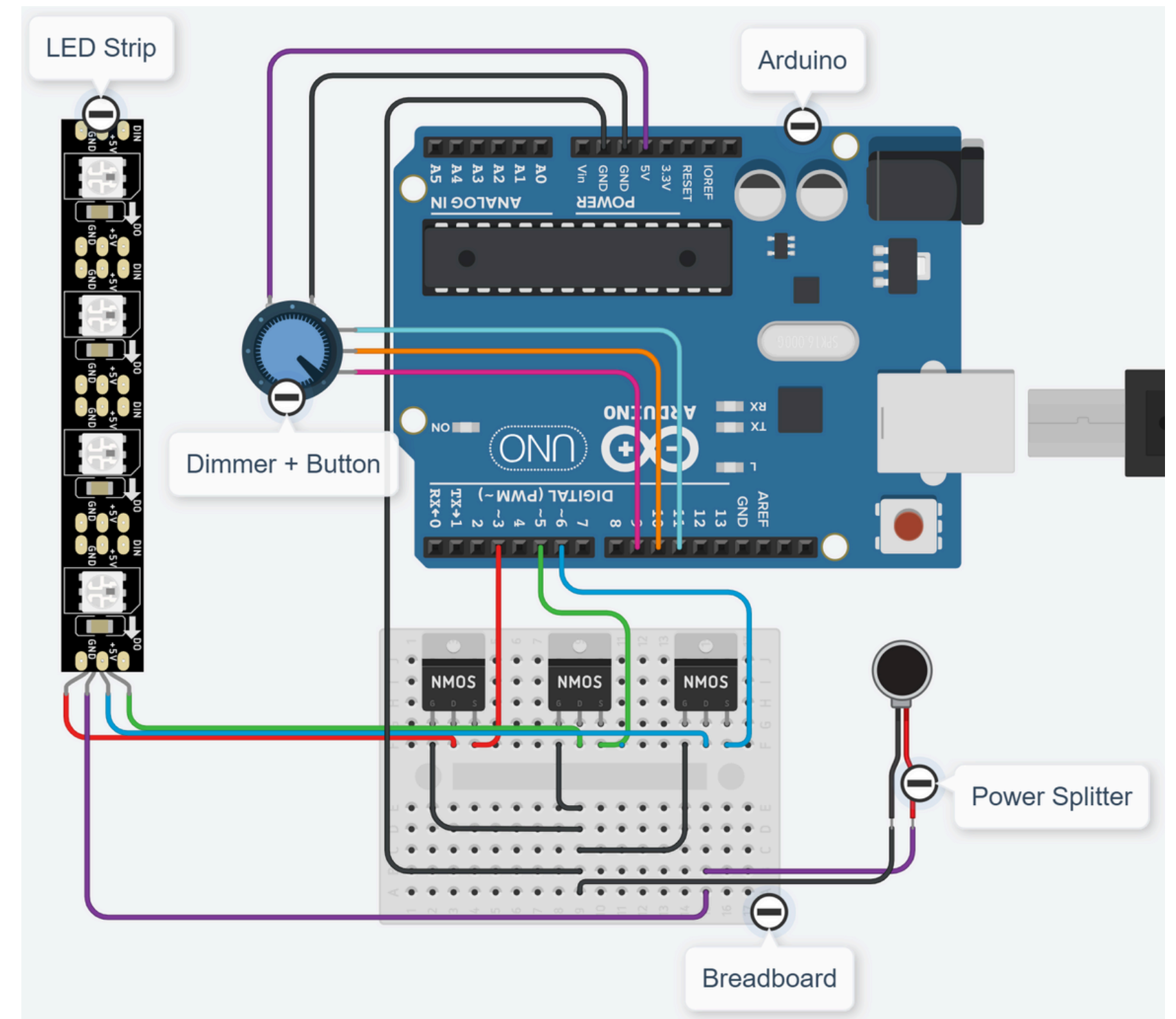
# initial electrical plan





# prototype schematic

Although the final product would be made from replaceable LED rods/bulbs, the final physical prototype was made from an arduino, dimmer button, and an led strip. I chose the arduino in order to create an accurate representation and works like model with the function of turning on, switching through color modes, and brightening and dimming the light. To the right is my final schematic of the wiring process.

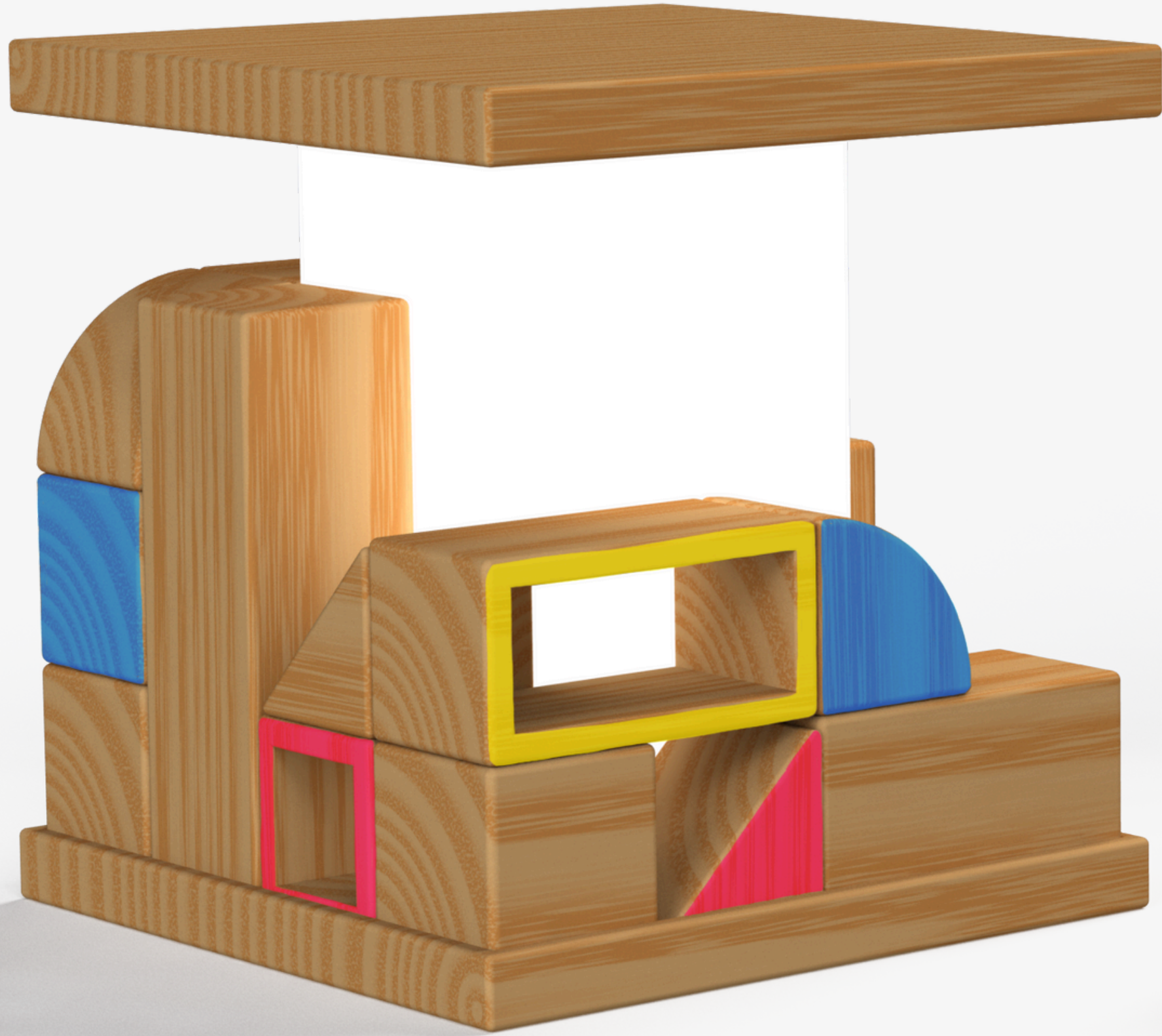




# final prototype







cymbox





# features



**25** building blocks

stacking game

light feature

instruction booklet



# materiality



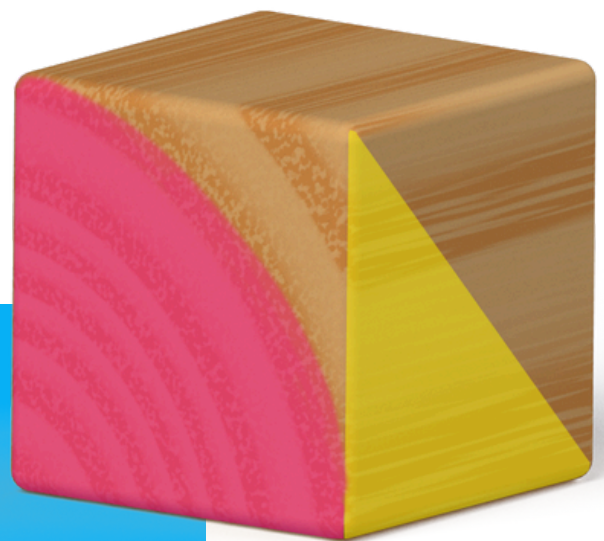
hardwoods, like oak, maple, birch, walnut, and poplar for the blocks and base build



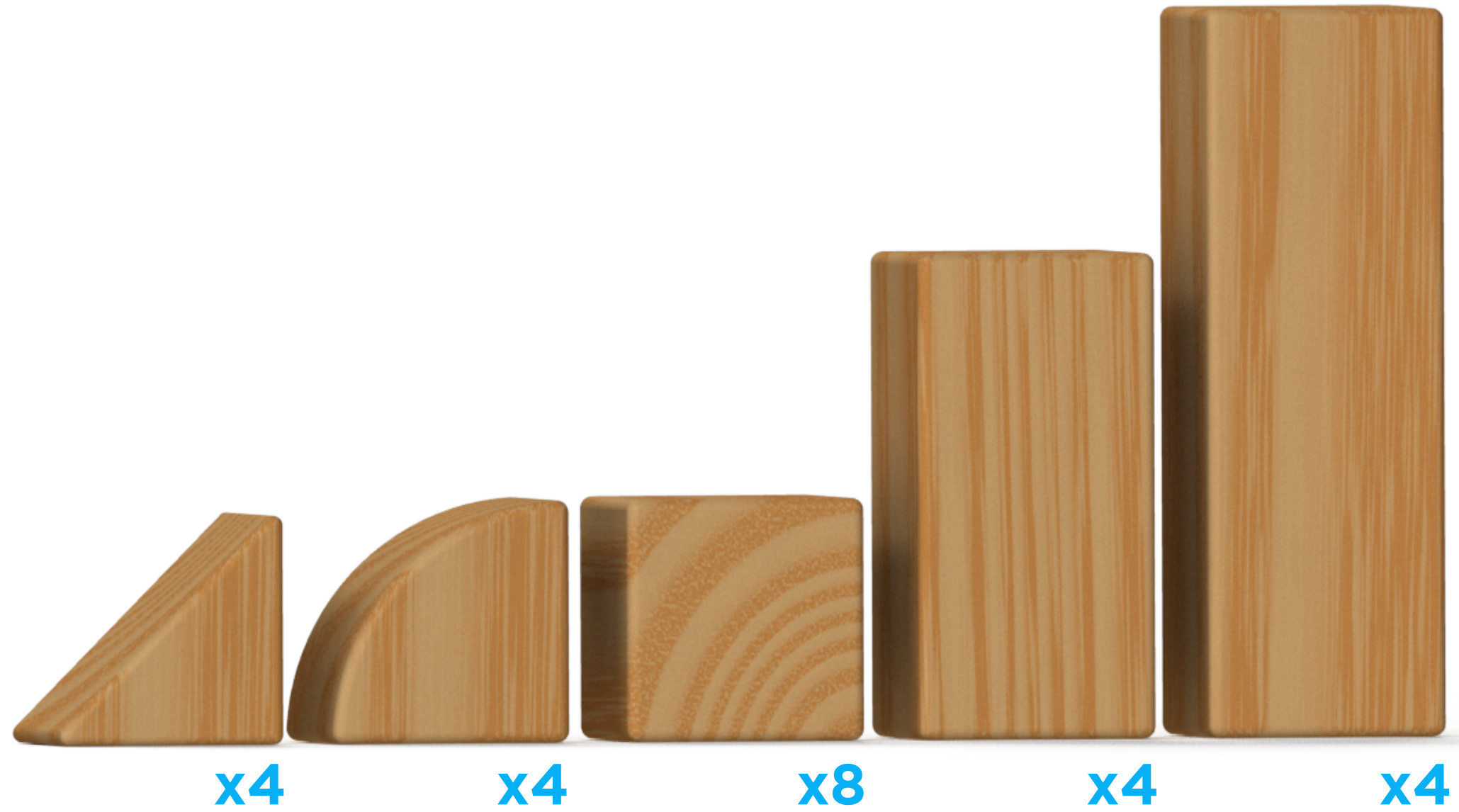
translucent sheets of acrylic to diffuse the light emitting from the LED light



# 25 block set



+1 die block





# cymstack!

stacking game

2 modes of play



## Basic Rule Set For Both Versions...

2x1 block starts as base

roll die which tells the player which block to place

must place blocks at the same level or higher than the previous block



## cooperative ruleset

work together, one tower

more freedom with blocks

circle face tells players to choose any block

goal: stack and balance all the blocks on one tower

## competitive ruleset

working in 2 teams or 1v1, two towers

more rules + risk involved in the gameplay

the circle face will skip the player's turn + give

an advantage to the other team

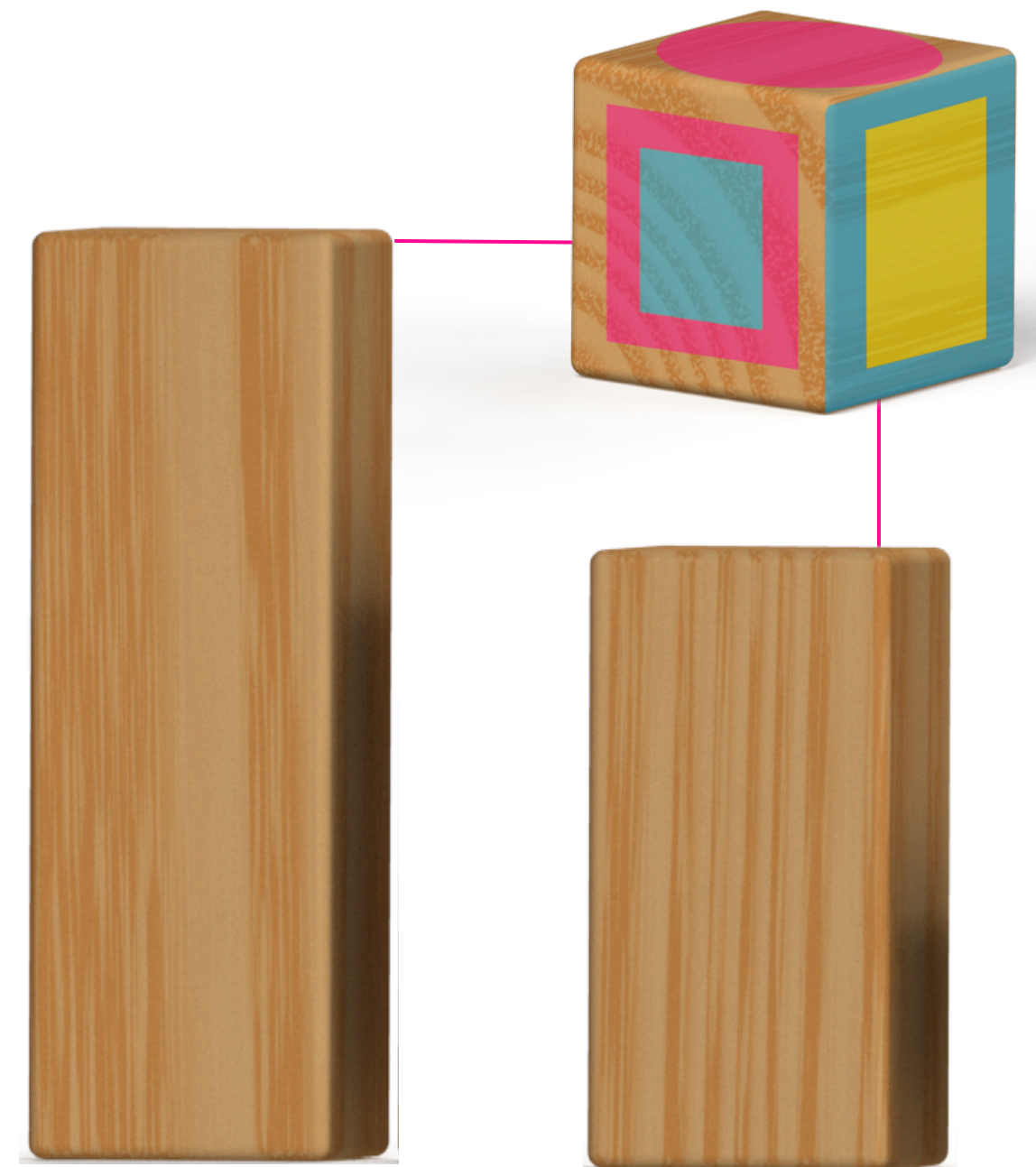
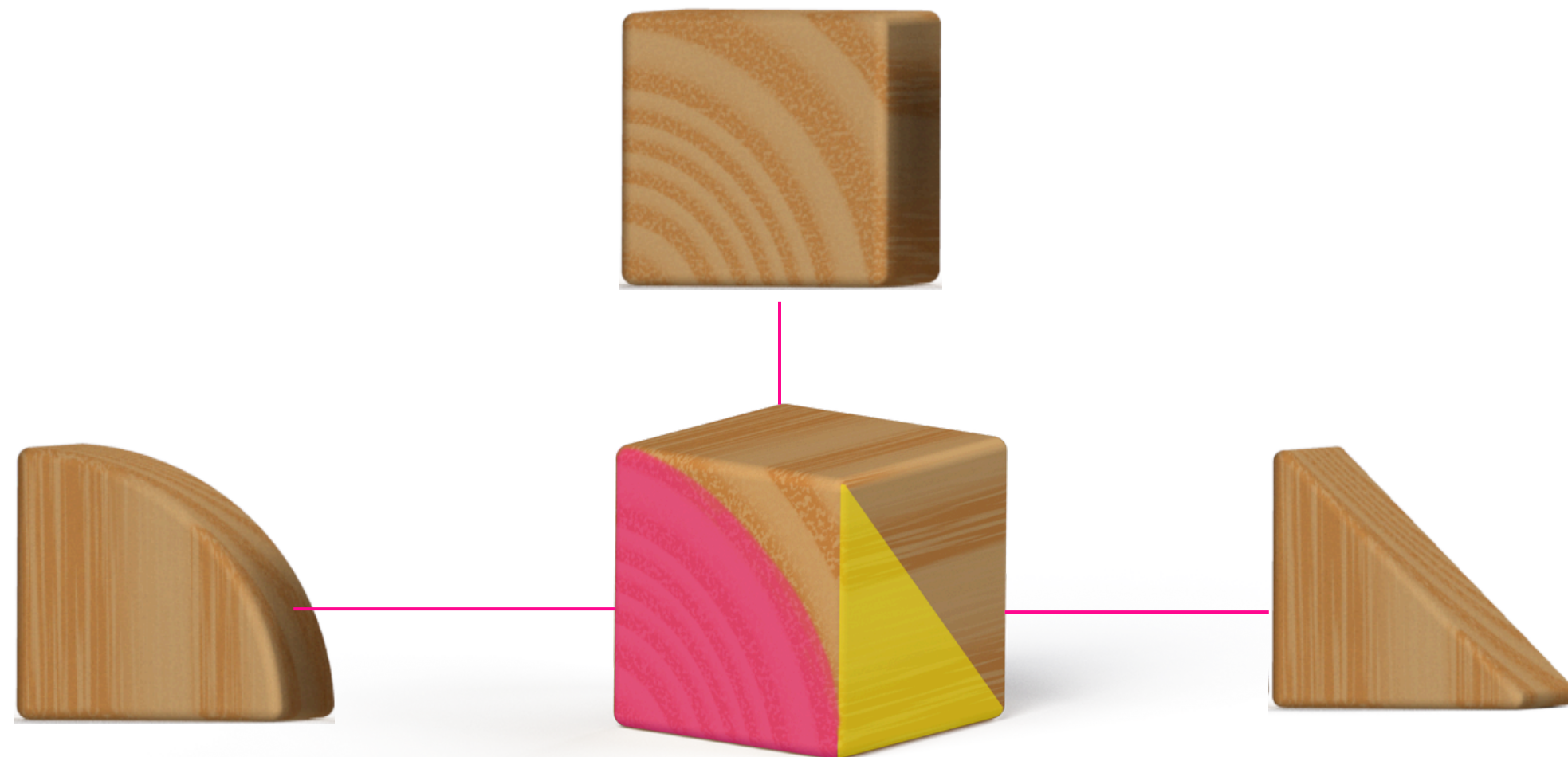
goal: have one tower survive!





# die graphics

For the die faces I decided to create custom graphics. The rounded corner block, right triangle block, and square block are all represented by its same shape. The 2x1 and 3x1 blocks correspond to the amount of colors or rectangles on the face. The circle face, in the cooperative mode, is a free block which signifies that when players roll the circle, they can choose any block of their choosing to place. In the competitive mode, the circle face represents a skip turn, where instead of placing a block, the team must remove a block from their tower and give it to the other team to place on their tower that same turn. They may not roll again after.





# lighting

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## 5 color modes:

white  
warm white  
rainbow gradient  
warm gradient  
cool gradient

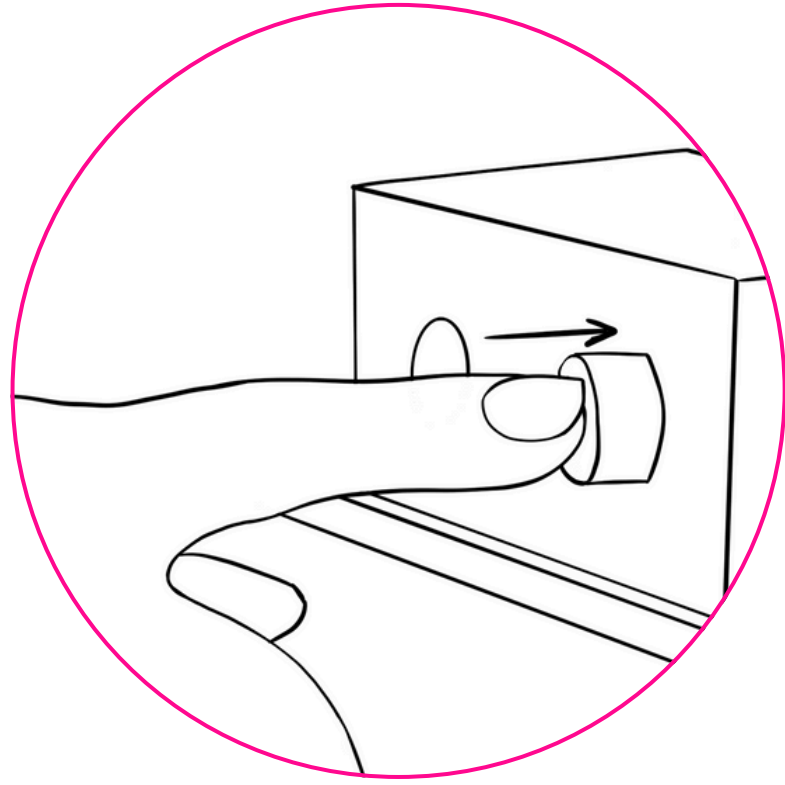
**Adjustable brightness**



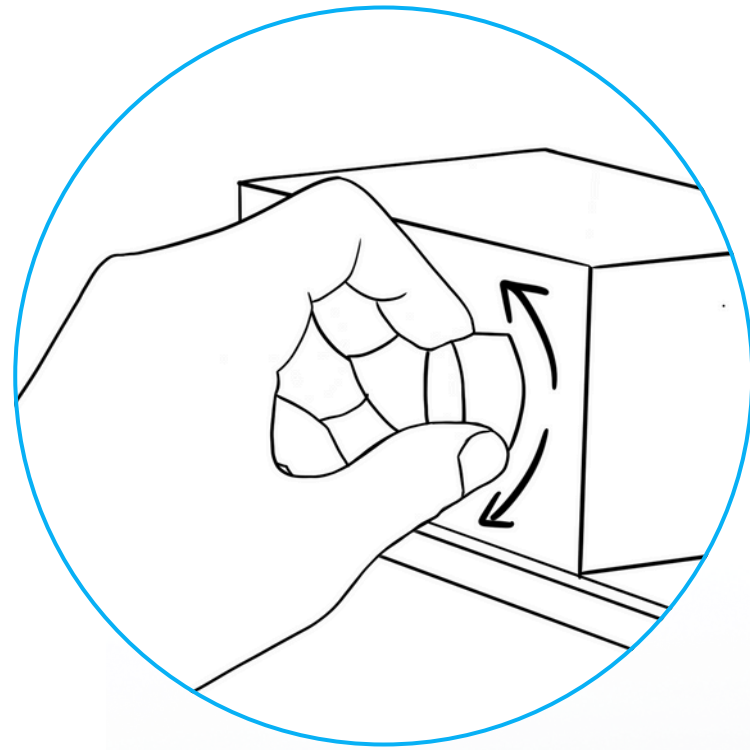








push to turn on and switch through color modes



rotate left and right to brighten and dim lighting

charging port

lighting controls

booklet slot

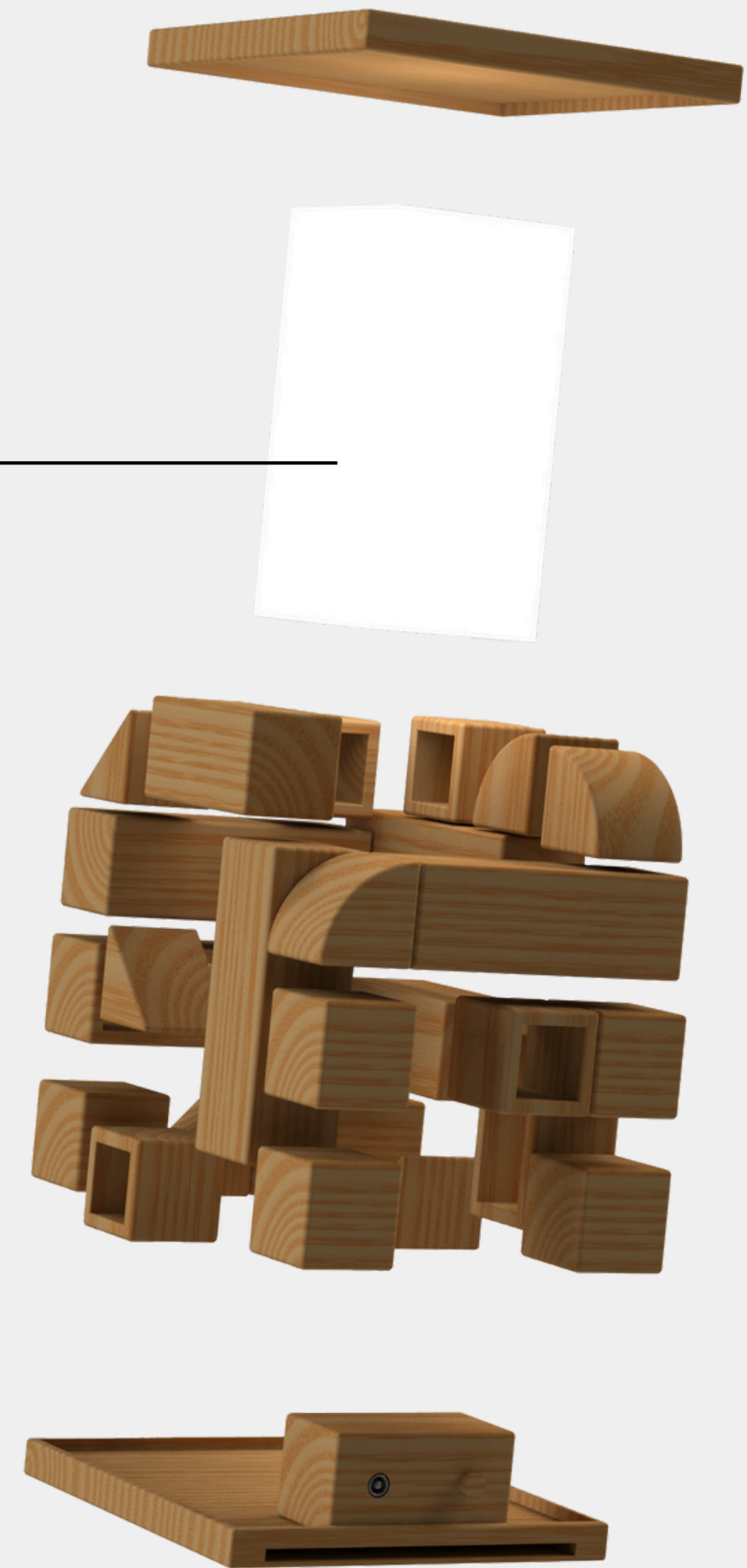
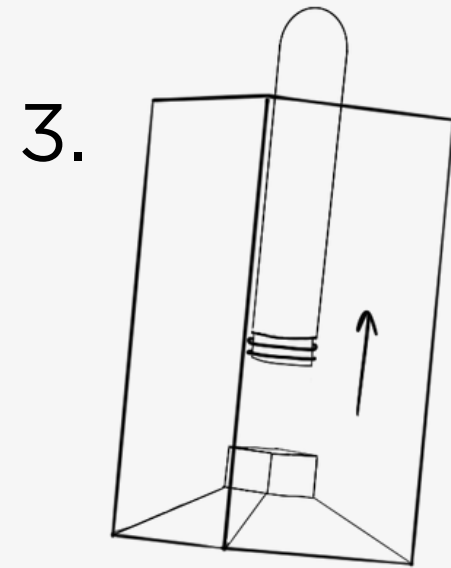
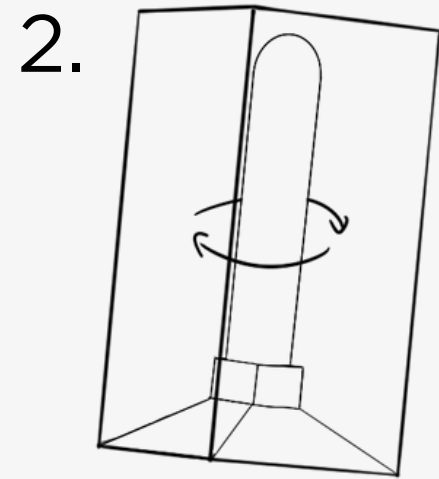
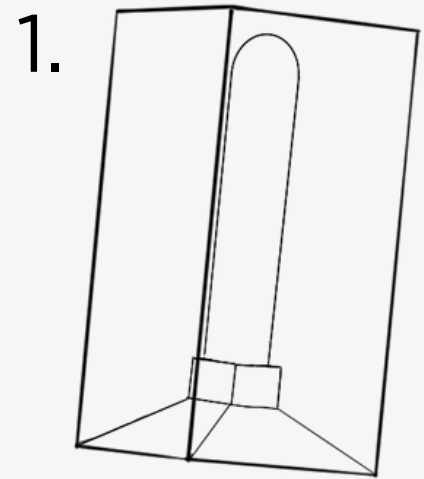




# repairability

Twist to remove and change LED bulb

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# USER MANUAL cymbox

This manual covers the basic use, functions, and features of the cymbox block set and lighting feature. For more information of the customization program, example how to videos for the cymstack! game, and customer service help or concerns, please visit [www.cymbox.com](http://www.cymbox.com).



The *cymbox* block set is best suited for users ages 2+. Adult supervision is recommended for children younger than 5 years old.

## Contents

<b>Welcome to Your cymbox!</b> .....	<b>01</b>
<b>25 Modular Block Set</b> .....	<b>03</b>
<b>cymstack Game</b> .....	<b>04</b>
Collaborative Version How To.....	04
Competitive Version How To.....	06
Die Faces.....	08
Extra Challenges + Modes.....	09
<b>Lighting Feature</b> .....	<b>10</b>
Lighting Modes.....	10
Lighting Controls.....	11
Replaceable Lightbulb.....	12
Electrical Specs.....	13
<b>Storage Puzzle Templates</b> .....	<b>15</b>

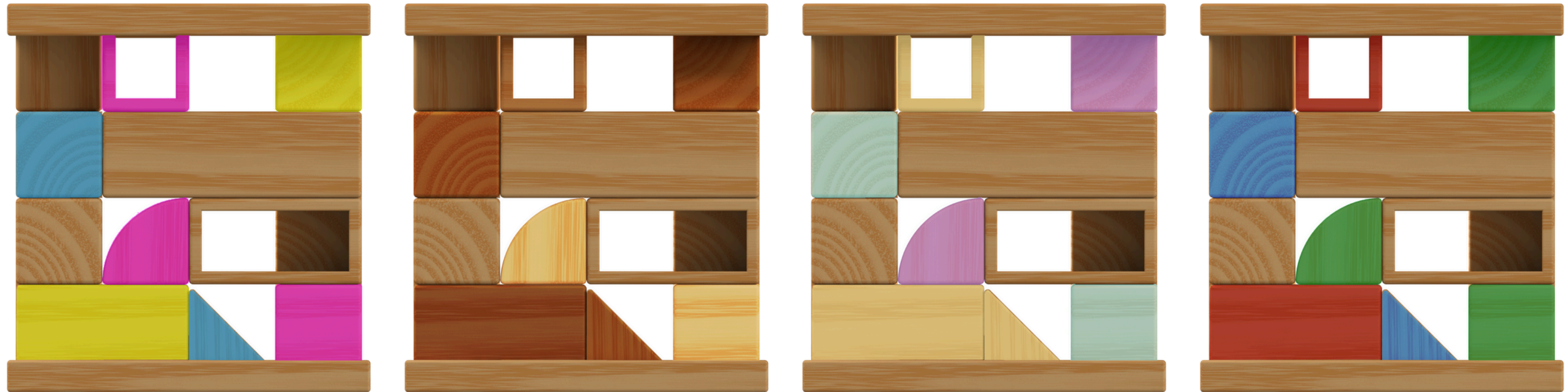
USER MANUAL



# colorways

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cymbox allows users to customize their block set's colors for them to have their perfect set that fits their home as they see fit.







cymbox can be integrated  
into user's daily routines

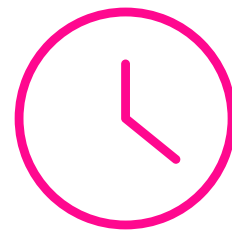




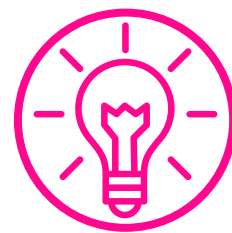
# sustainability considerations



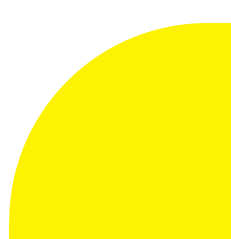
majority organic material choice



longevity from multi-faceted design



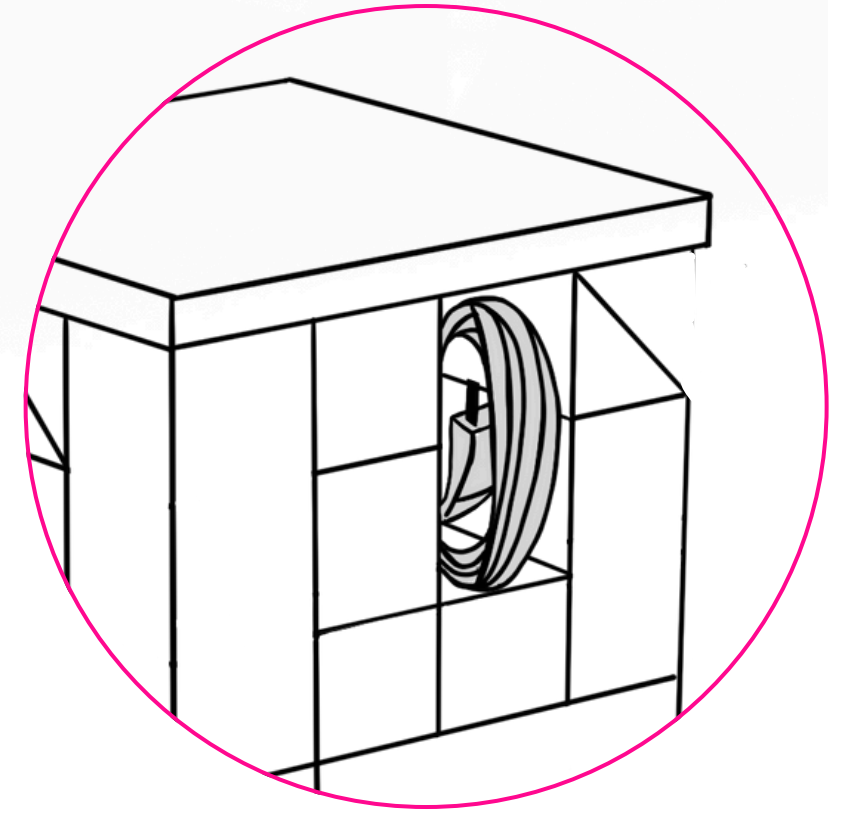
replaceable LED bulb





# packaging

charging cable placed in gap in  
between blocks





# resources

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[Toy Association- Economic Impact Data](#)

[Yale Environment Review](#)

[Plastivision-Understanding The Materials That Are Used To Build Plastic Toys](#)

[AAA Polymer-Polypropelyne Recycling](#)

[United Nations-Plastic Is Forever](#)

[Science Direct-A Life Cycle Assessment Of The Environmental Impact Of Children's Toys](#)

[National Library of Medicine-Degradation Of Polyethylene Plastic In Soil And Effects On Microbial Community Composition](#)

[Forbes-Connected Toys Need To Learn Longevity From Traditional Toy Makers](#)

[Time Magazine-My Kids Want Plastic Toys. I Want to Go Green. Here's the Middle Ground](#)

[Science Buddies- Analog RGB LED Strip Control With Arduino](#)

[BBC News-Plastic toys: Is It Time We Cut Back?](#)

[CNBC News-Adults Are Buying Toys For Themselves, And It's The Biggest Source Of Growth For The Industry](#)

[DePaul University-Researchers Reveal Environmental Impact of Children's Toys](#)

[International Toy Research Association](#)

[National Association for the Education of Young Children-Good Toys for Young Children by Age and Stage](#)

[Hospital for Special Surgery-Child Development Toys by Age: Choosing the Best Toys for Your Child](#)

[Emma Hubbard Pediatric Occupational Therapist-23 Developmentally Beneficial Toys](#)

[Play And Playground Encyclopedia-Games With Rules](#)

[The Consumer Product Safety Improvement Act \(CPSIA\)](#)

[Naef Spiele AG](#)

[Areaware Wooden Toys](#)

[Odin Parker Heirloom Wooden Toys](#)

[ZooModern Toys- Safe Wood](#)

[YOTTOY Productions](#)

[Freepik Booklet Mockuo](#)

[Unsplash-Vanessa Bucceri](#)

[Unsplash-Michał Bożek](#)

[Unsplash-Ryan Fields](#)

[Unsplash-Luis Arias](#)

[Unsplash-Nareeta Martin](#)

[Unsplash-Thomas Buchholz](#)

[Unsplash-Stephanie Moody](#)

[Unsplash-Nat](#)

[Unsplash-Samantha Gades](#)

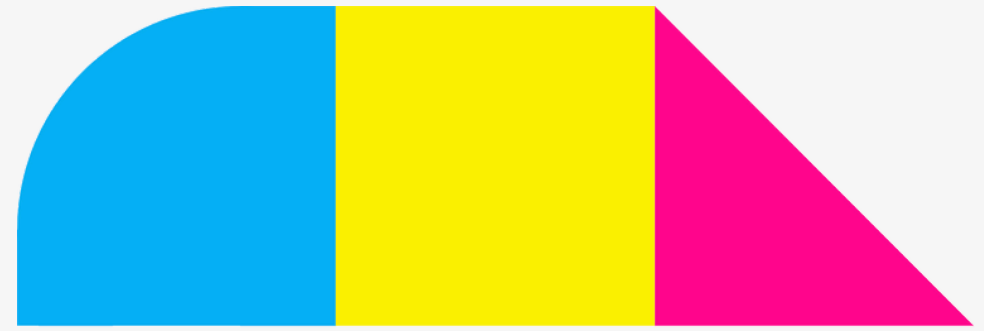
[Unsplash-Marisa Howenstine](#)

[Unsplash-Geon George](#)

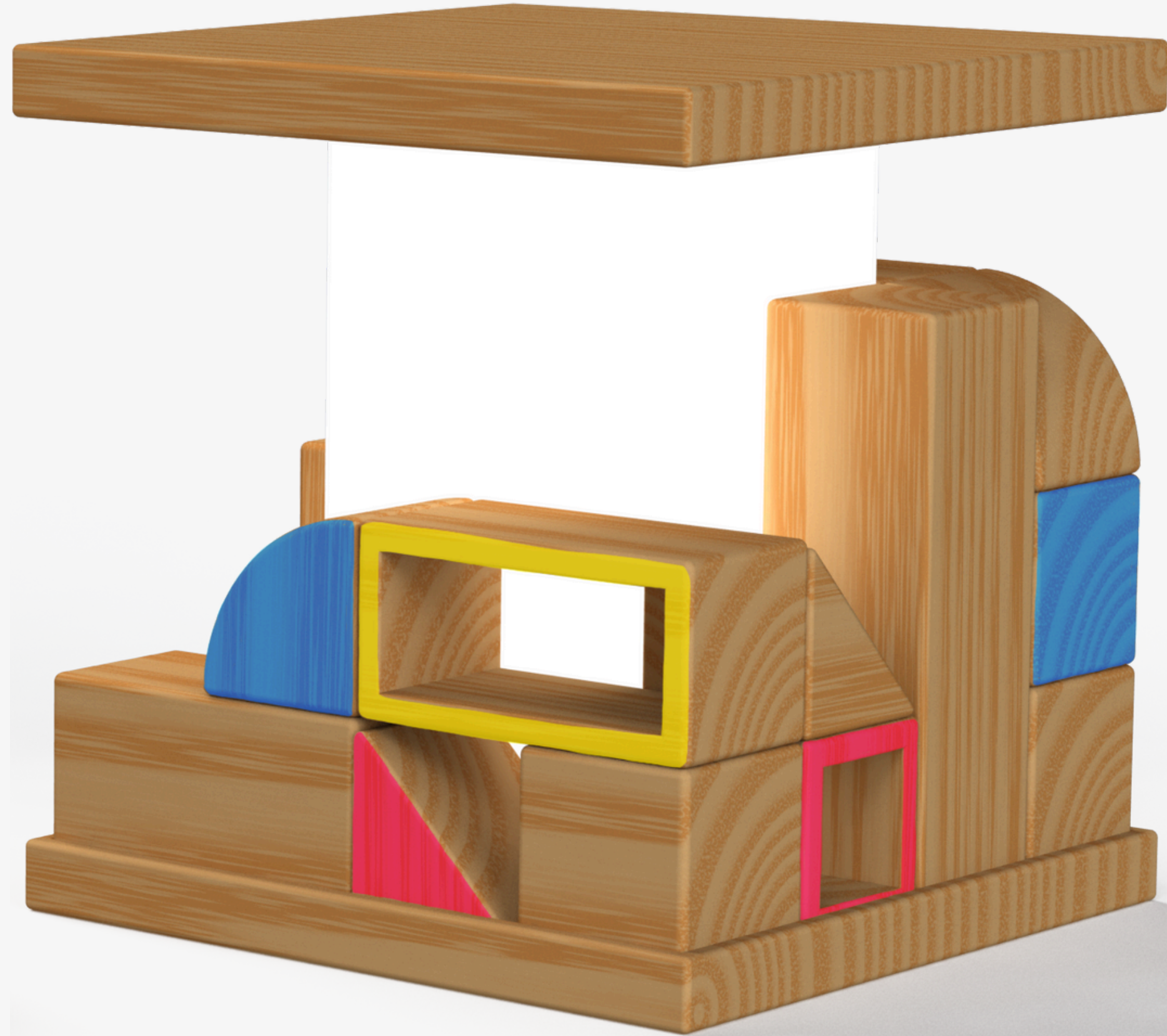
[Pexels-Cottonbro Studio](#)

[Pexels-Jan van der Wolf](#)





cymbox



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ARTS, AND DESIGN  
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