

# **Lakeshore Learning**

Classroom furniture design challenge

# table of contents

Project Plan

Research

- Meet the teachers
- Interview questions
- Insights

Problem statements

Inspiration

Mood board

Sketches

CAD / rendering

Testing

Closing

# Project Timeline

Monday	Schedule interviews, write questions, mood board and inspiration research, sketching
Tuesday	3 Interviews, Research analysis, Mood board research, sketching
Wednesday	3 Interviews, Research analysis, Mood board research, sketching
Thursday	1 Interview, Research analysis, sketching
Friday	Sketching, CAD modeling
Saturday	CAD, Rendering, Create presentation
Sunday	CAD, Rendering, Finalize presentation

## Research



Through 30 - 45 minute phone interviews, the goal was to learn from teachers about their experiences in classrooms and listen to their thoughts on furniture.

In 2 days, I spoke with 6 teachers, 6 women and 1 man, who have taught in California, Arizona, Minnesota, Idaho, Texas, and South Carolina.



# Meet the teachers !



Arizona  
29 years  
K-12th



Minnesota  
5 years  
0 - 6th



ID, AZ  
3 years  
K-7th  
special needs



Arizona  
3 years  
6 - 8th

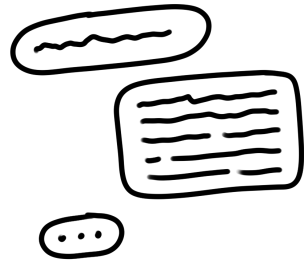


South Carolina  
5 years  
2nd



CA, TX  
10 years  
K-6th  
Special needs

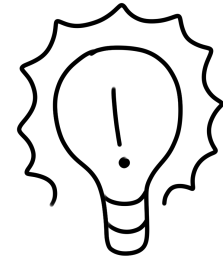
# Phone interviews



Over the course of the interview, I asked teachers questions such as:

- What does success look like in the classroom from your perspective as the teacher?
- What does success look like in the classroom from the students' perspective?
- What furniture in the classroom works well? What doesn't?
- Tell me about storage.
- What makes a desk accessible?
- If you could wave a magic wand and change anything inside the classroom, what would it be?

# High Level Insights



## Flexibility

Classrooms need solutions that can be moved from place to place by the teachers and students, take up as little space as possible when stored, and fit more students than just those with “standard” bodies.

## Wiggling

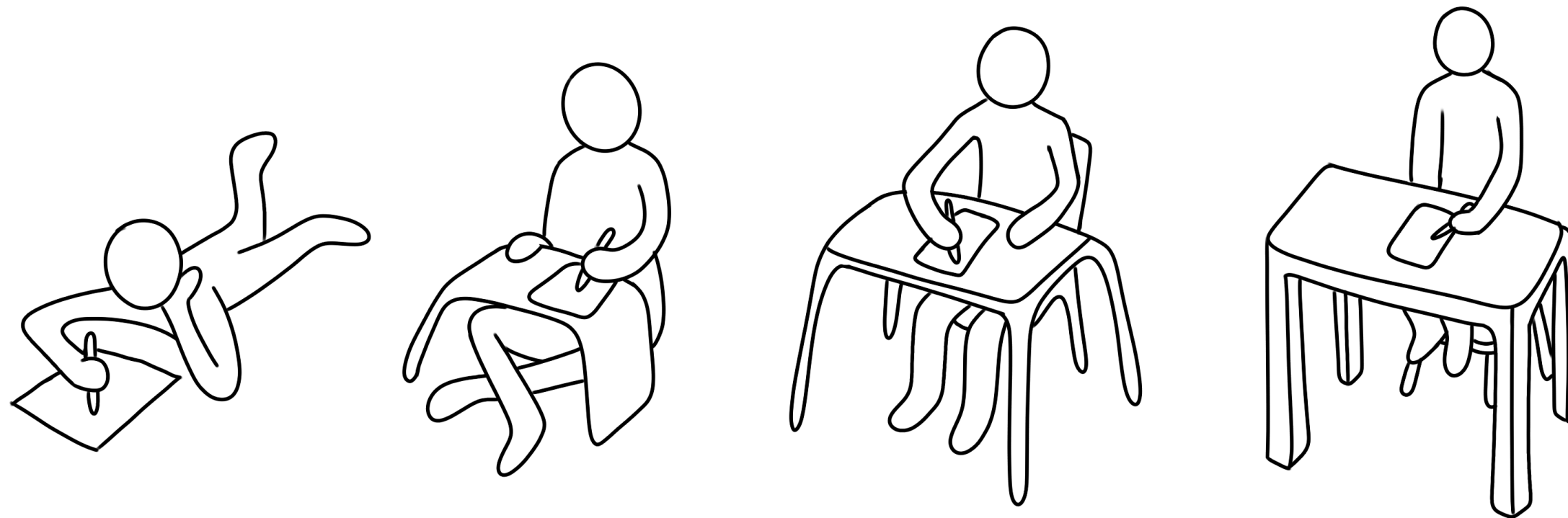
Kids have a lot of energy and are always in motion, but many furniture solutions are designed for kids to sit still. When kids let that energy out, or wiggle, their furniture often fights back.

## Must-Haves

Classroom furniture might live in a classroom for 30 years, so it needs to be exceptionally sturdy. The product should also be designed for kids still developing their coordination. Lastly, as all areas of life have been impacted by Covid19, easily sanitized is another top of mind for educators.

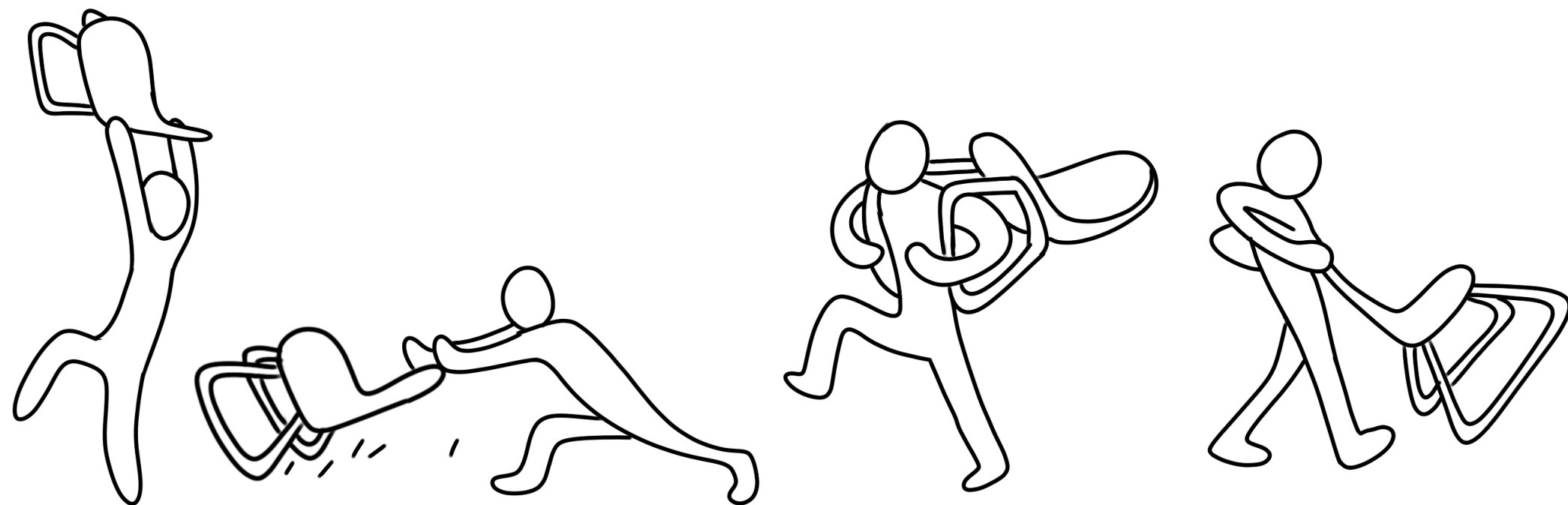
## Insights: flexibility

Teachers shared that kids learn and behave better when they have autonomy, and for them, being able to choose from a variety of seating options empowers them. A seating spectrum was described, where on one end, kids can lay on the floor, and on the other, they sit at a high top table and stool.

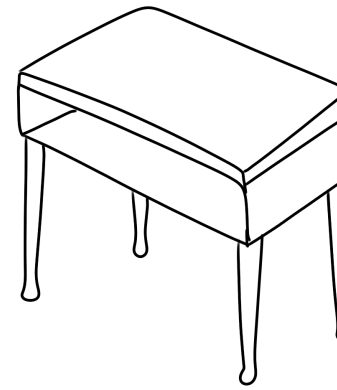


## Insights: flexibility

While some schools have storage rooms, some don't have closets or storage infrastructure at all. Having to condense tables, chairs, and other equipment during instruction time and with students present means the furniture solutions should be easy enough for the students to participate in re-organizing the room and stacking the chairs.

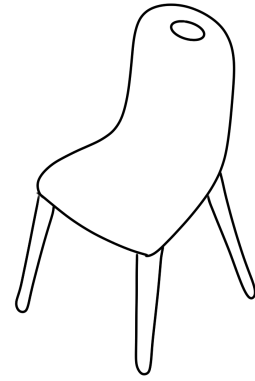


## Insights: desks and tables



- Needs to have storage incorporated so that supplies are closer to students
- Ideally would be adjustable height for kids of different sizes, especially when they grow at a significantly different rate than their peers. Additionally, the floor of the class may be uneven, which affects pencils rolling off the desks, which would be solved through adjustable desks.
- Needs to come together in groups and create a continuous surface
- Because kids move a lot, the desks should link together “like puzzle pieces”
- Should be light, easy enough to move around, even for the students
- Water bottle hanging solution desired; drinking fountains are undesirable (covid)
- Indentation for 1 or 2 pencils
- Should accommodate wheelchairs
- For younger kids, and especially those with vision impairments or are intellectually delayed, having the alphabet on/at their desk is very helpful for quick reference

## Insights: chairs



- Current chairs are not designed for motion, but kids have a lot of energy. This leads to the furniture fighting back and results in distractions to the rest of the room, like squeaking
- Need to have fewer grooves and textures for easy cleaning with wipes
- Wide spread legs are more likely to trip people
- Must be easy to move around and stack, even for the kids
- A rubber band around the legs helps kids “wiggle,” but the current bands aren’t able to be removed and put on another, even by 2 adults
- A backpack storage solution, especially for older kids who want their possessions closer. Or for students worried about getting their belongings stolen by other students.
- Chairs that are permanently attached to the desk are inaccessible
- Old plastic chairs become brittle, and large cracks or splits can occur

# General Insights

- Seating furniture and classroom layout can change weekly
- Products may sit in a classroom for 30 years, so it must be exceptionally durable
- Flexible seating (multiple kinds of seating) allows kids to learn where and how they work best
- Many classrooms are a hodgepodge of furniture that doesn't match. Some kids have chairs that are drastically the wrong size
- Carpets are a key piece of furniture that define zones/areas and are comfortable for students



## Teacher's Stories

“The students know they weren't thought about during the design. They feel like a mutant not fitting in the furniture meant for them.”

## Teacher's Stories continued

“My room has adjustable height desks, but I don't have the tool to do it. And I have to put in a work order for that--I don't have time for that.”

## Teacher's Stories continued

"These chairs be dusty musty  
crusty and untrusty"

## Teacher's Stories continued

“Everything is color coordinated. Red table, red bucket, red supplies. It's easy to call them by color, and they have more ownership of the stuff.”

# Dear designers, sincerely teachers

Keep the kids that are different in mind.  
Normal standards of a desk, chair, and  
pencil just don't work.

Kids come in all sizes, shapes and forms. Go out in the field.  
Go talk to kids, go ask them if they ever feel uncomfortable.  
The tall 8th grader who looks 35, even him."

# Problem Statements: How might...

- a chair be designed for wiggling, without distracting the rest of the class?
- a desk feature storage?
- classroom furniture be more mobile?
- existing furniture that can't be adjusted, be augmented to different heights?
- we enable teachers to be more independent in the classroom?
- we make the classroom feel more like home?



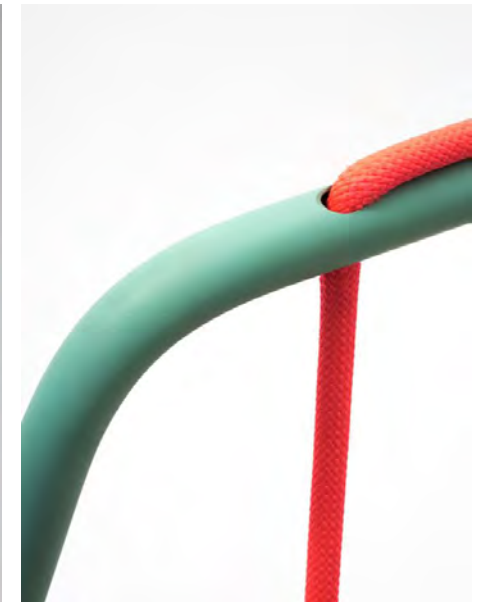
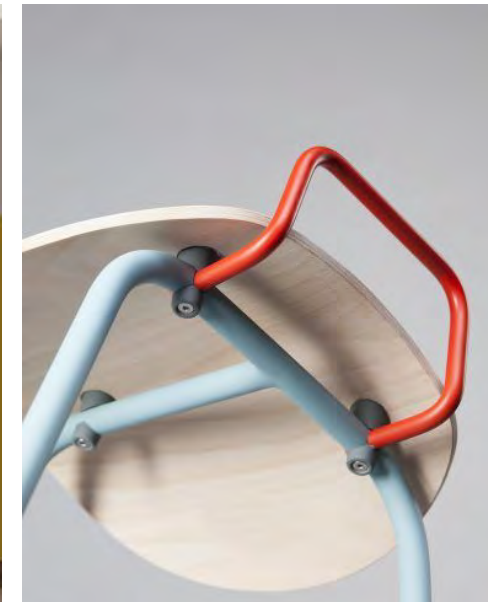
# Inspiration



flexible, movement, simple



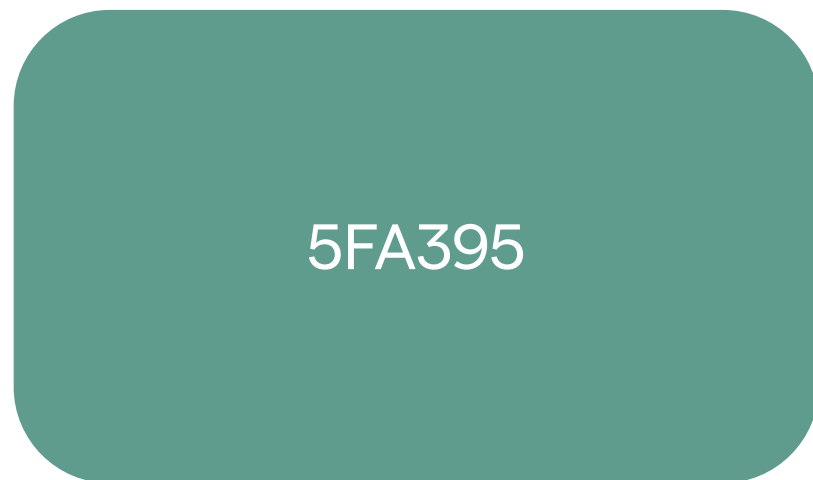
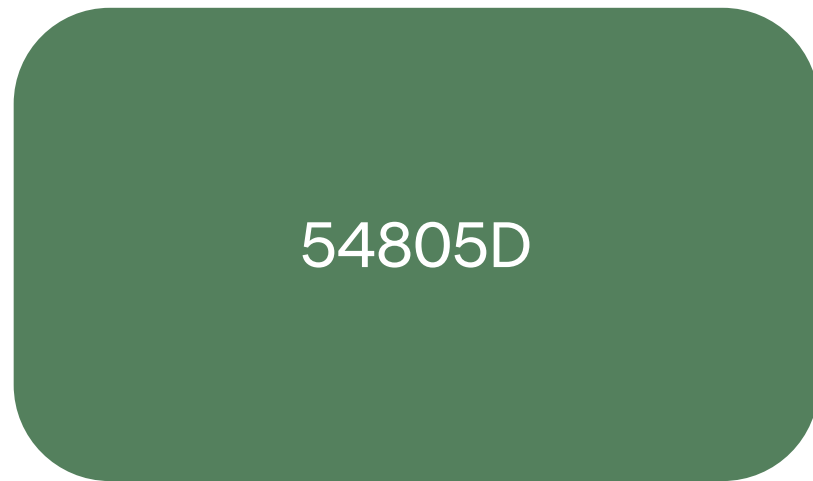
# Mood Board



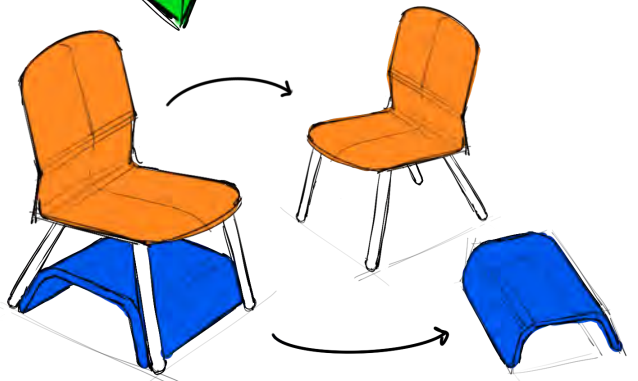
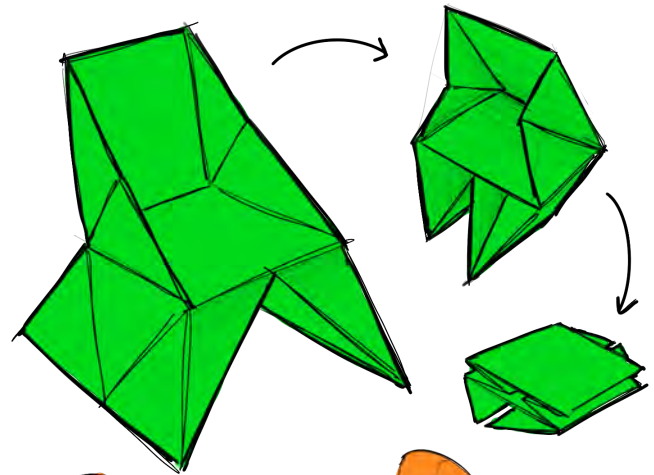
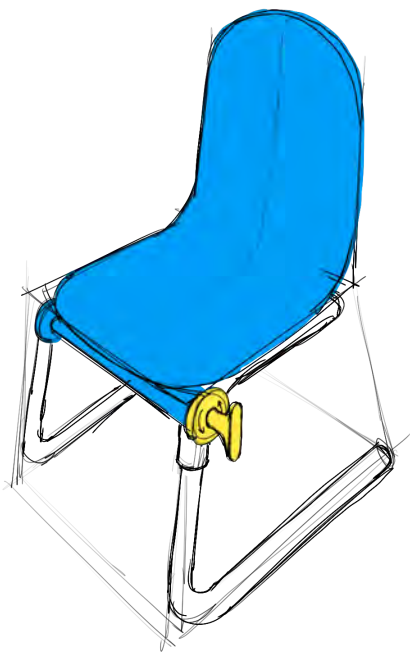
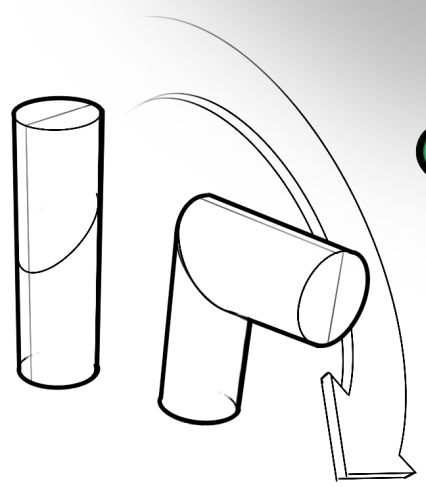
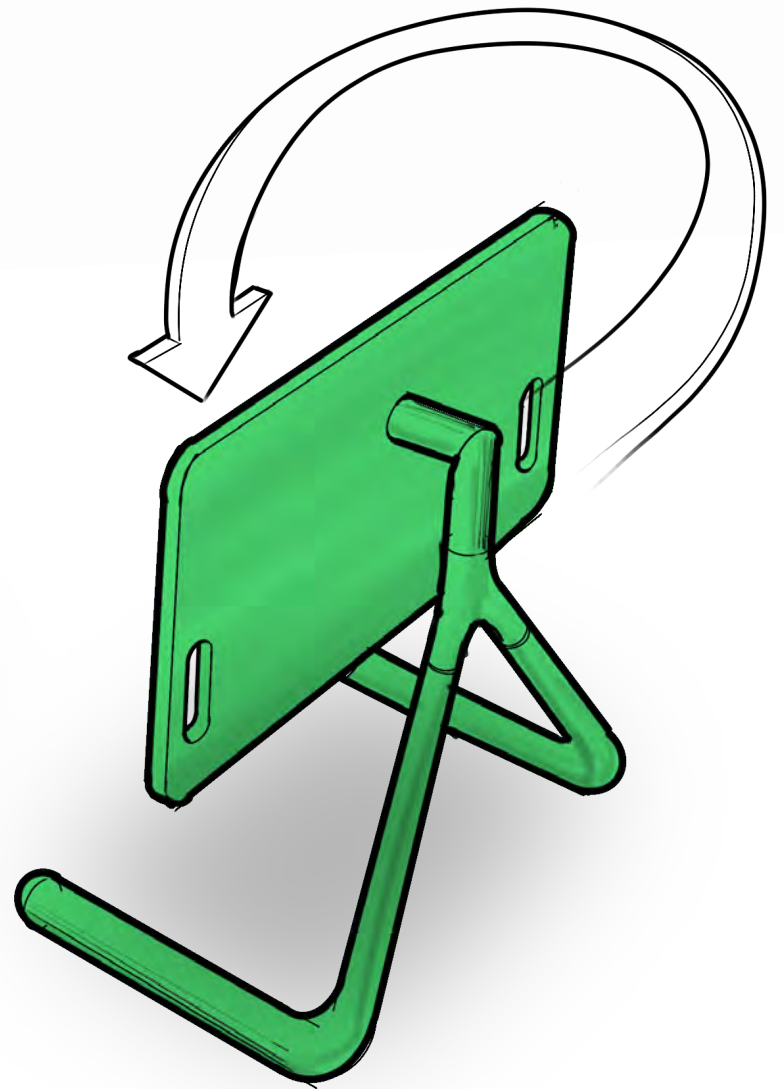
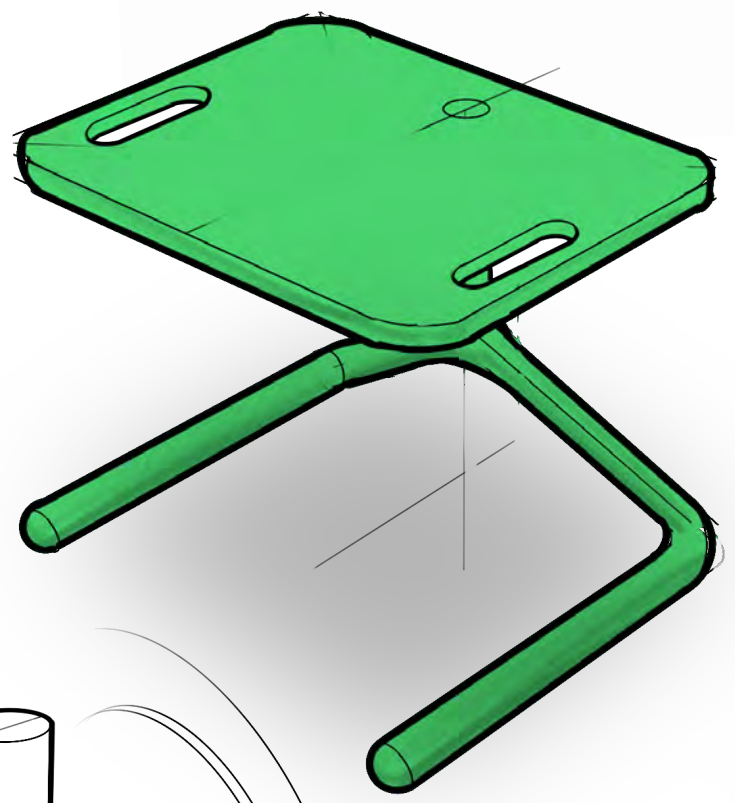
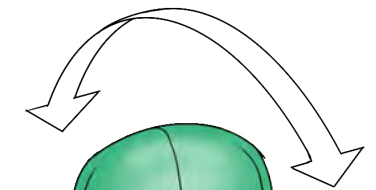
playful, nurturing, reliable



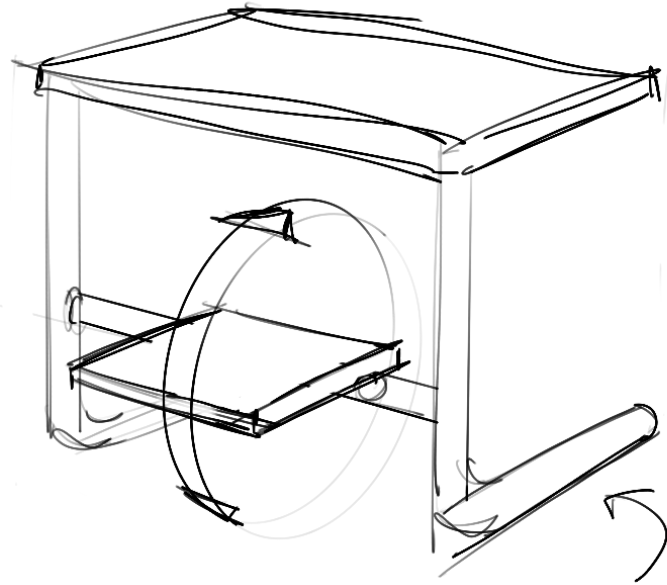
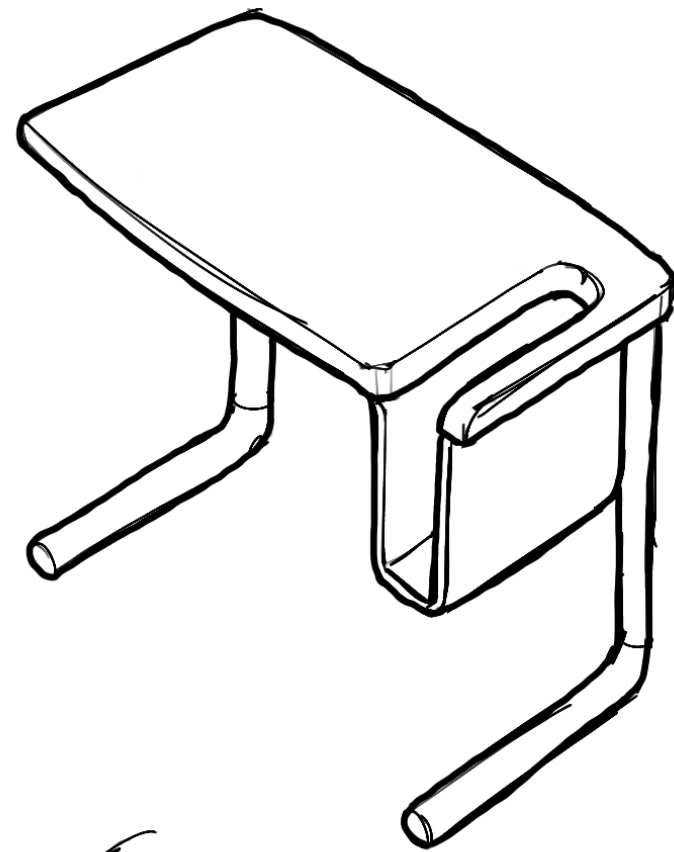
# Color Palette



# **Sketching & Concept Development**

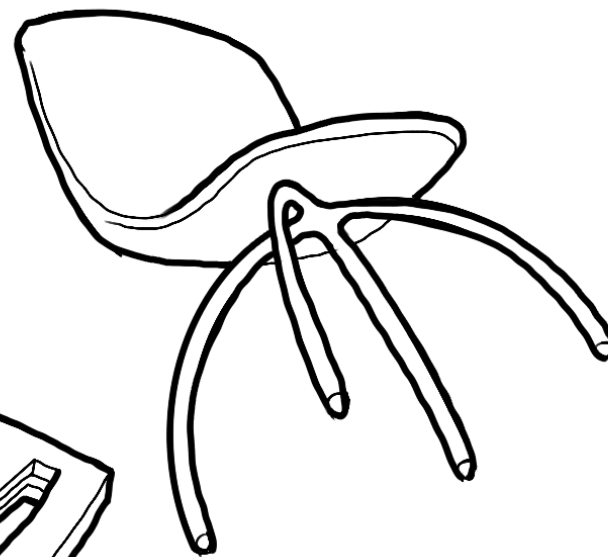
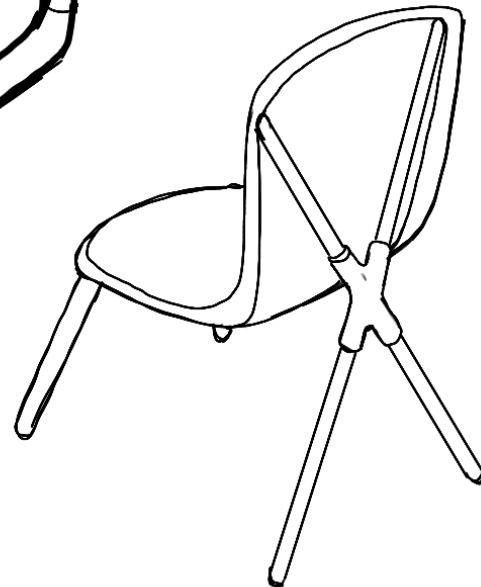
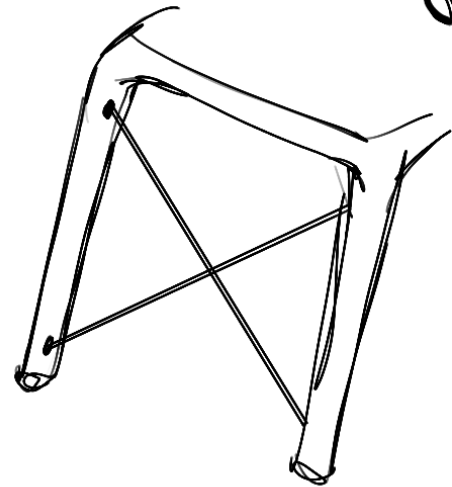
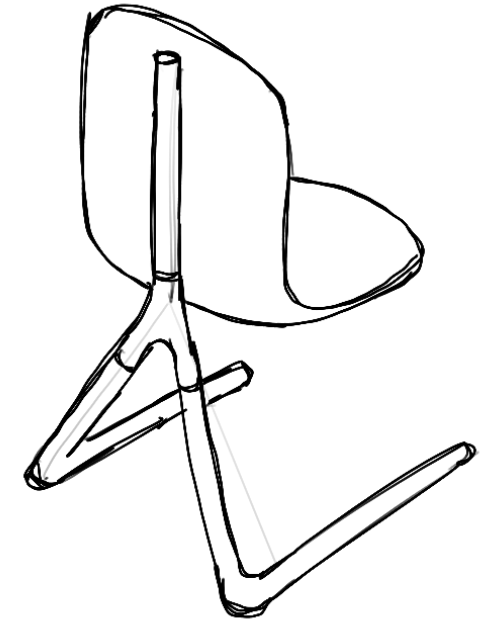
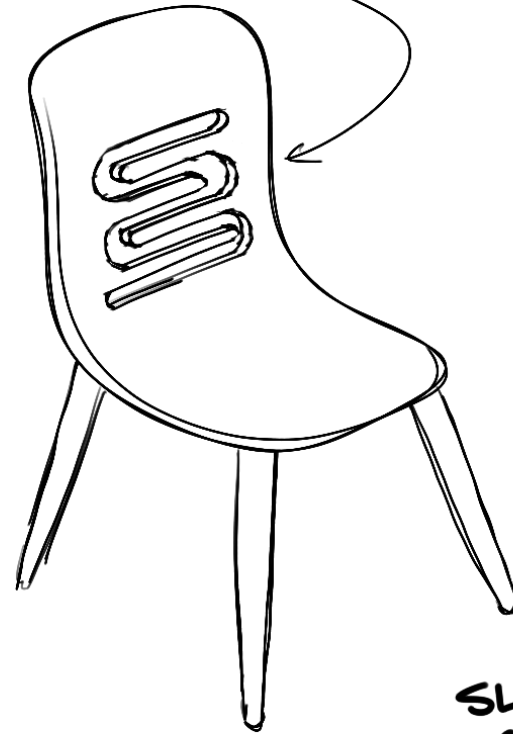


CHAIR GROWS IN HEIGHT AS THE KNOB IS TURNED

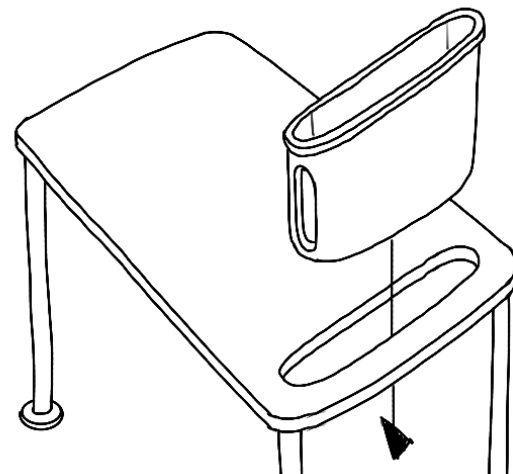
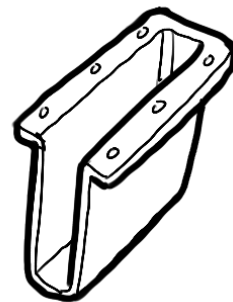
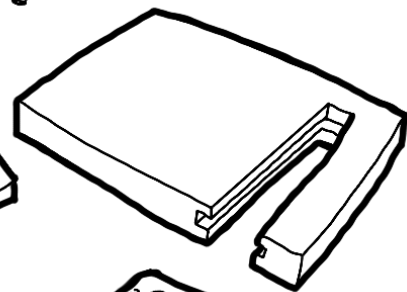
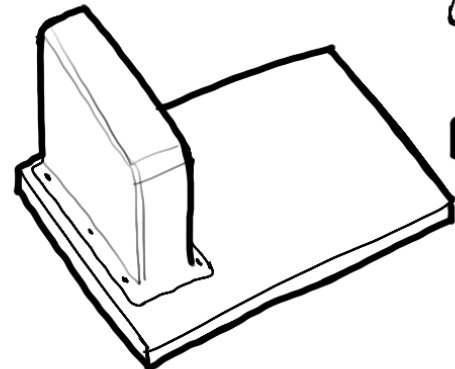
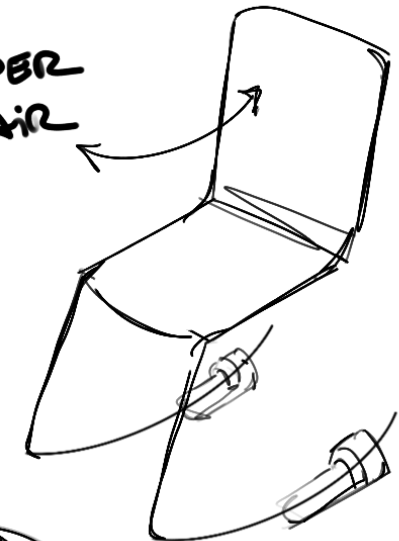
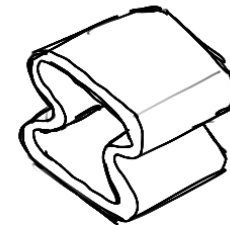


CALF PRESS  
DESK

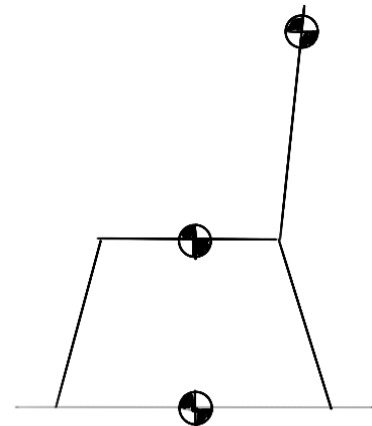
FLEXURE  
CHAIR

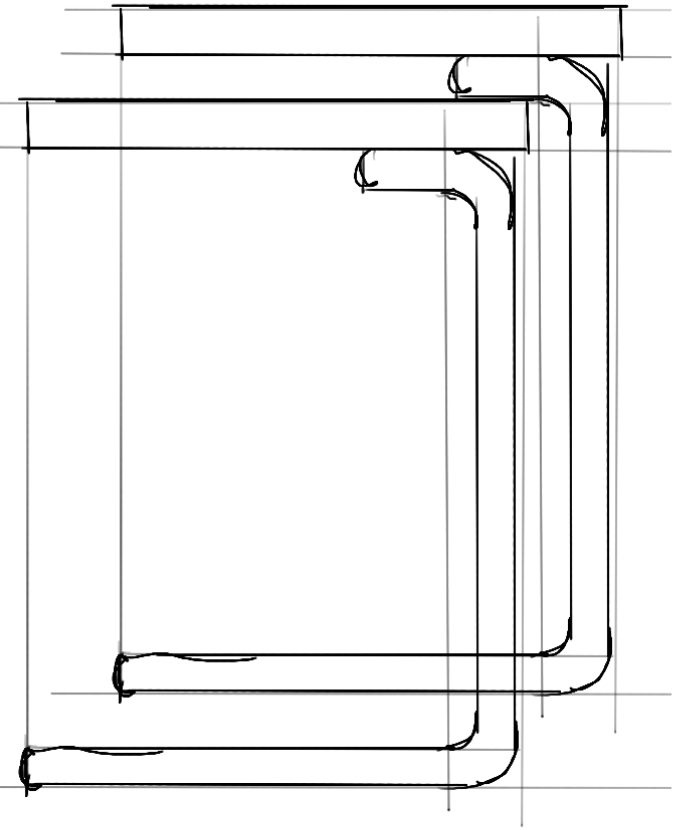
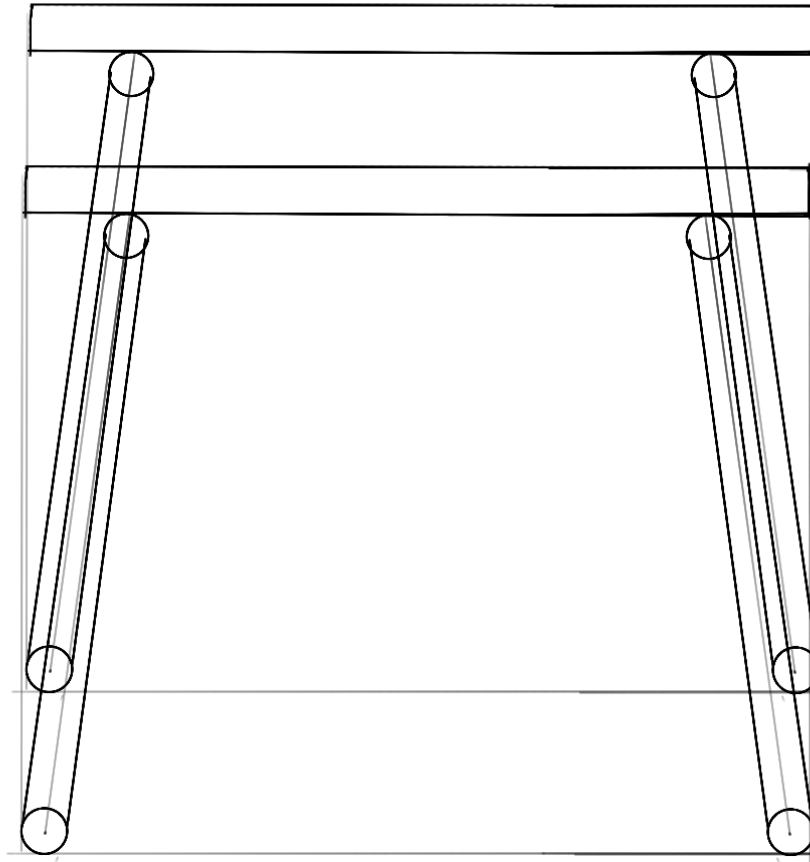
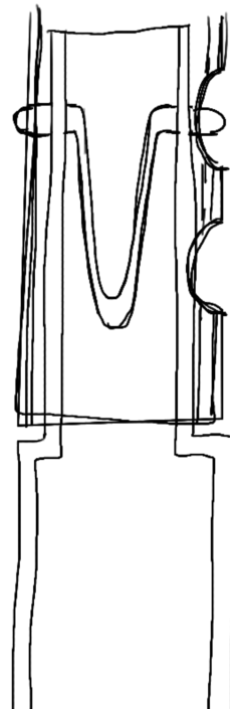
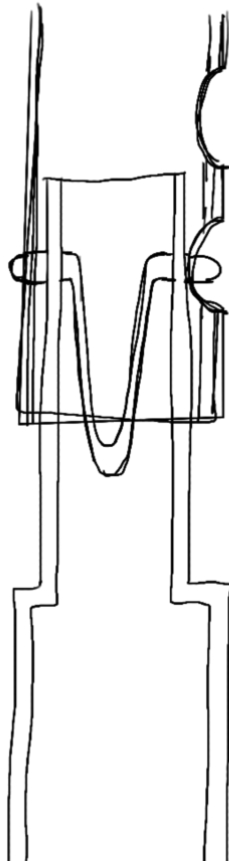
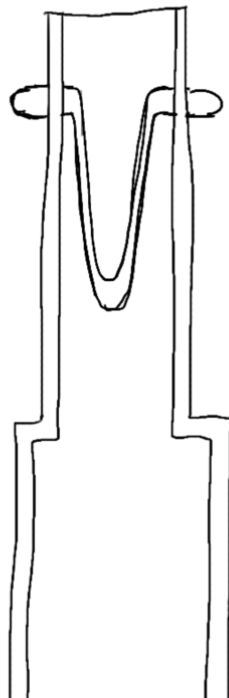
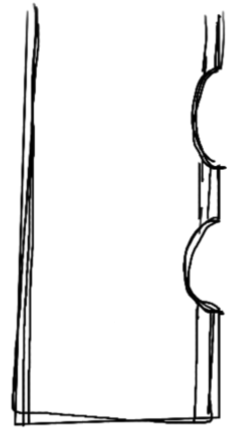


SLIPPER  
CHAIR



WOBBLE  
CHAIR

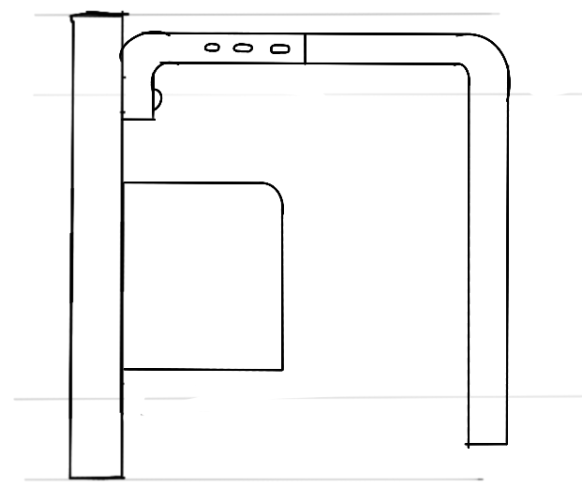
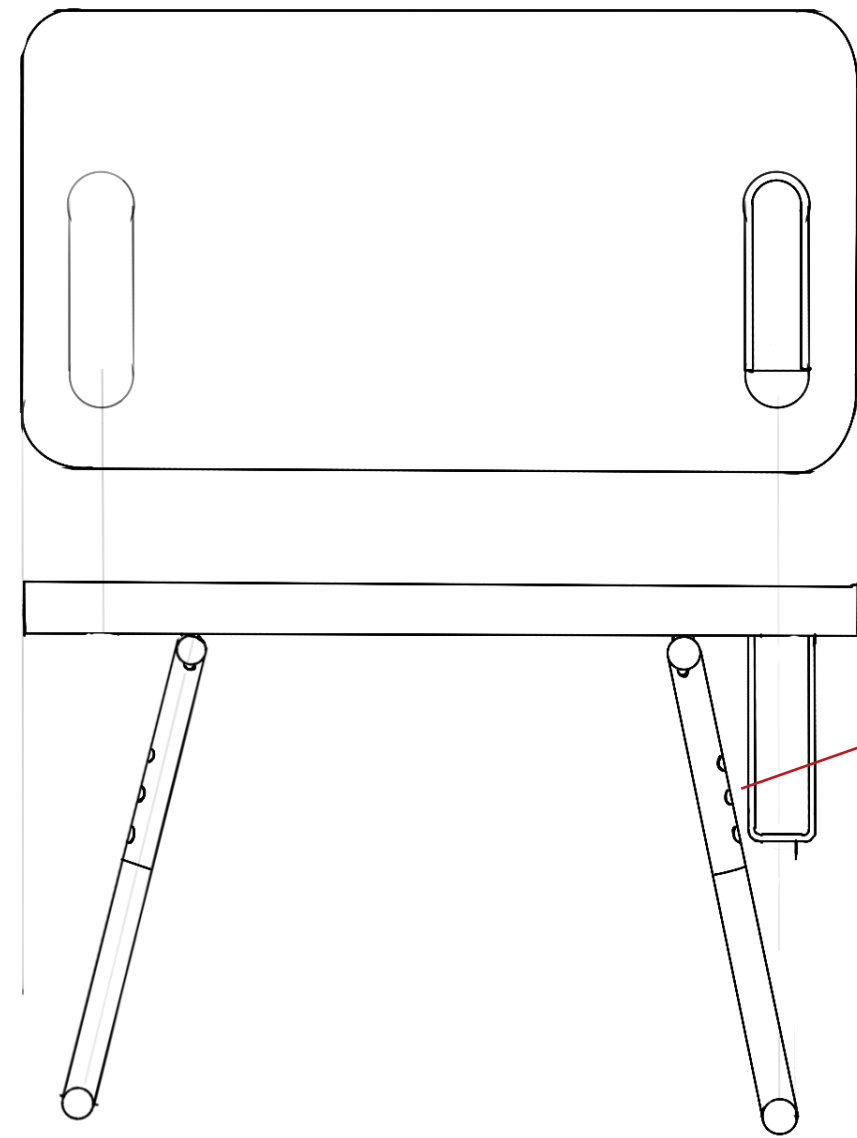




ANGLE LEGS TO MAKE  
MORE STACKABLE

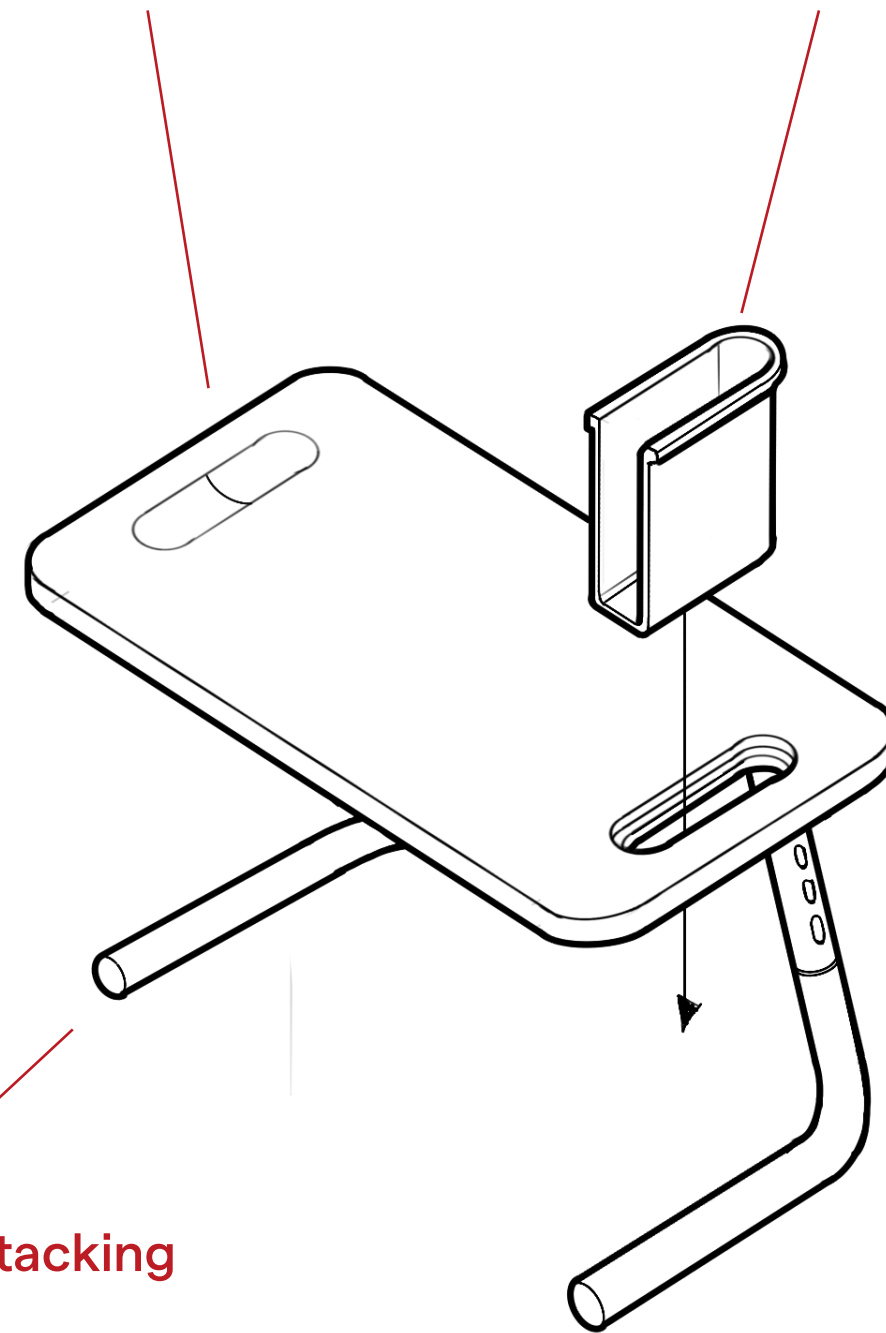
MAKE LEGS ADJUSTABLE  
HEIGHT

# Concept 1



pencil divet

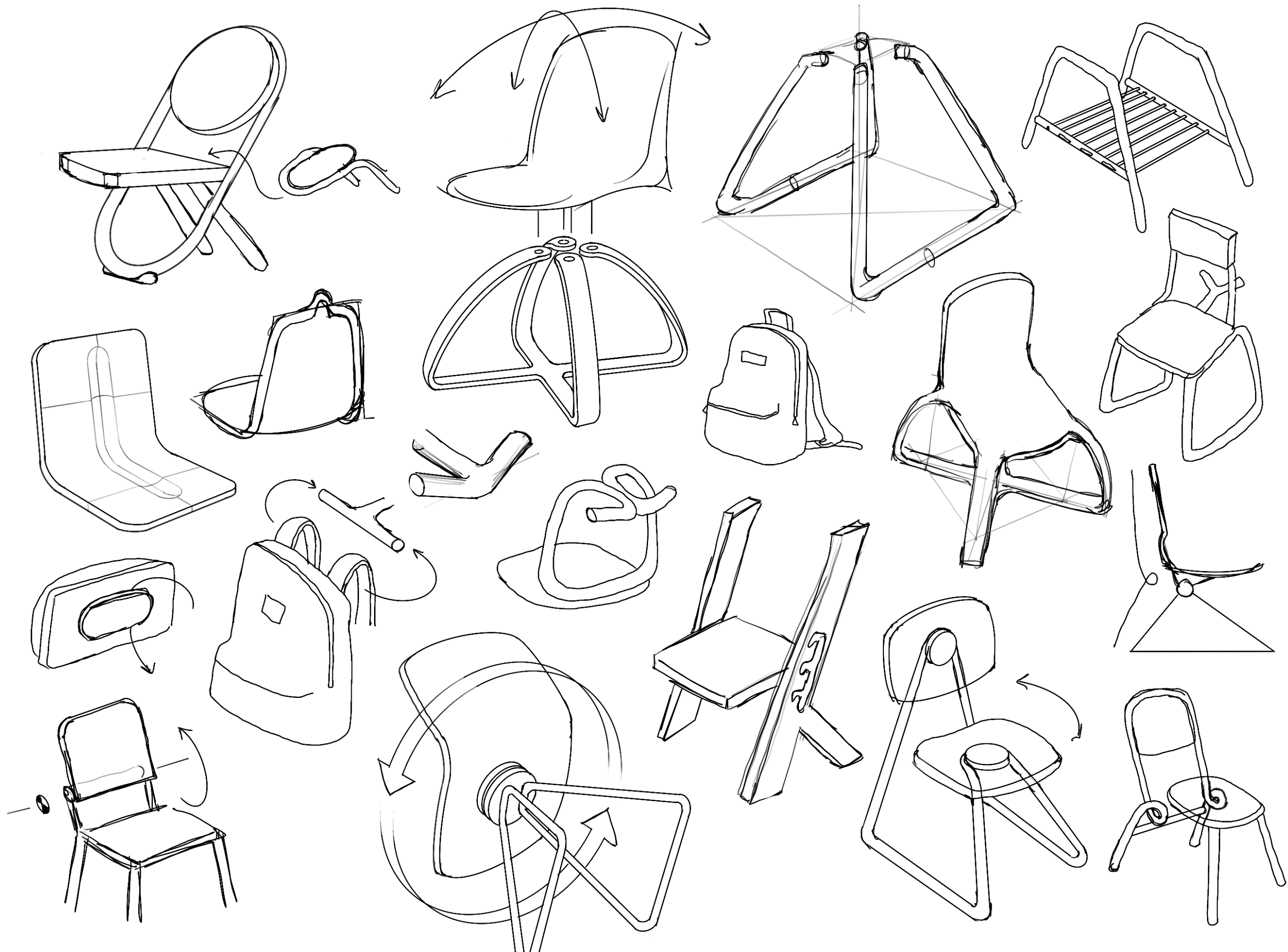
2 way storage shelf

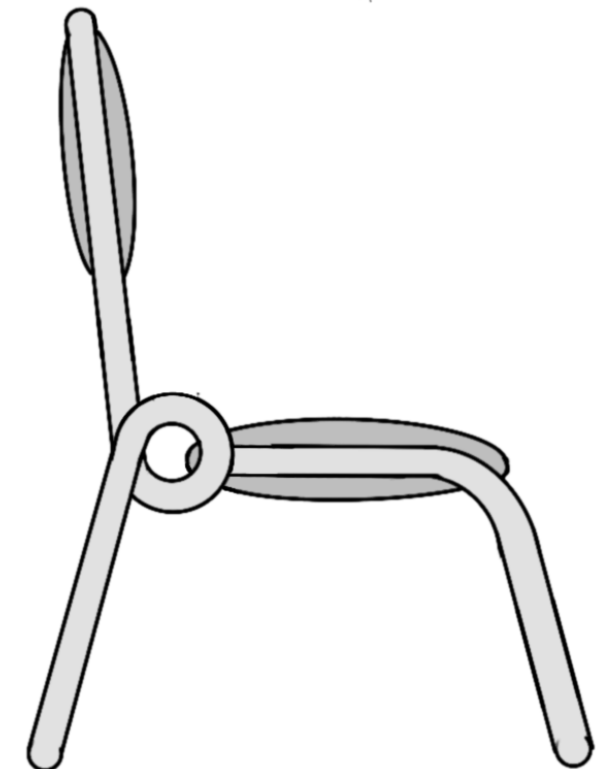
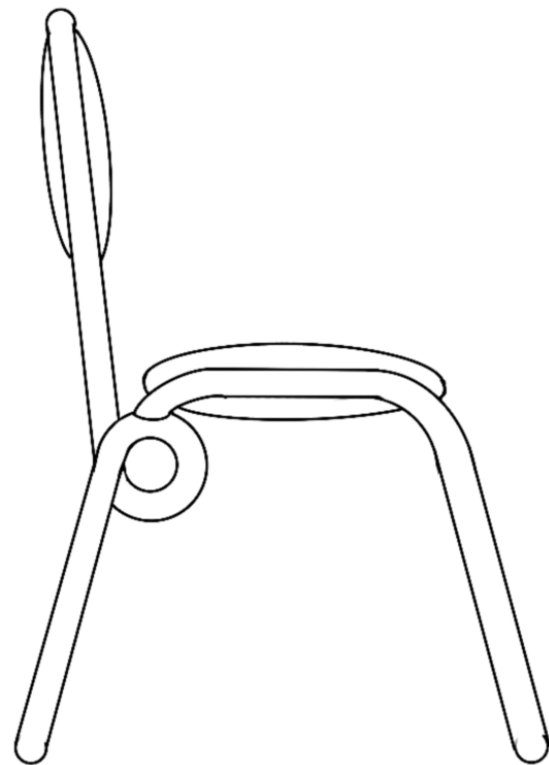
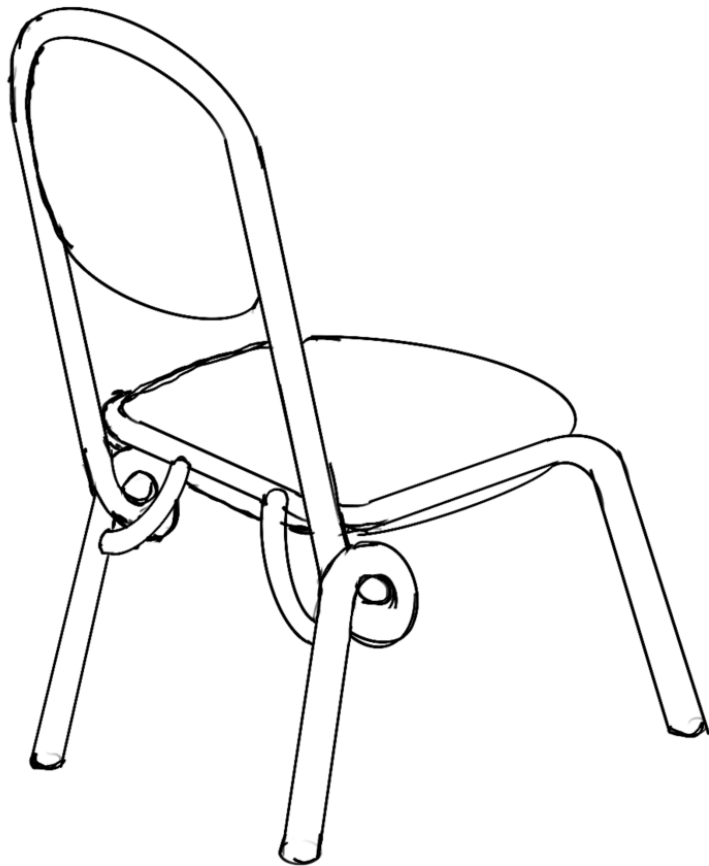
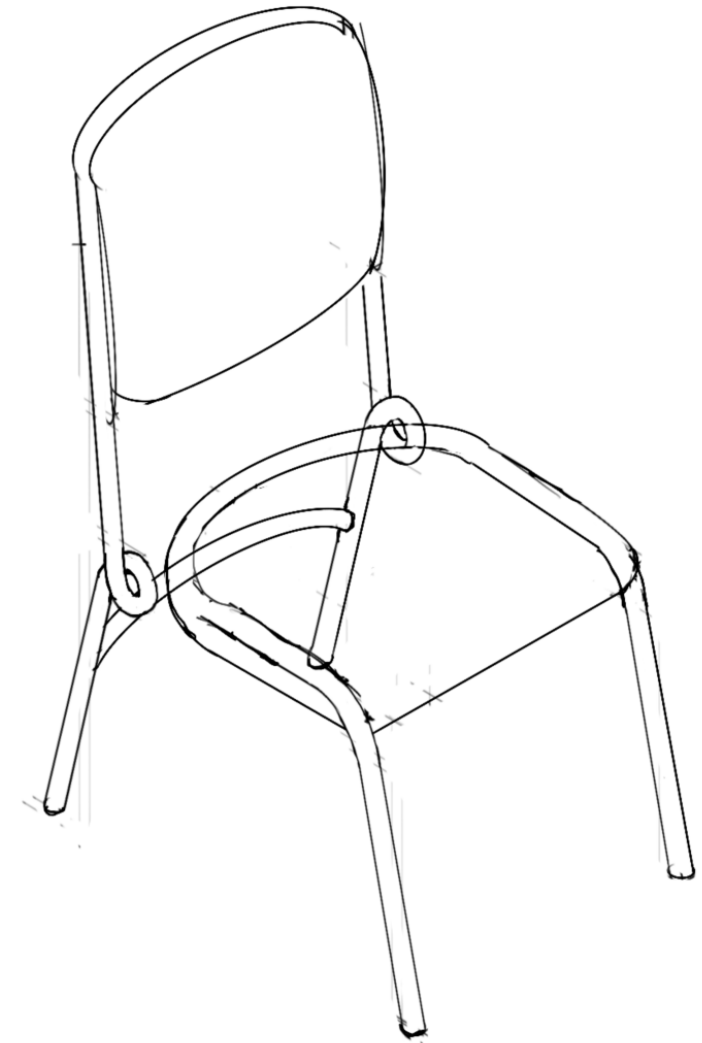
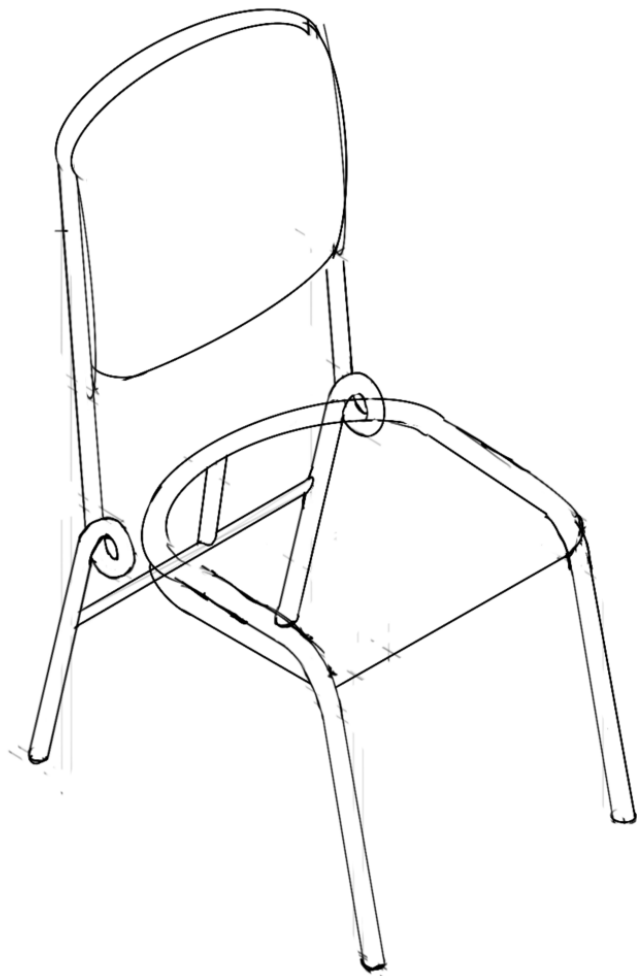
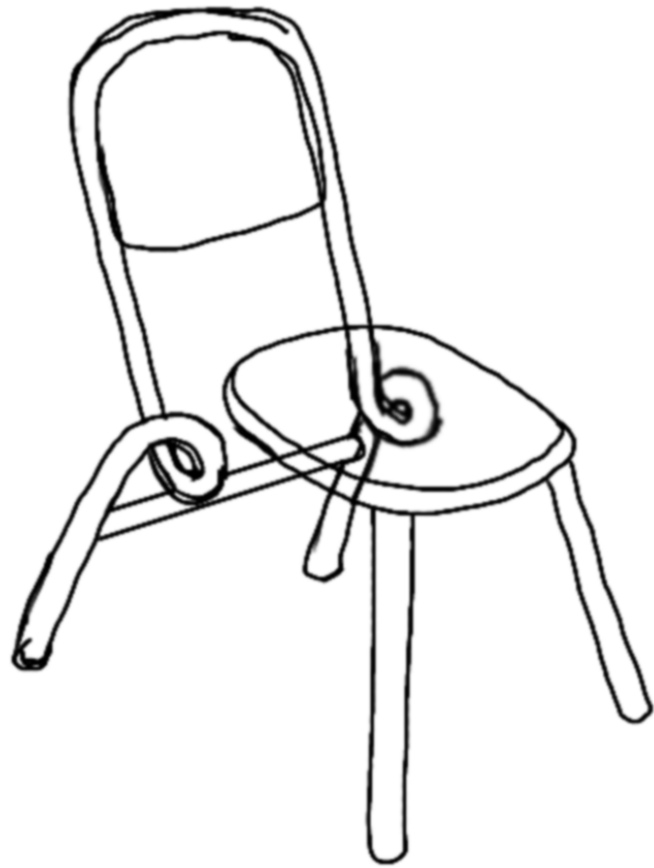


adjustable height

angled legs for stacking



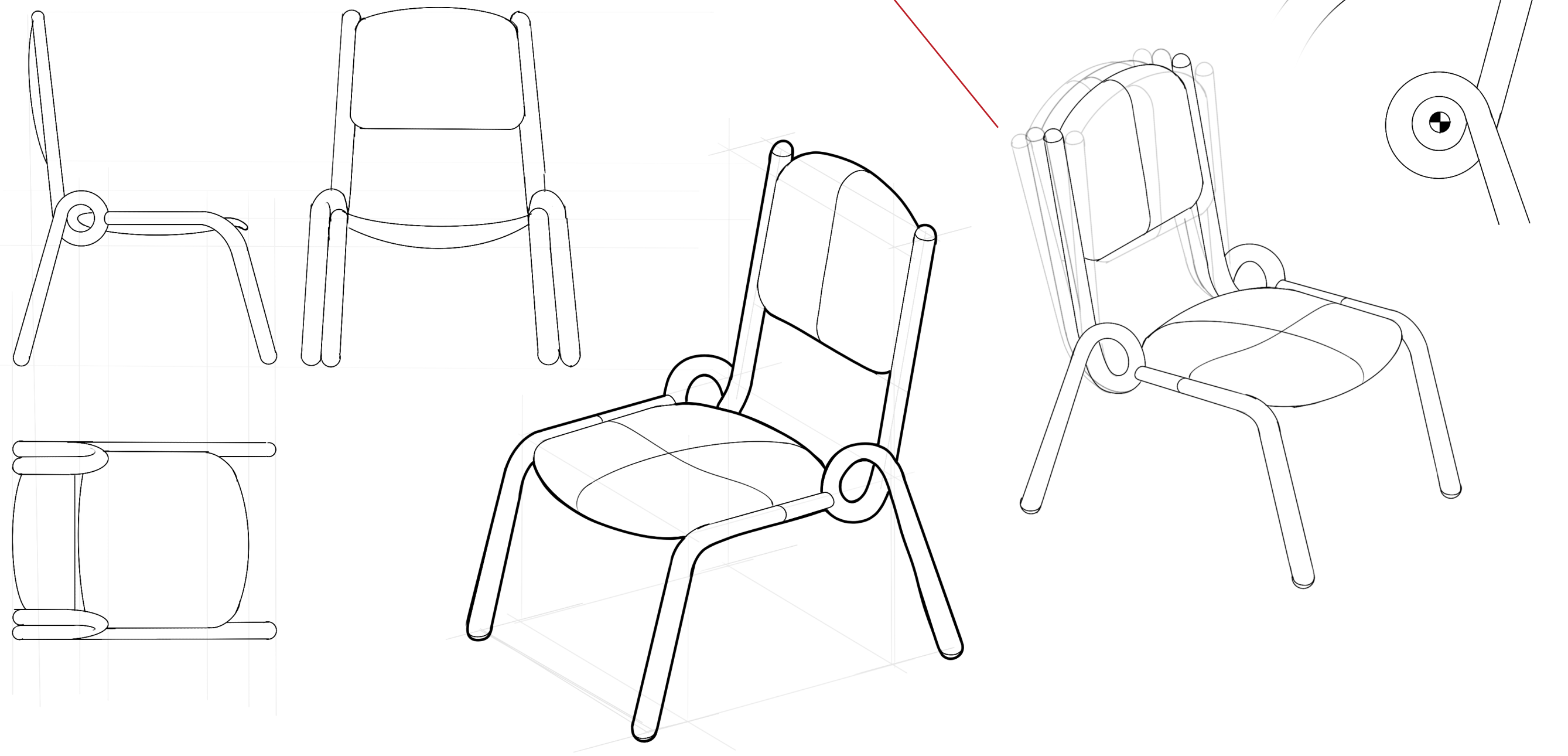




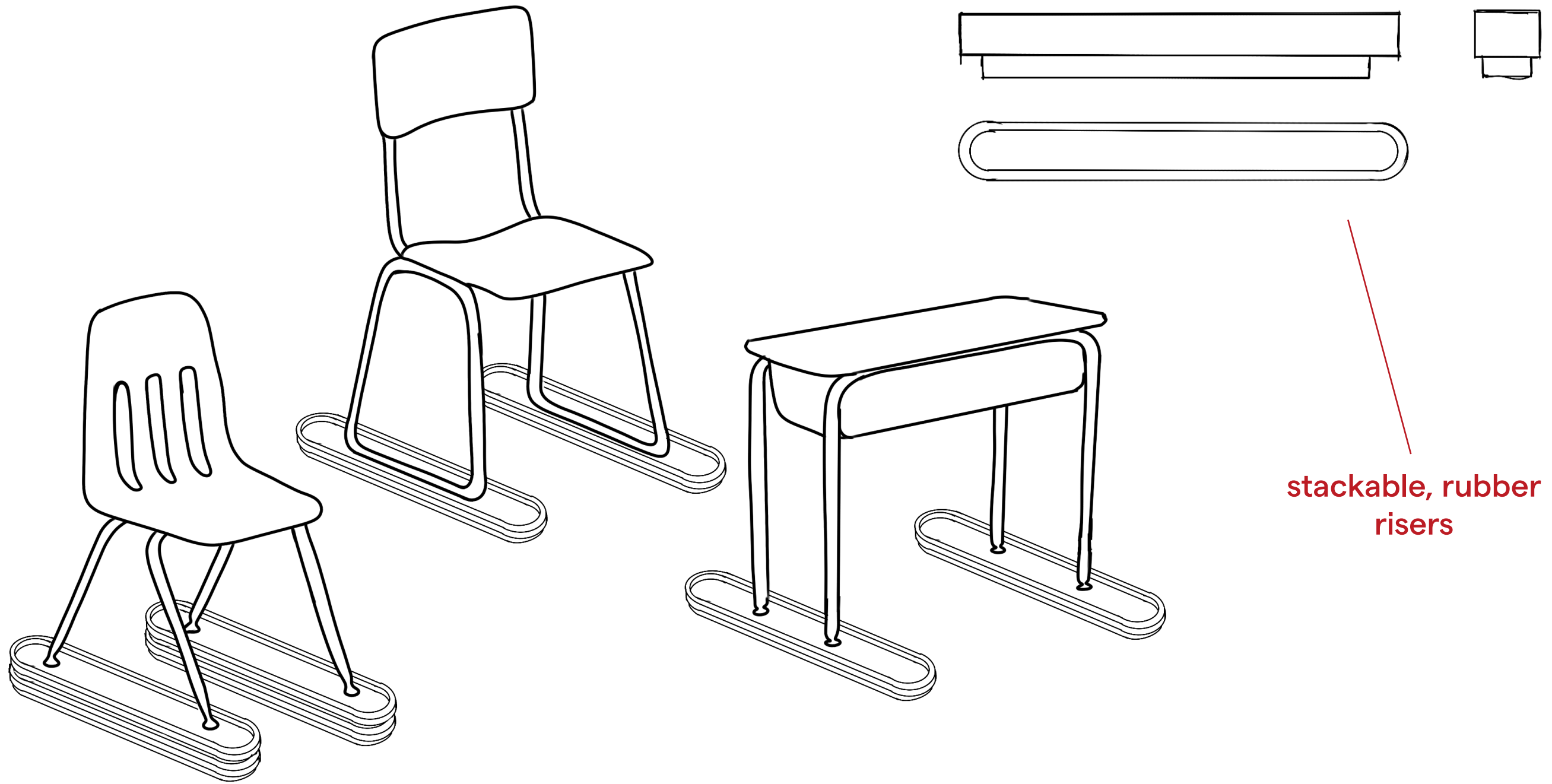


# Concept 2

the frame is a spring

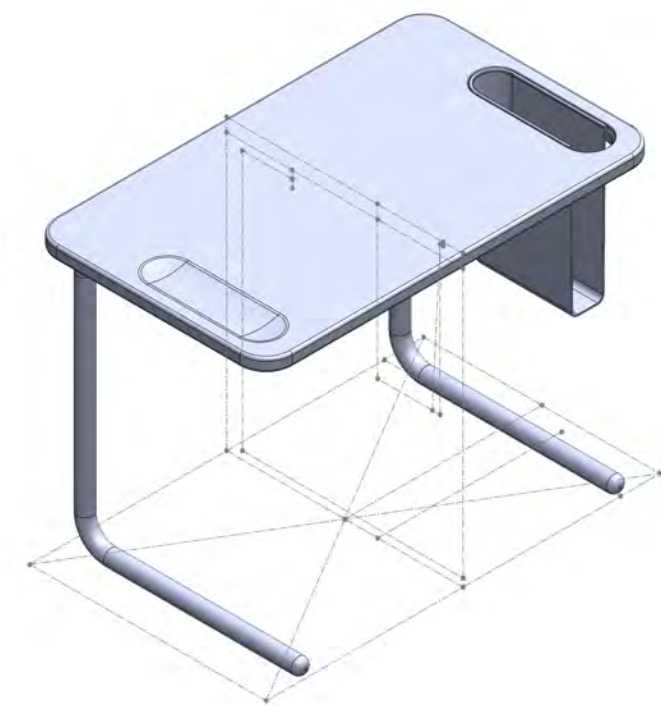
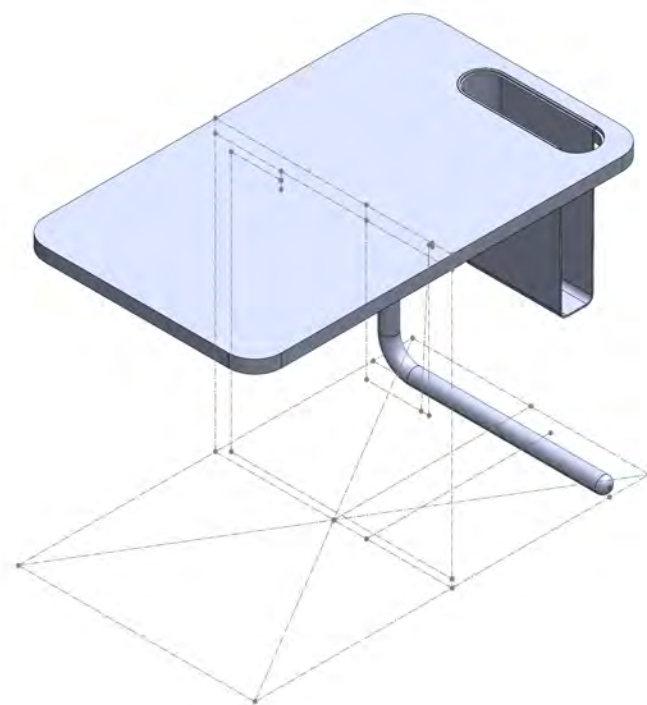
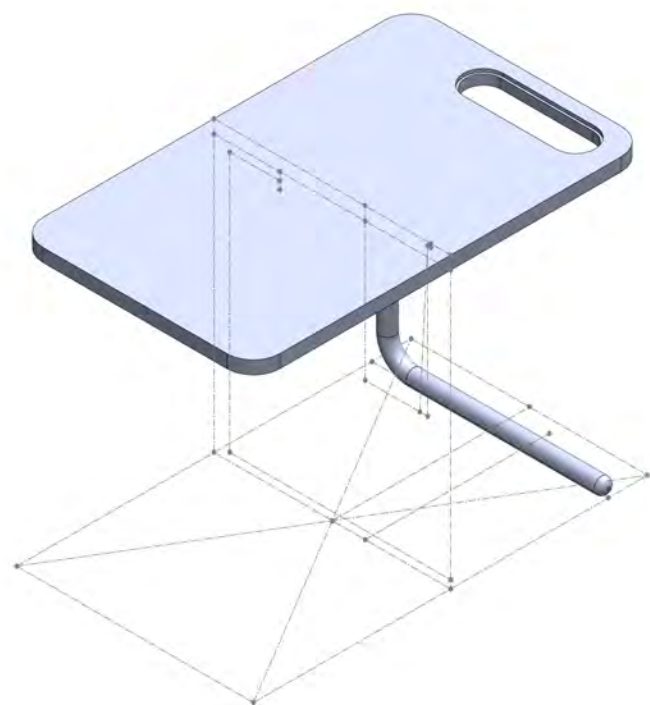
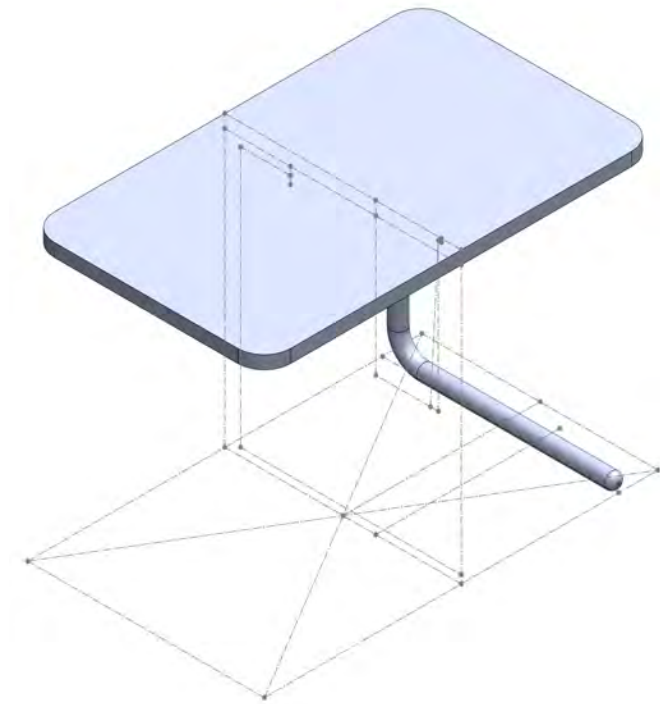
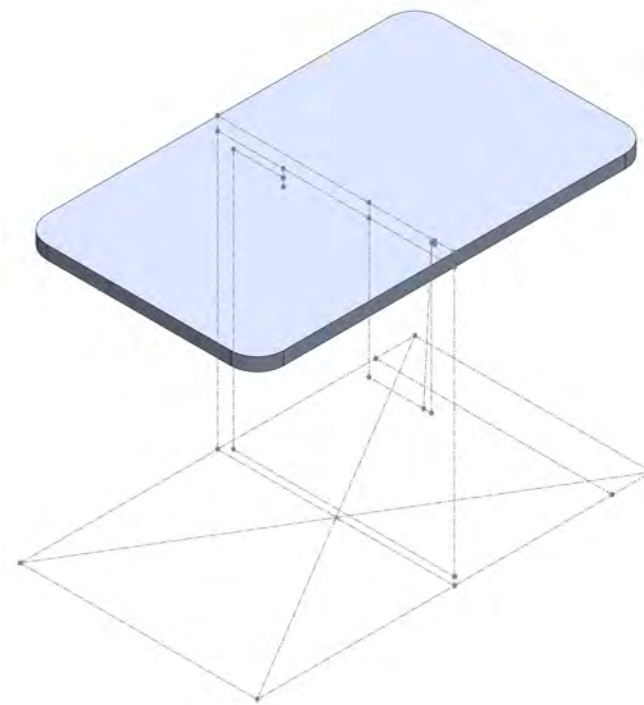
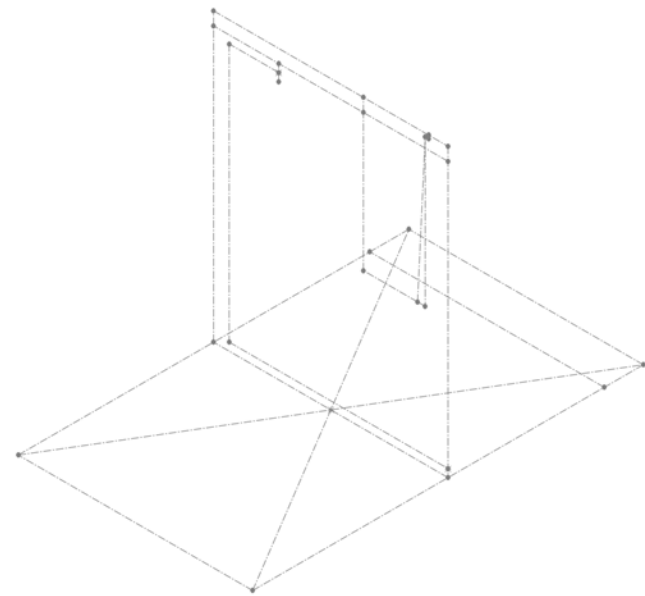


# Concept 3

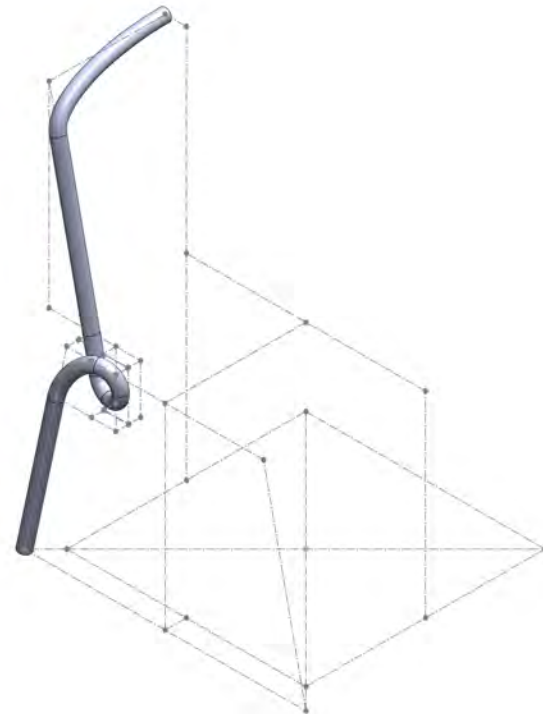
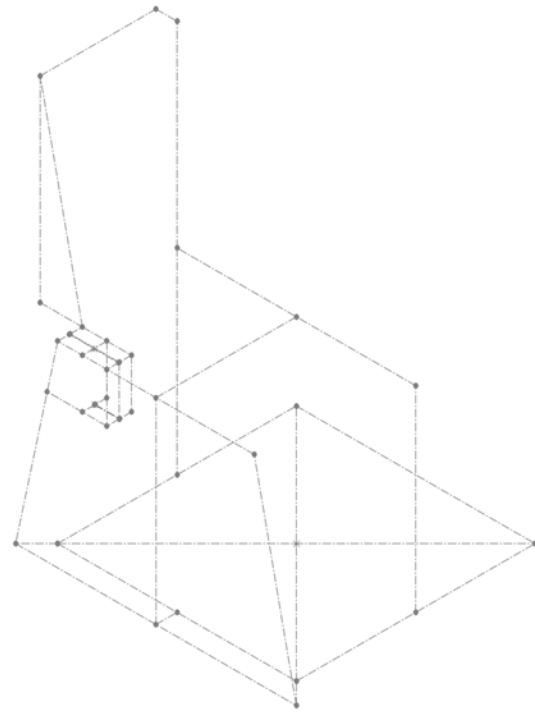


stackable, rubber  
risers

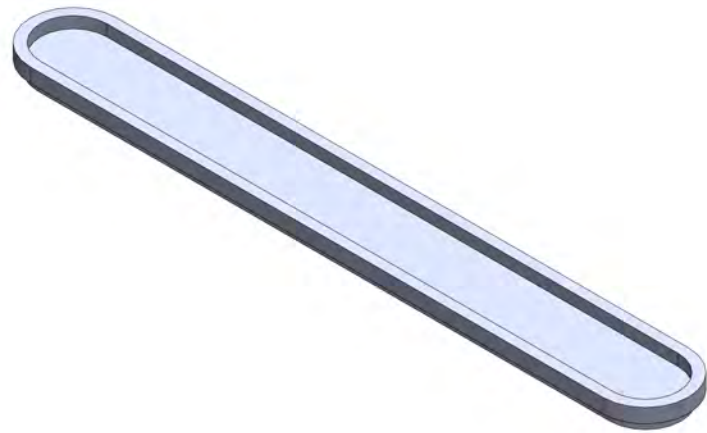
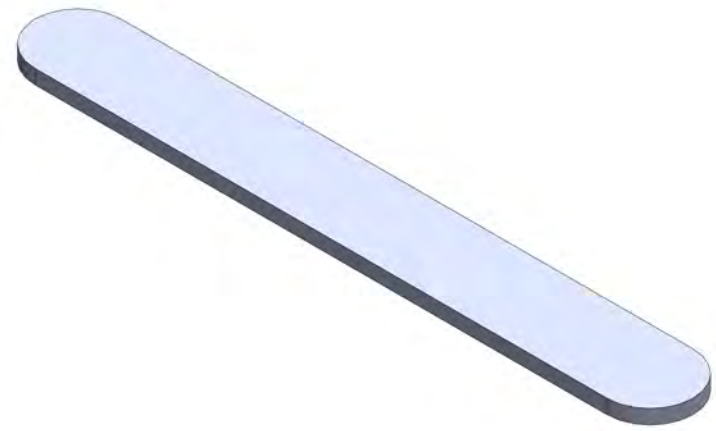
# Desk CAD



# Chair CAD



# Risers CAD





# Wiggle Chair and Way Desk

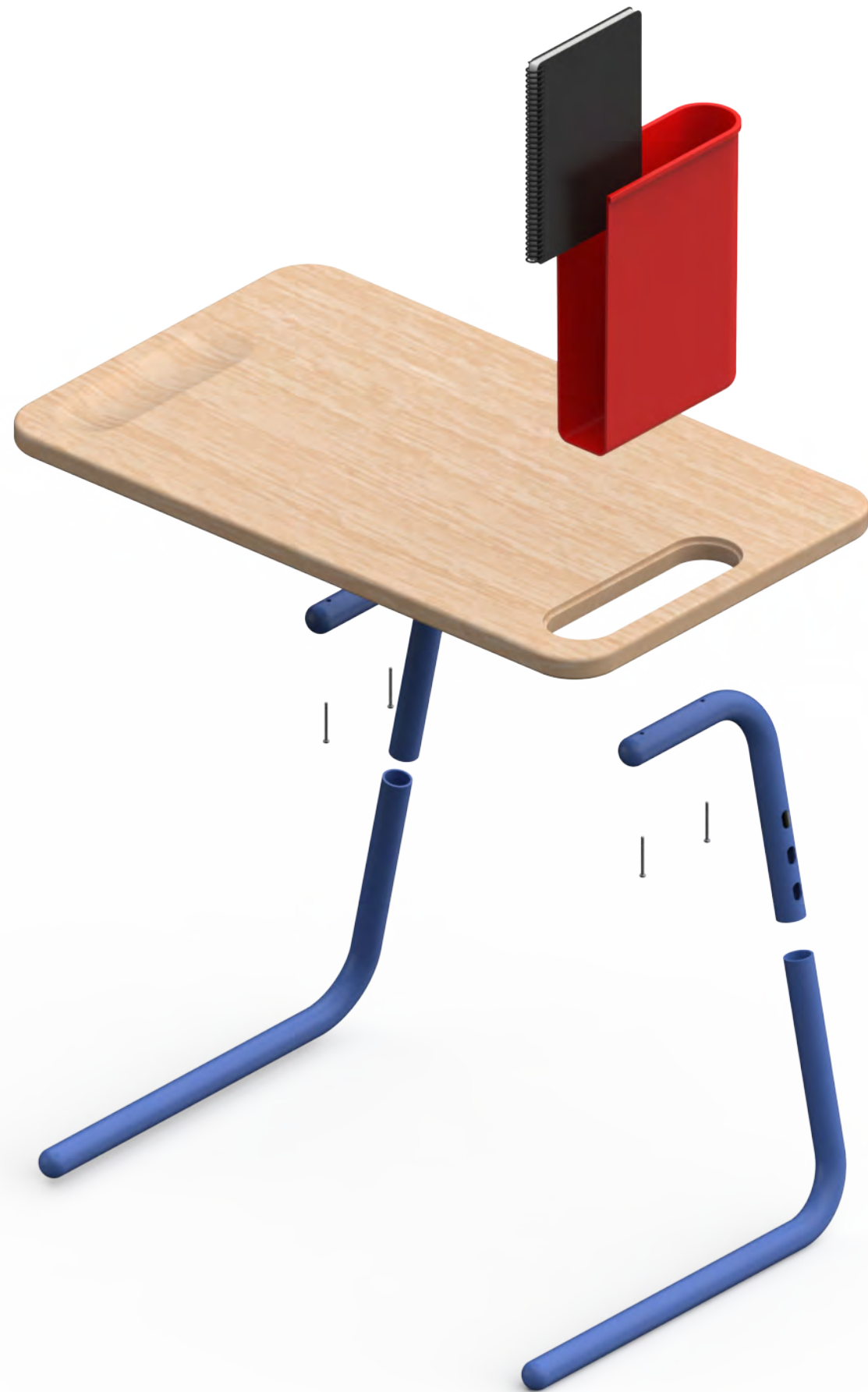


## Way Desk

This desk features a storage compartment large enough for some spiral notebooks or a 3 ring binder, keeping supplies close so that kids won't be running around the room searching for them.

Adjustable legs allow the desk to grow with students. The buttons face away from the center of the desk, allowing a person to access the buttons without getting under the desk. After tilting the desk, gravity assists the tool-free adjustment process.





## Way Desk

1 wood table top, CNC'ed  
1 plastic storage compartment,  
injection molded  
4 metal leg components, extruded,  
bent, and drilled  
2 adjustable leg hardware pieces  
4 fasteners

30" x 18" x 22"



# Wiggle Chair

Behaving similar to a double torsion spring, the frame of this chair is designed for the back to gently bounce, allowing kids to get a little bit of energy out while sitting. When the back is pressed, the coil will open slightly, which means no pinched fingers here.

Metal frame, 3 extruded, bent, and welded parts

2 plastic seat parts

(minimum) 7 fasteners

17" x 17" x 28"





# Furniture Risers

With teachers' rooms often housing a mismatch of furniture that can't be adjusted, students are often subjected to furniture that works against them.

These stackable rubber risers can work with chairs or desks, bringing students closer to a comfortable, ready to learn sitting position.

The gray color helps it blend into the floor, not drawing much attention.

23" x 3" x 0.85"



# Next Steps

In the product design and development process, another critical step would be to conduct several rounds of testing.

Testing can be done in different fidelities, and might look like:

- Showing students and teachers sketches or renderings
- Having students and teachers interact with rapid prototypes (like cardboard)
- Putting manufactured prototypes in classrooms and getting feedback

# Thank you for your time!



Presentation by Nick Cyr

Special thank you to the 6 teachers who were willing and able to give me time out of their busy weeks to talk on the phone, especially right before the holiday break.