PORTFOLIO

Isabella Cho

YoungArts Winner with Distinction in Design

Pacific Academy, Irvine, California

Part 1 Product Design: Blind Reader, Smart Step, GoGo Belt

Part 2 Visual Art: Graphite, Charcoal and Acrylic

PART 1

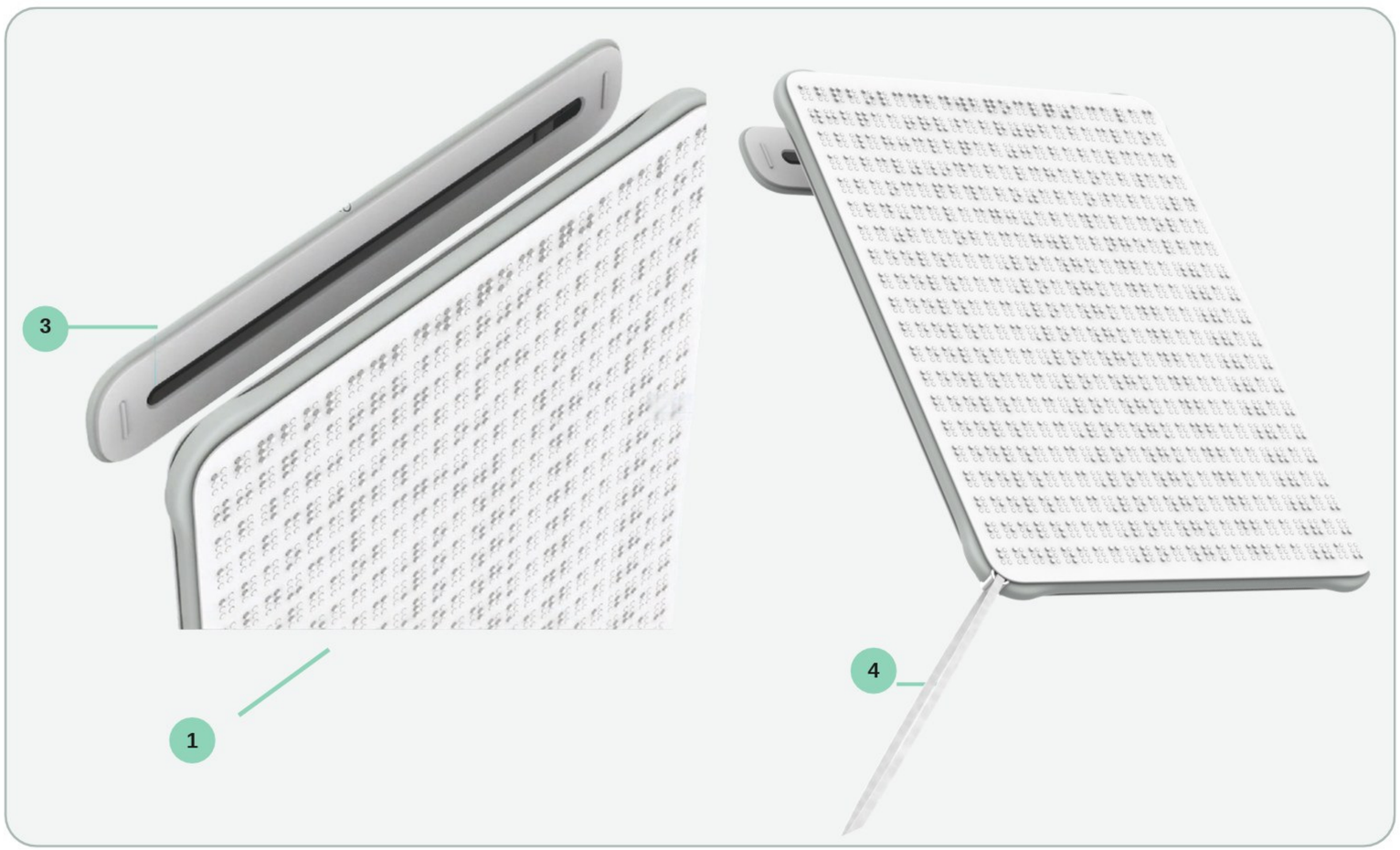
Product Design

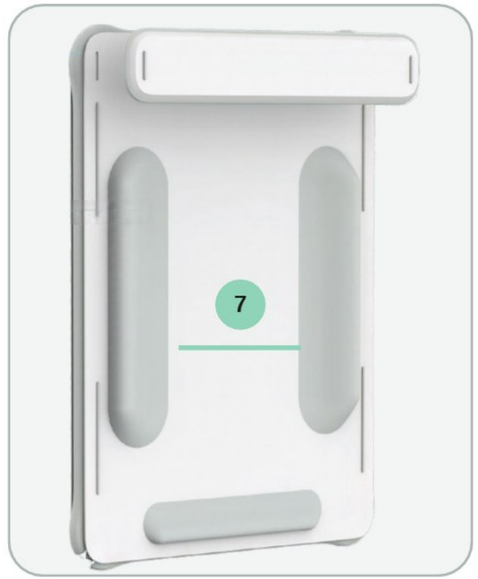
Blind Reader | Smart Step | GoGo Belt

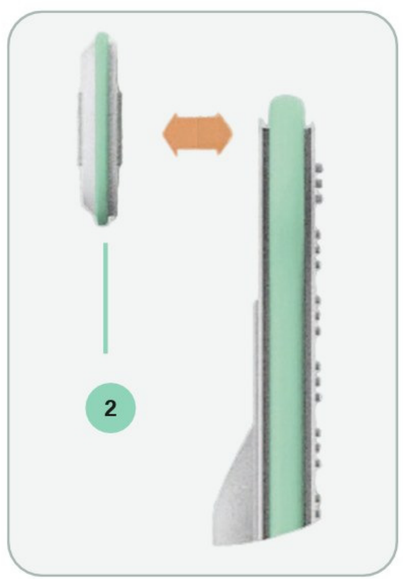
PROPOSED FINAL DESIGN CONCEPT

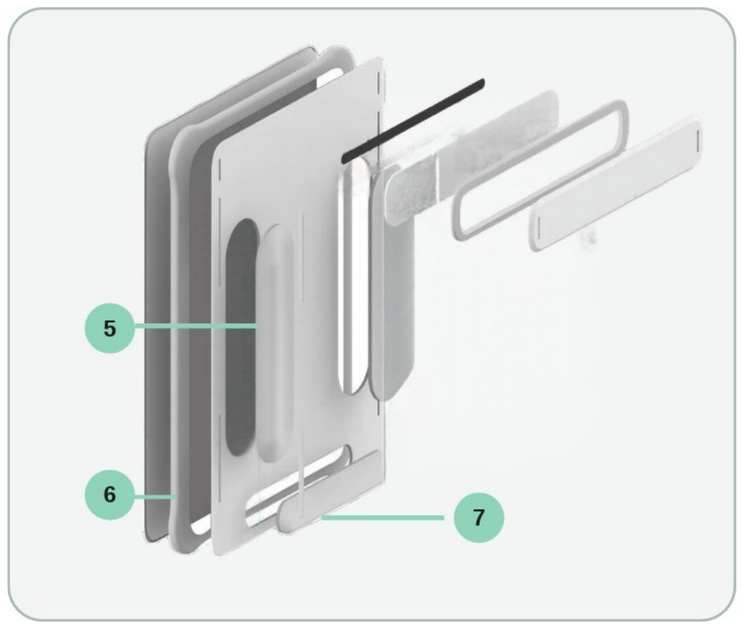
Blind Reader

Blind Reader offers a portable device for scanning printed text and translating it into Braille on a refreshable pad, expanding access to conventionally printed books for the visually impaired.









1 Refreshable Braille Surface
The scanner's transmitted data raises dots on the Braille tablet.

2 Detachable Scanner
Removes from the device for scanning books and reattaches with a magnetic strip.

3 Scanner Bar and Lens
Scans continuously through multiple lines of text. The 15 cm wide lens covers the majority of book sizes.

4 Wrist Strap
A soft leather strap ensures the user does not lose their grip.

5 Mid Bumper
Protects the tablet from breaking on impact.

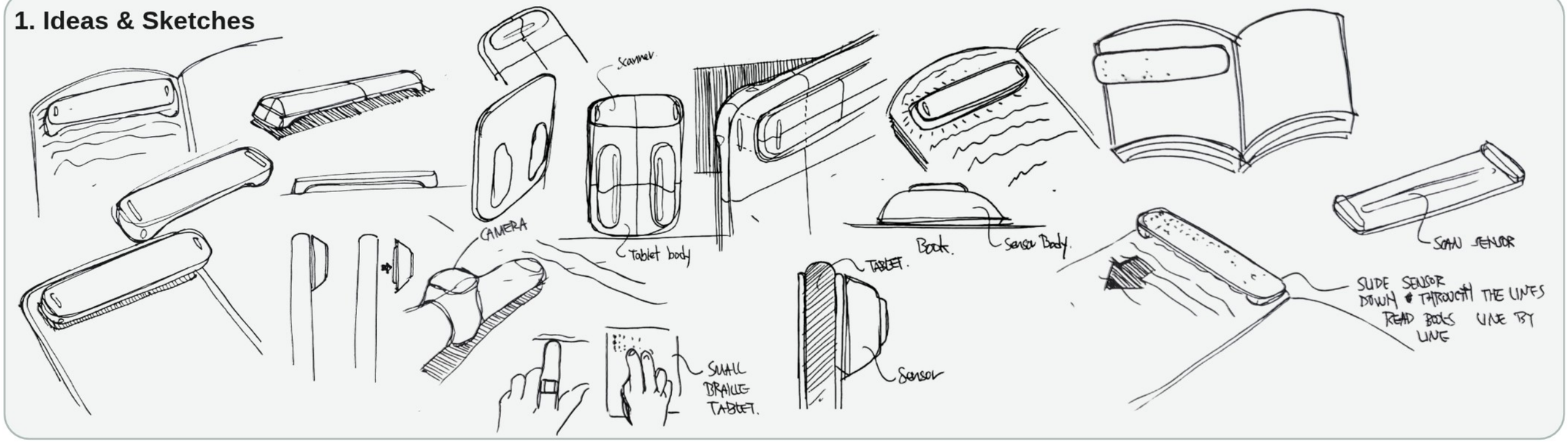
6 Outer Edge Bumper
Prevents dropping.

7 Back Bumper Grips
Prevent sliding and create a stable surface for holding the reader.

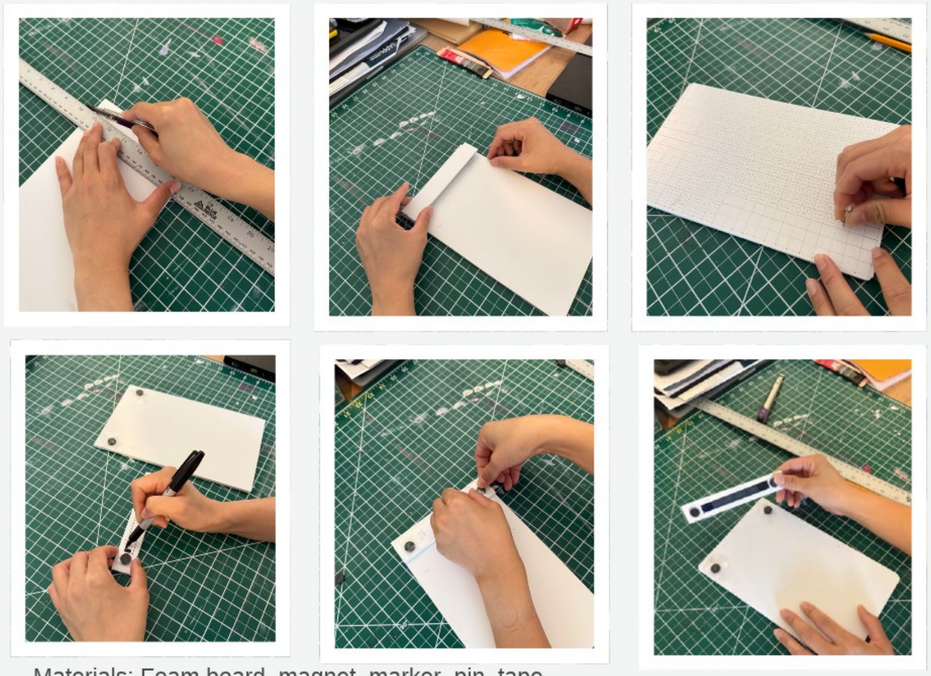
BLIND READER

Design Process

1. Ideas & Sketches

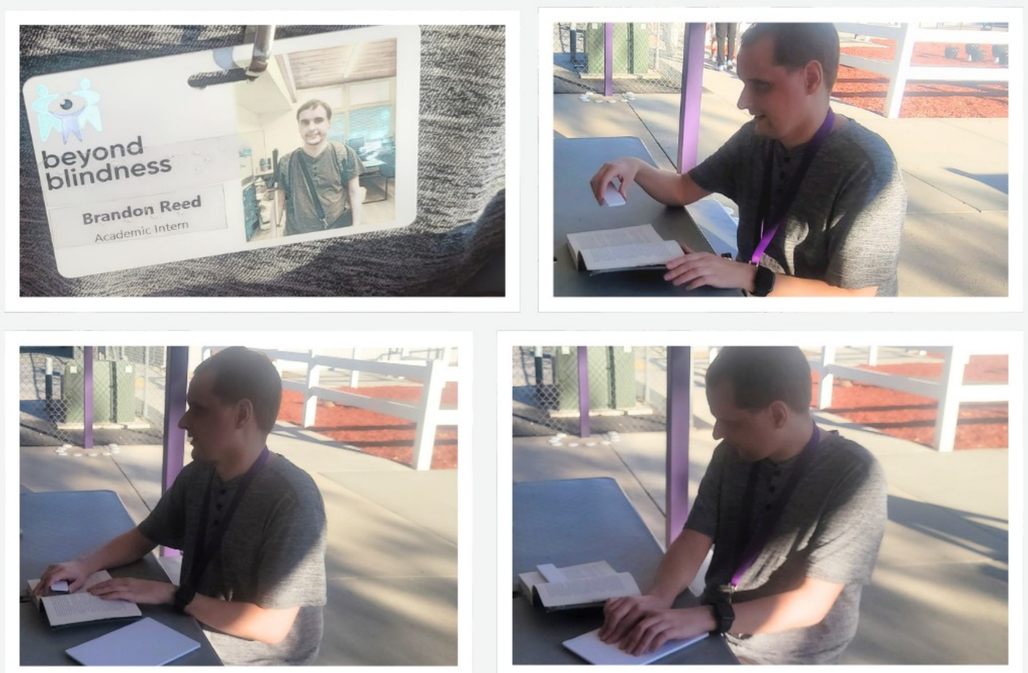


2. Creating Mock-Up



Materials: Foam board, magnet, marker, pin, tape

3. Interview & Mock-Up Testing



Design Goals

Accessibility

Expand access to conventionally printed books, supporting greater social engagement with other readers.

Portability

Create a compact system adaptable to different book sizes.

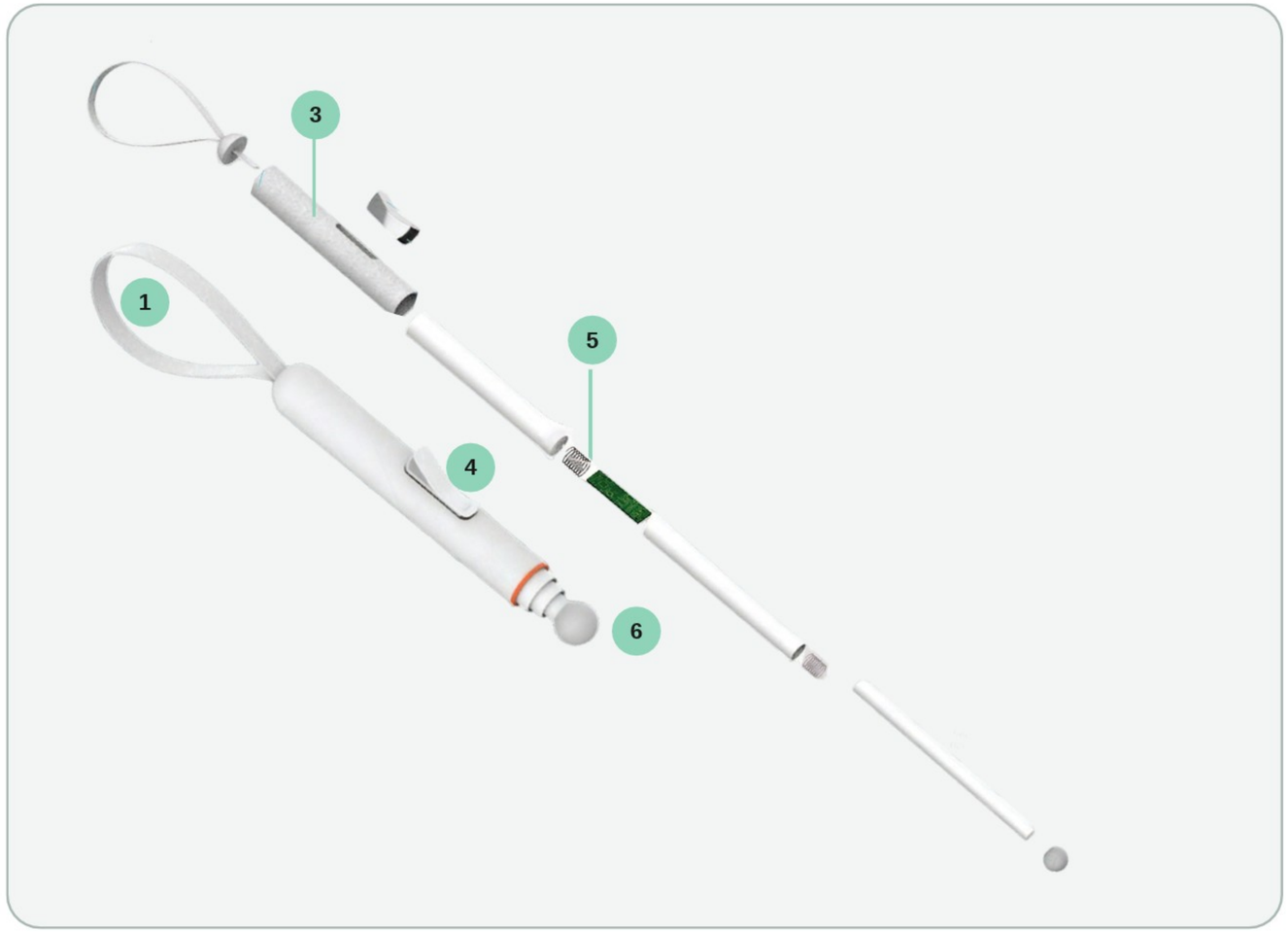
Enhanced Literacy

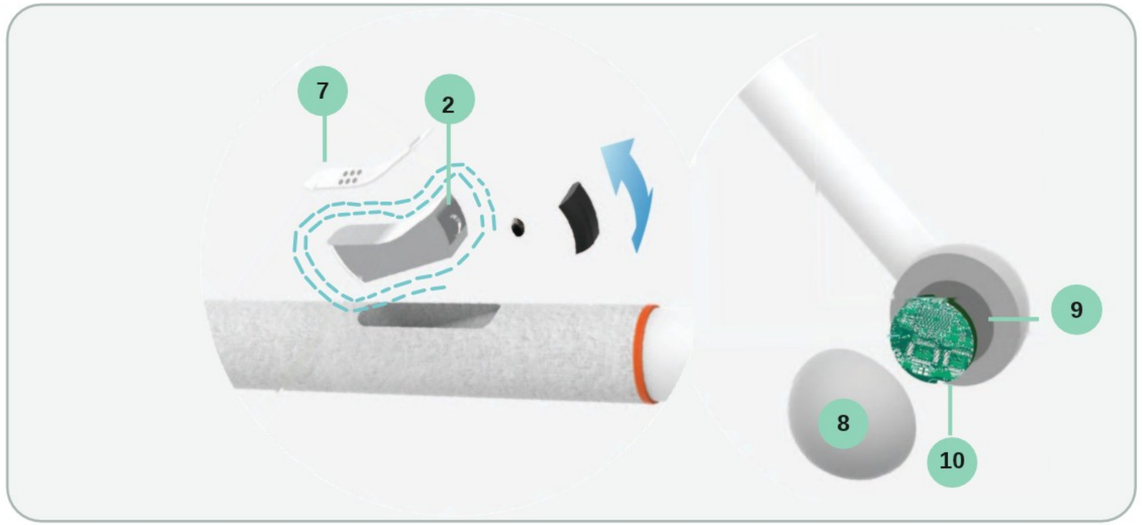
Allow users to read more easily at their own pace while sensing grammar and punctuation.

PROPOSED FINAL DESIGN CONCEPT

Smart Step

Traditional white canes have limited hazard detection outside of their sweeping range, increasing risk of injury to the visually impaired in unfamiliar, noisy, and busy environments. The smart cane uses a built-in smart camera to detect obstacles in real time and alert users, helping them navigate more safely and confidently.







Marshmallow Tip
Good for beginners who prefer the constant-contact technique, especially for indoor navigation.

Ball Tip
Good for walking fast and in slippery conditions. Makes it easy to roll outdoors and over varied terrain.



Pencil Tip
Perfect for tapping cane side to side. Provides precise feedback.

Smart Tip

1 **Strap**
Wraps around the wrist.

2 **Camera**
A compact, wide-angle camera at the top of the cane. Sensors and an AI processor detect hazards and trigger vibration alerts.

3 **Handle**
Covered with soft and grippy fabric for better grip.

4 **Switch**
Press the upper part to turn on and raise the camera; press the lower part to turn off. The surface acts as a braille pad.

5 **Spring**
Ensures smooth, stable extension and retraction.

6 **Smart Tip**
The concept explores pressure sensing surface texture; a PCB microcontroller adjusts the rubber tip's shape and hardness.

7 **Braille Pad**
Braille dots pop up to indicate upcoming danger and give directions.

8 **Flexible Rubber**
Adjusts to become hard or soft based on ground conditions.

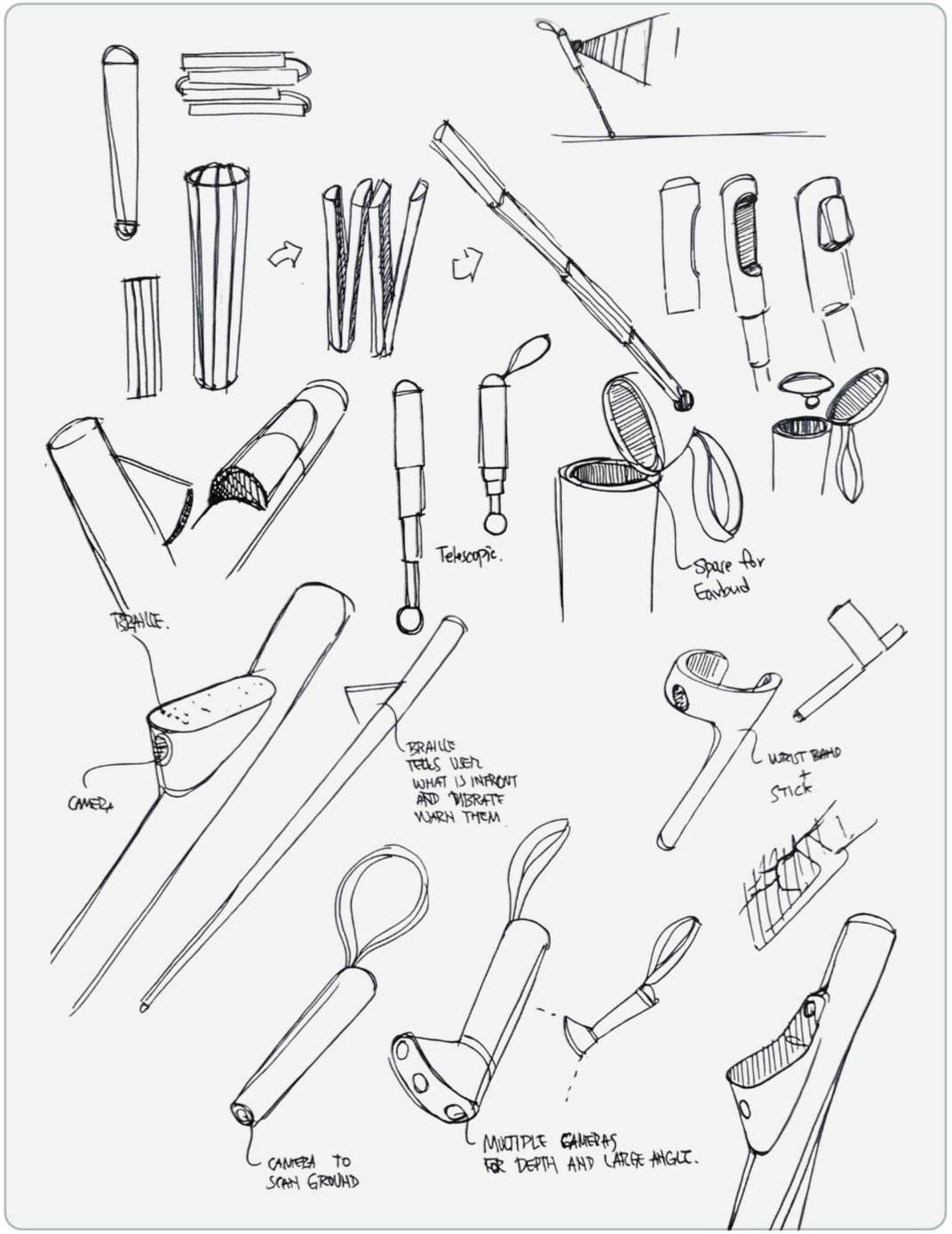
9 **Soft Rubber**
Soft material serves as a cushion.

10 **Printed Circuit Board (PCB)**
Controls the smart tip

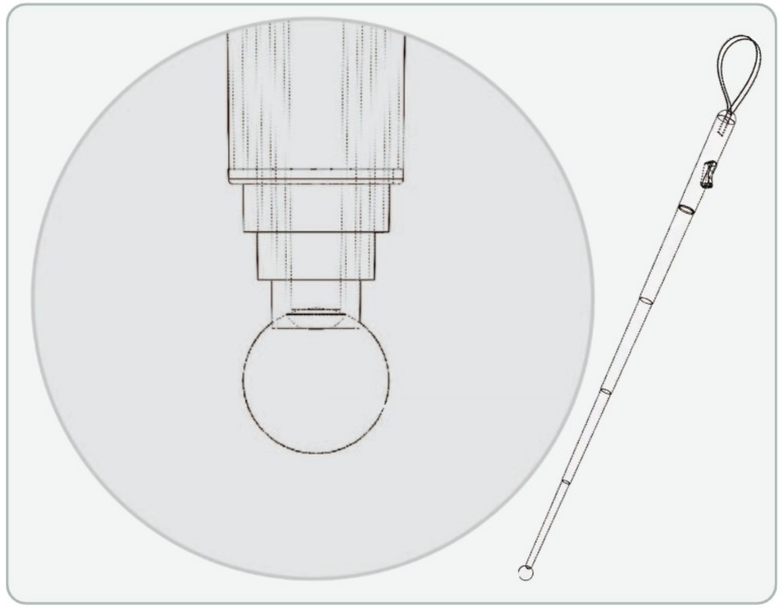
SMART STEP

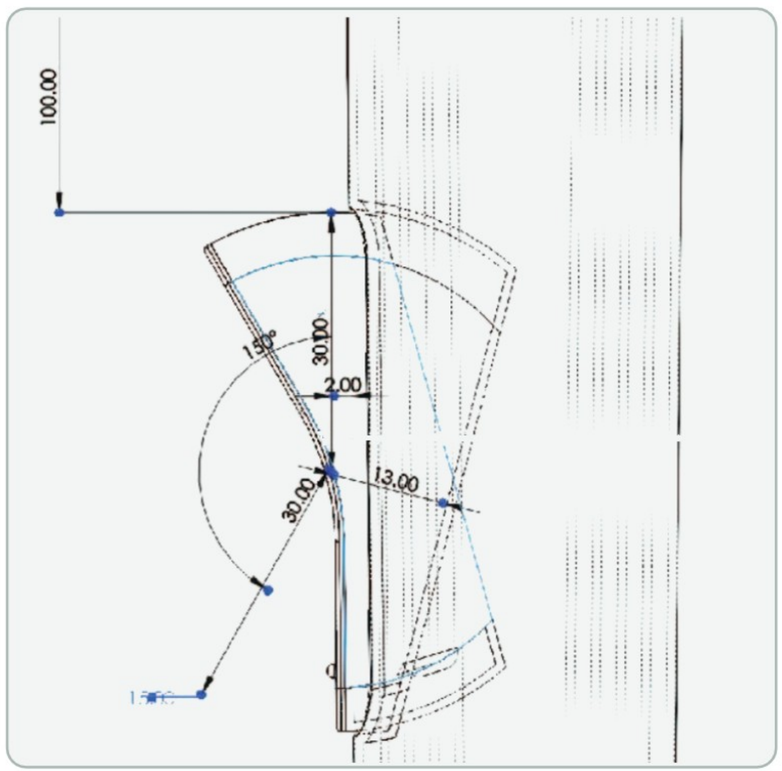
Design Process

1. Ideas & Sketches



2. CAD Detail





Design Goals

Portability

Make the cane both extendible and collapsible for ease of use and storage.

Enhanced Awareness

Detect obstacles in the user's upper body range and broader surroundings, including blindpads, moving objects, sidewalk curves and tree branches.

Tactile Feedback

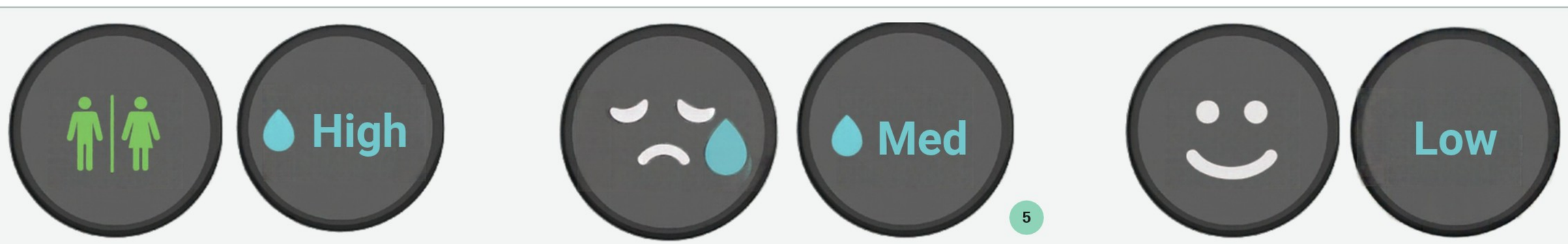
Communicate alerts through the braille pad about directions or upcoming dangers, such as approaching cars or curves ahead.

PROPOSED FINAL DESIGN CONCEPT

GoGo Belt

GoGo Belt explores a wearable system to support potty-training habits for children with Down syndrome. This proposed concept combines a waist belt that monitors urine levels in the user's bladder and a removable pin that gives caregivers visual and tactile alerts in real time, ensuring they can bring their child to the bathroom in time to avoid accidents.





When bladder level is high and kid has to go to the restroom

When bladder is medium and kid needs to go to the restroom soon

When bladder is low and kid is good to go

Pin Display

1 Fabric Band
Microsuede material is designed to be elastic, soft to the touch, and breathable

2 Holding Frame
Frame keeps the sensor unit in place around the child's belly

3 Sensor Module
Senses the amount of urine in the bladder

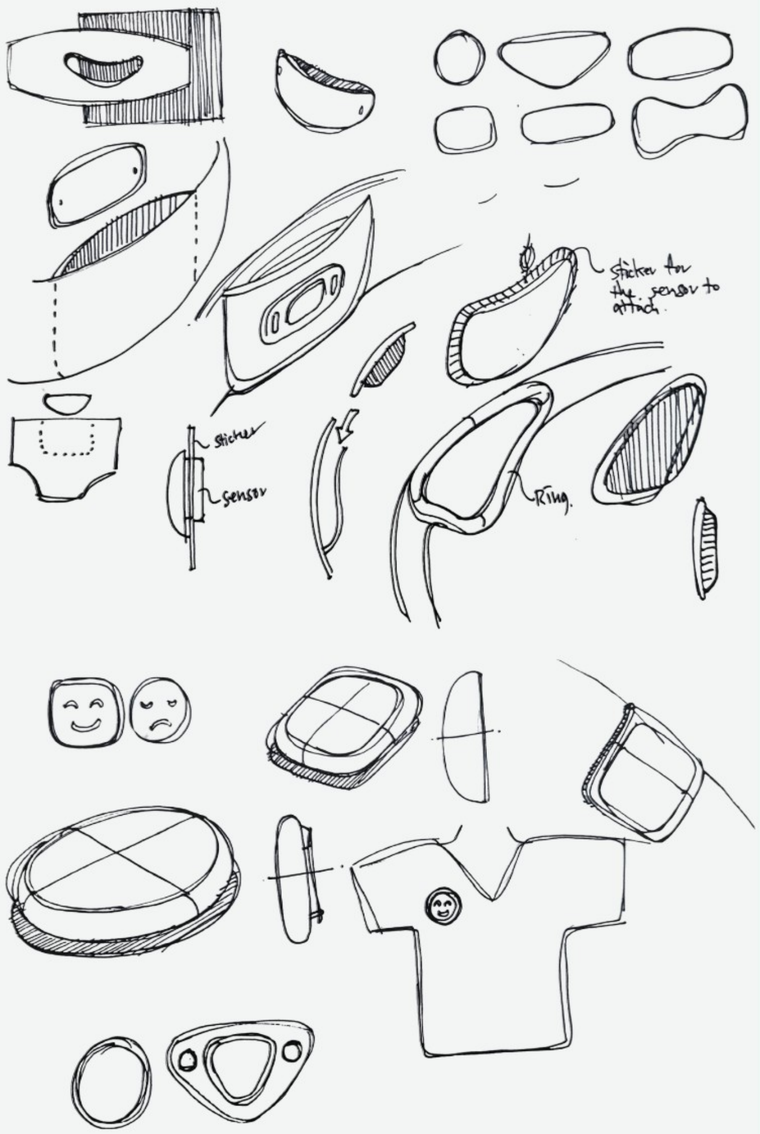
4 Ultrasound Sensor
Curved sensor fits snugly around belly area. Conceptually uses low-power pulse-echo technique to safely monitor bladder volume.

5 Pin Display
Conceptually, sensor module compares bladder volume with a set threshold. Pin receives bladder-volume data via wireless Bluetooth Low Energy. Firmware interprets signals, triggering vibration alert and micro-LED visual display

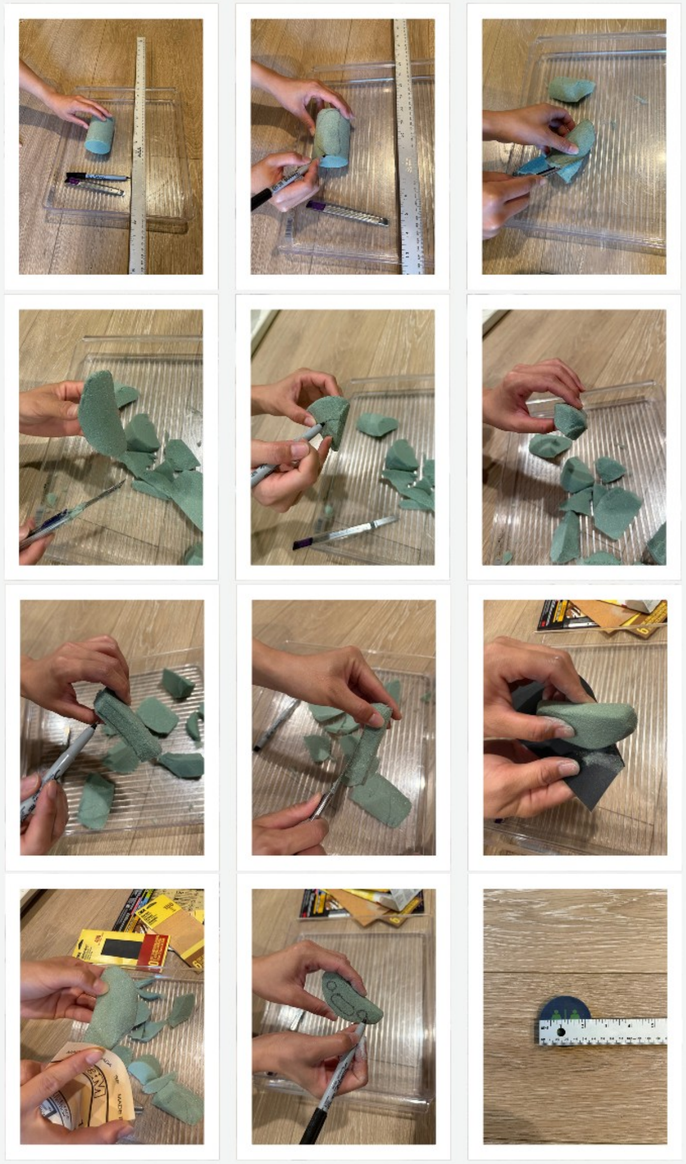
GoGo Belt

Design Process

1. Ideas & Sketches

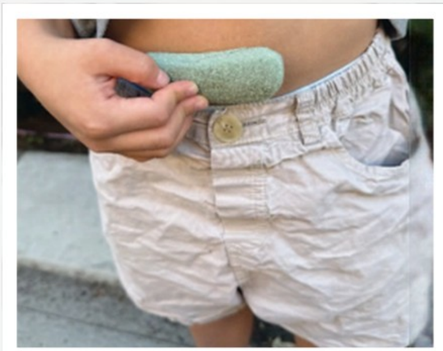


2. Creating Mock-Up



Materials: Craft Dry foam (Cylinder), Marker, 2.25" blank button shell, button cover

3. Interview & Mock-Up Testing







This non-functional mock-up was used to visualize scale and placement on clothing.

Design Goals

Accident Prevention
Monitor bladder fullness using a non-invasive technique and alert caregivers before an accident occurs

Discreet Monitoring & Feedback
Provide subtle, wireless alerts for caregivers while preserving children's privacy & dignity

Comfort
Ensure all-day wear with a breathable, custom-fitted, soft belt that allows kids to freely engage in their regular activities

PART 2

Visual Art

Graphite, charcoal and acrylic



Designed Freedom

Charcoal on paper, 28" x 42"

Visiting the zoo gives us a fascinating glimpse into the animal kingdom, but we feel sad seeing wild creatures confined for human amusement. This feeling leads to a question: What if animals were given one day of freedom to roam in the city?



A Moment of Pause

Graphite on bristol vellum, 8" x 11"

In the quiet of the laundry room, silence isn’t empty—it’s peaceful. Taking an intentional pause in life means turning off autopilot, being alone with our thoughts, and recharging so we can respond to the world with clarity.



Indulgence

Acrylic on illustration board, 7.5" x 12.25"

Sometimes, life can feel like a constant negotiation between denial and desire. You wake up wanting the comfort of what is familiar, yet long for the taste of something more interesting.



Small Errors

Acrylic on illustration board, 14" x 14"

Two napping men at a laundromat are unaware that an old washer's door has popped open, sending water bursting out and mixing colors with whites. It’s one of the many small, everyday mistakes that make us human.



Learning Curve

Acrylic on illustration board, 9.5" x 13.5"

Focusing has always been challenging for me. In class, my thoughts often scattered. I felt isolated and frustrated, as if I was the only one like this. Since my ADHD diagnosis, I've come to understand myself better: I just learn and think differently.



What Love Requires?

Acrylic on illustration board, 15" x 20"

A dog owner who is allergic to dogs has three of them. It makes me wonder what kind of discomfort I am willing to endure just to love.



The Space Between Us

Acrylic on illustration board, 14" x 15"

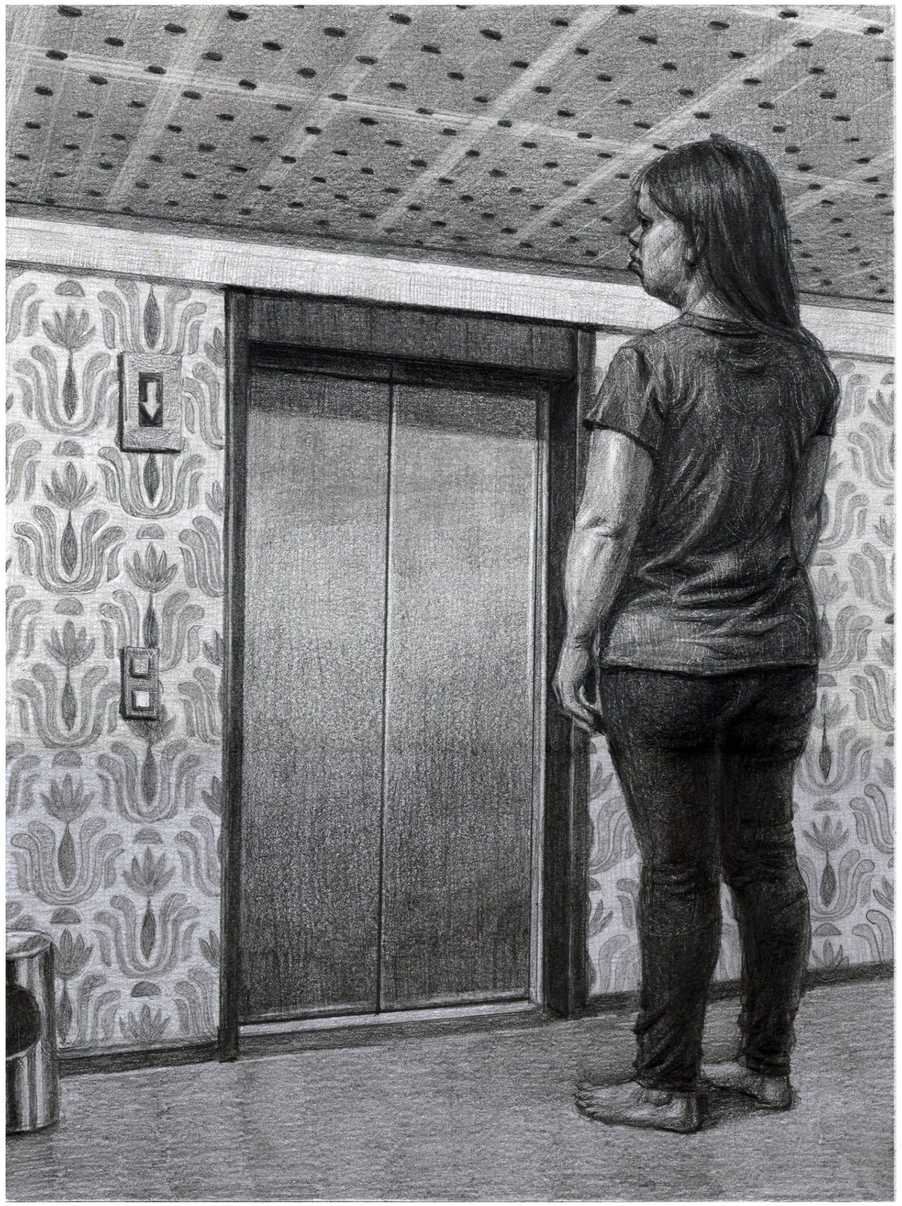
My Grandma’s passing was the biggest loss in my life, bringing me mixed emotions: sadness, shock, and regret. Disengaged images of myself and my grandma reflect her absence and an emptiness in my heart.



Under Pressure

Graphite on bristol vellum, 5.75" x 10"

A chef, prideful of her dish, drops it on the floor. Nobody gets hurt, but her mistake reflects my own struggle to keep pride and ego from shaping my actions.



Going Somewhere

Graphite on bristol vellum, 9.25" x 12.5"

One day, I saw an 8 or 9-year-old girl waiting by the elevator. She was shy, but her amazing smile could hold the whole world. Her image symbolizes dreaming about the future without knowing where she will end up.



After the Fall

Acrylic on illustration board, 8" x 14"

A girl accidentally drops her friend's birthday cake. In the grand scheme of things, it may seem like a minor accident—but in the moment, it feels like a disaster, particularly if you let down people you love.