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9-10-19 Team Norms

- Attendance
- Pulling your own weight
- Open to new/other ideas
- Be nice
- Flip coin when breaking a tie
- Honesty
- Majority agreement before moving forward
- Focus on the task at hand
- One problem at a time

Brand Idea: Waking up
Q: How do people wake up / what do they respond to?
Q: How many people struggle with this?
Q: What do people have to wake up?
Q: Budget?
Q: Is this realistic?
Q: How long will it take to "wake someone up"?
Q: What are the most effective ways to wake up?
Q: What causes someone to wake up?
Q: Why do we struggle with waking up?
Q: Do dreams affect waking up?
Q: What causes us to fall asleep?
Q: What are some things that people have to wake up, what is their effects?
Q: How do our dreams effect us waking up?
Q:

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PROPRIETARY INFORMATION

9-11-19 Brainstorming

Idea One: Waking up

- What do we know about the problem?
 - People oversleep their alarm
 - Falling back to sleep
 - Widespread problem
- What do we need to figure out?
 - Triggers that wake people up
 - Why do people oversleep?
- What resources?
 - Time
 - Money
 - Internet

Idea Two: Getting Out of Bed

- What do we know about the problem?
 - It is a common problem
- What do we need to figure out?
 - How to motivate people to get out of bed
- What resources?
 - Time
 - Money
 - Internet
 - Connections

Idea Three: Blankets falling off the Bed

- What do we know about the problem?
 - What happens to active sleepers
- What do we need to figure out?
 - How common is this problem
 - Has it been solved?
 - Alternatives
- What resources?
 - Time
 - Money
 - Internet
 - Connections

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9-24-19 Research

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https://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1117&context=aeshm_pubs

Chiang, Y. C., Arendt, S., Zheng, T., & Hanisch, K. (2014). The effects of sleep on academic performance and job performance. *College Student Journal*, 48(1), 72-87. Maybe is useful probably not

"The purpose of this study was to explore the effects of sleep on academic performance and job performance. A total of 172 undergraduate students completed an on-line questionnaire and their GPAs were obtained from the registrar's office. Data were analyzed using t-test, principal component analysis, and step wise regression. The results were consistent with delayed sleep phrase syndrome, a common sleep problem in college students. Also, sleep latency and sleep medicine were negatively correlated with academic performance, and sleep quality was significantly associated with job performance. The knowledge of the impact of sleep is effective for educators and employers in helping students with sleep problems. Educators and employers need to be cognizant of the importance of sleep for students' success in their academic performance and job performance."

<https://www.medicaldaily.com/how-human-body-wakes-morning-circadian-rhythms-clock-genes-brain-regions-406344>

Borrelli, L. (2016, December 12). This Is How Your Body Wakes Up In The Morning.

"Natural morning light travels through the optic nerve to the SCN, communicating what's happening in the outside world. The hypothalamus then halts the production of melatonin, a hormone that triggers sleep. At the same time, it increases the production of vasopressin and noradrenaline throughout the brain, which help control our sleep cycles"

<https://www.sciencedirect.com/science/article/abs/pii/S1389945708700133?via%3Dihub>

Van Cauter, E., Spiegel, K., Tasali, E., & Leproult, R. (2008). Metabolic consequences of sleep and sleep loss. *Sleep medicine*, 9, S23-S28.

"Reduced sleep duration and quality appear to be endemic in modern society. Curtailment of the bedtime period to minimum tolerability is thought to be efficient and harmless by many. It has been known for several decades that sleep is a major modulator of hormonal release, glucose regulation and cardiovascular function. In particular, slow wave sleep (SWS), thought to be the most restorative sleep stage, is associated with decreased heart rate, blood pressure, sympathetic nervous activity and cerebral glucose utilization, compared with wakefulness. During SWS, the anabolic growth hormone is released while the stress hormone cortisol is inhibited. In recent years, laboratory and epidemiologic evidence have converged to indicate that sleep loss may be a novel risk factor for obesity and type 2 diabetes. The increased risk of obesity is possibly linked to the effect of sleep loss on hormones that play a major role in the central control of appetite and energy expenditure, such as leptin and ghrelin. Reduced leptin and increased ghrelin levels correlate with increases in subjective hunger when individuals are sleep restricted rather than well rested. Given the evidence, sleep curtailment appears to be an important, yet modifiable, risk factor for the metabolic syndrome, diabetes and obesity. The marked decrease in average sleep duration in the last 50 years coinciding with the increased prevalence of obesity, together with the observed adverse effects of recurrent partial sleep deprivation on metabolism and hormonal processes, may have important implications for public health."

<https://academic.oup.com/sleep/article-pdf/19/4/318/13660411/sleep-19-4-318.pdf>

Pilcher, J. J., & Huffcutt, A. I. (1996). Effects of sleep deprivation on performance: a meta-analysis. *Sleep*, 19(4), 318-326.

"To quantitatively describe the effects of sleep loss, we used meta-analysis, a technique relatively new to the sleep research field, to mathematically summarize data from 19 original research studies. Results of our analysis of 143 study coefficients and a total sample size of 1,932 suggest that overall sleep deprivation strongly impairs human functioning. Moreover, we found that mood is more affected by sleep deprivation than either cognitive or motor performance and that partial sleep deprivation has a more profound effect on functioning than either long-term or short-term sleep deprivation. In general, these results indicate that the effects of sleep deprivation may be underestimated in some narrative reviews, particularly those concerning the effects of partial sleep deprivation."

<https://holistic.ort.org.il/wp-content/uploads/2016/02/sleep-loss-learning-capacity-and-academic-performance-2006.pdf>

Curcio, G., Ferrara, M., & De Gennaro, L. (2006). Sleep loss, learning capacity and academic performance. *Sleep medicine reviews*, 10(5), 323-337.

"At a time when several studies have highlighted the relationship between sleep, learning and memory processes, an in-depth analysis of the effects of sleep deprivation on student learning ability and academic performance would appear to be essential. Most studies have been naturalistic correlative investigations, where sleep schedules were correlated with school and academic achievement. Nonetheless, some authors were able to actively manipulate sleep in order to observe neurocognitive and behavioral consequences, such as learning, memory capacity and school performance. The findings strongly suggest that: (a) students of different education levels (from school to university) are chronically sleep deprived or suffer from poor sleep quality and consequent daytime sleepiness; (b) sleep quality and quantity are closely related to student learning capacity and academic performance; (c) sleep loss is frequently associated with poor declarative and procedural learning in students; (d) studies in which sleep was actively restricted or optimized showed, respectively, a worsening and an improvement in neurocognitive and academic performance. These results may be related to the specific involvement of the prefrontal cortex (PFC) in vulnerability to sleep loss. Most methodology"

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9-26-19 Problem Statement

Who?... Teenagers & Adults

Where?... Around the world

What?... Lack of motivation to get out of bed

Why?... Affects peoples performance and abilities

How?... Majority of people (130.8 million)

63% of Americans have trouble getting out of bed. This correlates to lower academic performance and inability to do basic job skills

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10-2-14

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10-2-19

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10-2-19 Patents

<https://patents.google.com/patent/US6795377B2/en>

Gorden, C. J. (2004). U.S. Patent No. 6,795,377. Washington, DC: U.S. Patent and Trademark Office.

A personalized alarm clock allows a user to receive a predetermined audio and/or image signal, or to place a predetermined telephone call to a selected telephone number at a predetermined time. The personalized alarm clock is generally configured in the form of a portable entertainment device, such as a portable AM/FM radio and/or CD/DVD device. The personalized alarm clock includes at least one input device, at least one output device, at least one input port, at least one output port, at least one telephone jack, an automatic telephone dialer, a central processing unit, at least one memory device, and a power supply. The personalized alarm clock is configured with upper and lower housings connected together by a hinge.

Pros: A personalized alarm clock is provided that allows a user to receive a predetermined audio and/or image signal, or to place a predetermined telephone call to a selected telephone number at a predetermined time

Makes waking up more pleasant because you get to choose the sound and image you wake up to each morning

Cons: Alarm clock unit is bulky and takes up a large portion of space

Requires a phone to be used properly

<https://patents.google.com/patent/US4821247A/en>

Seiger, H. W. (1971). U.S. Patent No. 3,553,746. Washington, DC: U.S. Patent and Trademark Office.

A support device for helping a person or patient with a back injury out of bed by himself includes a base frame positionable adjacent to a side of the bed with suitable foot support means extending under the bed. A vertical column structure is secured to the base frame and extends vertically upwardly past the side of the bed. Hand gripping means secured to and extending laterally from the upper portion of the column means are disposed in a position to enable a person lying on the bed to grip the hand gripping means and pull himself to an upright position and simultaneously swing himself around towards the side of the bed to facilitate his getting out of the bed. An arm support means is also provided on the column means disposed below the hand gripping means for engaging the person's forearm when raising himself thereby providing leverage to greatly assist him in raising and swinging his body.

Pros: Determines the likelihood that the user is about to get out of the bed from changes in the one or more physiological characteristics.

Better for people with disabilities or injuries that prevent them from using regular alarm clock

Cons: Many specialized parts included

Not available for all people because it is not exactly a one size fit all situations

<https://patents.google.com/patent/US6236622B1/en>

Blackman, S. E. (2001). U.S. Patent No. 6,236,622. Washington, DC: U.S. Patent and Trademark Office.

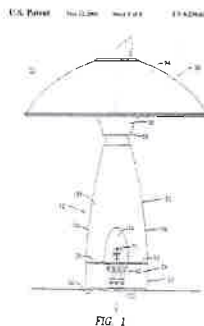
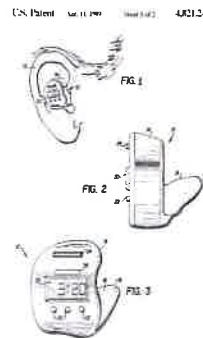
A lighting fixture having a lamp and alarm clock with a wake-up cycle and sleep cycle with gradually increasing and decreasing light and sounds. The lighting fixture includes at least one lamp for emitting light in the wake-up cycle and in the sleep cycle. The lighting fixture also includes at least one speaker for emitting sound in the wake-up cycle and in the sleep cycle. The lighting fixture further includes a dimmer switch for dimming the light and wake-up cycle control buttons for setting and controlling a wake-up cycle having a light control button for setting the time when the wake-up cycle control buttons activates the light mode and gradually increases the lamp brightness emitted from the at least one lamp; and sound control buttons for setting and controlling the time when the wake-up cycle control buttons activates the sound mode and gradually increases the sound intensity emitted from the at least one speaker; and sound selection switches for selecting one of multiple pre-set sounds for the sound mode of the wake-up cycle, or for full time operation as background sound.

Pros: Utilizes both sound and sight to wake target

Imitates a sunrise, making the waking up process easier

Cons: The buttons to turn off/on the lamp and the clock could easily be mixed up

Not all people are light sleepers and sensitive to the sunrise



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10-2-19 Brainstorming for Solution

- Individual
- Vibration of some sort
 - Alarm clock with modified variations to allow for other senses - besides hearing
 - Alarm clock for deaf could be used as reference ~~for~~ for solution
 - Something in or dealt with a pillow
 - Hangs on bed
 - Goes under bed/mattress -
 - Smell?
 - Wakes you up while still keeping natural process
 - Deprivation? How it affects sleep.

- Team
- Pillow that vibrates and creates sound
 - Slow hydraulic system that
 - Something to get you moving (out of bed)

10-9-19 Final Solution

- Pillow
- Wall Clock
- Natural Clock
- Calm light solution to gently wake someone up. May use sound to provide additional motivation

10-14-19 Cost Analysis

- Light Bulb \$2-\$3
- Arduino Mega \$40 (Free) (Vasco)
- Wires and Misc \$15
- Relay \$10
- Base Material - (3D Printed)
- Total is **\$28**

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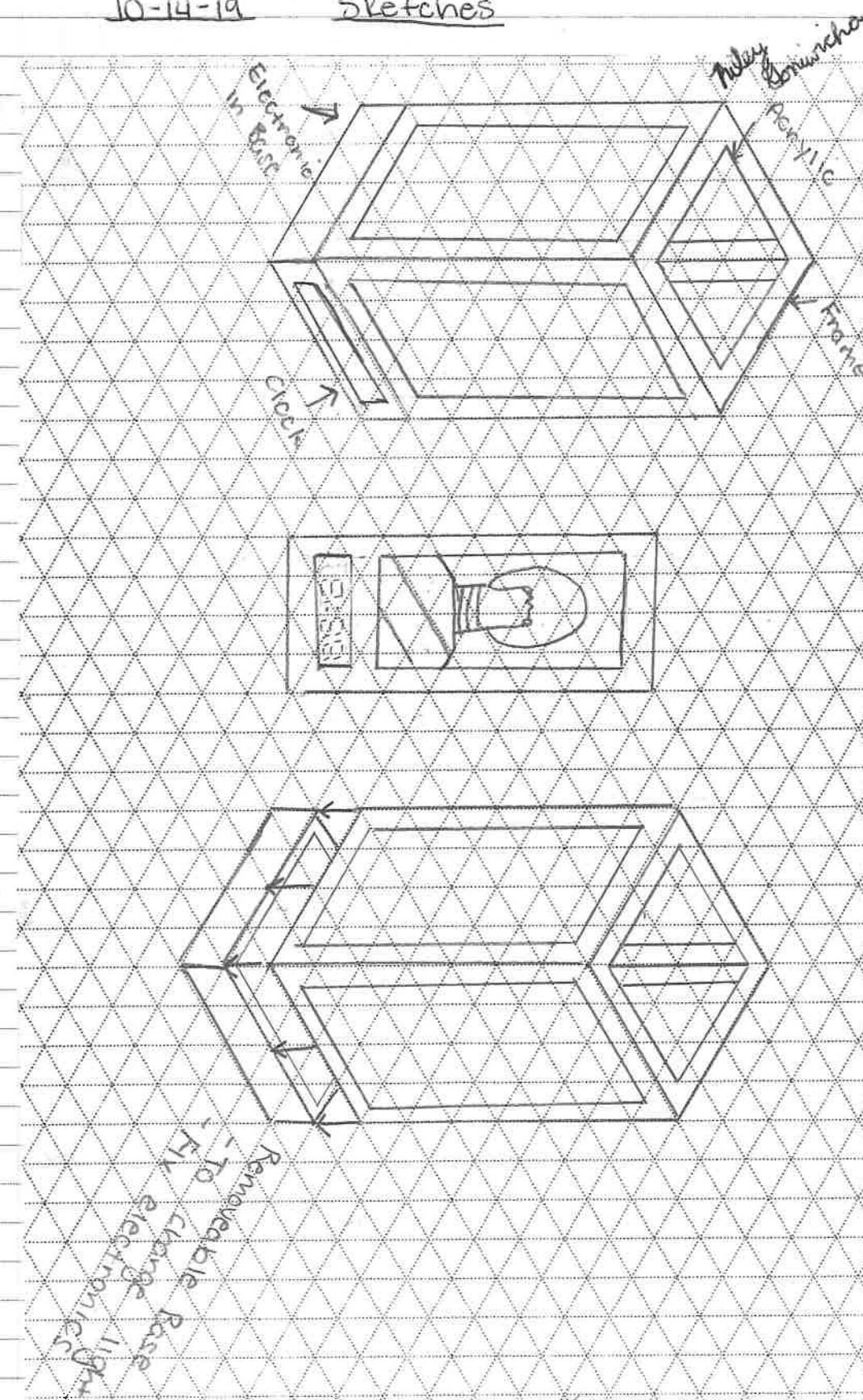
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10-14-19 Sketches



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Testing

12-8-19

Heat Test:

Measure the operating Temp. of LED's after 15 min to determine safety

Time(min)	Temperature (°C)
15 min	66°C
20 min	73°C
25 min	78°C
30 min	78°C

Durability Test:

Record the durability and lightweight box structure. If product falls off of nightstand, or knocked over plastic remains in-tact.

Height(in)	Result
6	No effect
12	No effect
18	Fracture
24	Fracture

Waking Up Test:

Make sure the product wakes people up. Timer began at certain time and was concluded when the person was out of bed.

Participants	1	2	3
Reaction Time (min.)	4 min 30 sec	6 min 16 sec	2 min 45 sec

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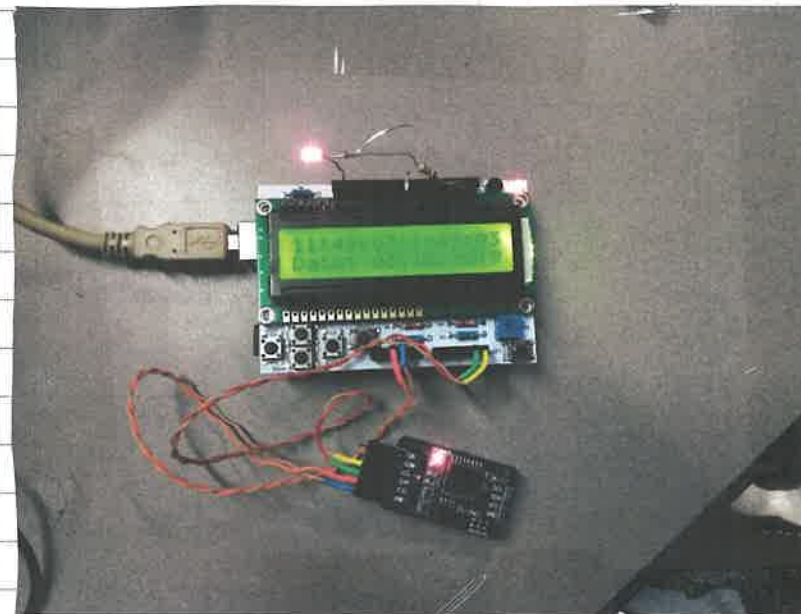
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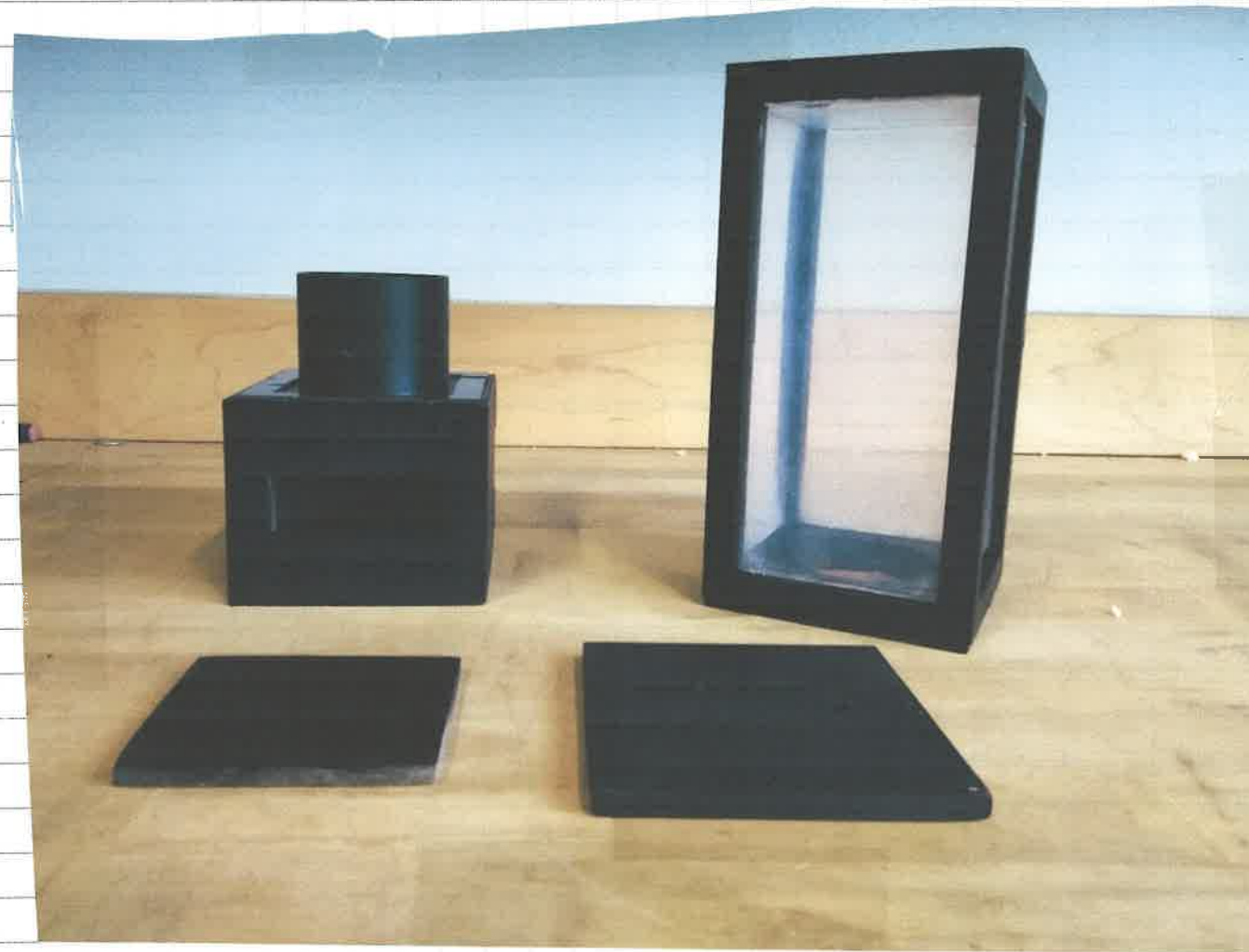
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