



Element D

Problem Statement

One in six women are a victim of sexual assault. Women from the ages 18 to 24 who don't have the physical means to fight back are the ones most commonly attacked. The victims afterwards then suffer mentally, physically, and financially for something that they weren't responsible for.

Introduction

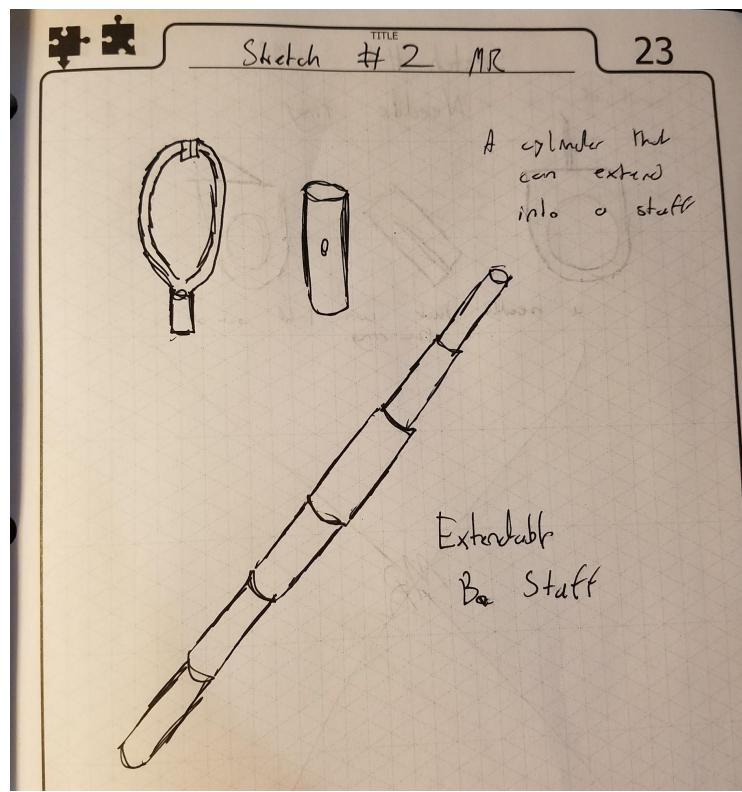
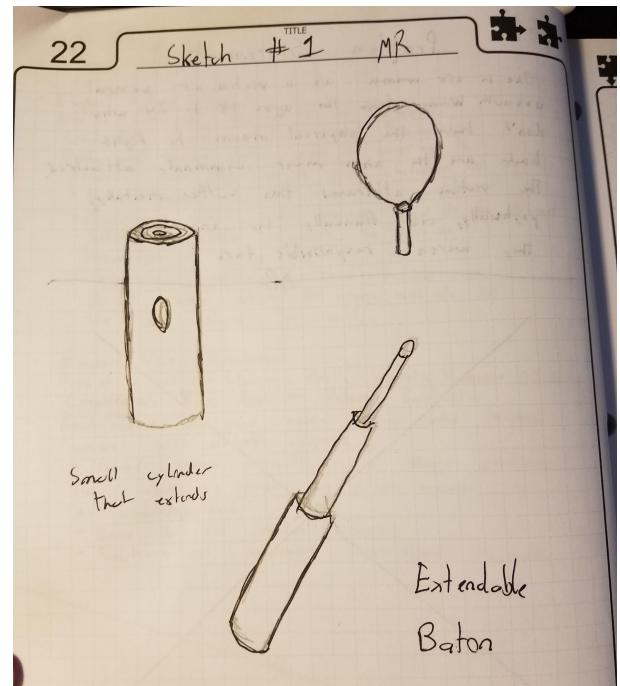
In order for us to find a solution to our problem, we all will start by examining a few more existing solutions and their good/bad qualities. From there we will all separately sketch out ten brainstorming ideas so that we have a total of thirty. Once we have those thirty, we will go through them all individually and discuss all of the pros and cons of them to decide if they should move on. We will have a minimum of five that move on, and we'll have to describe why each other sketch was not chosen. With those five, we will make a decision matrix comparing them against our design requirements from Element C until we have one winner. That one winner barring extenuating circumstances, will be our solution that we make.

Brainstorming Sketches

Key

Maya	Evalynn	Emily
#1-10 MR	#1-10 EV	#1-10 EG

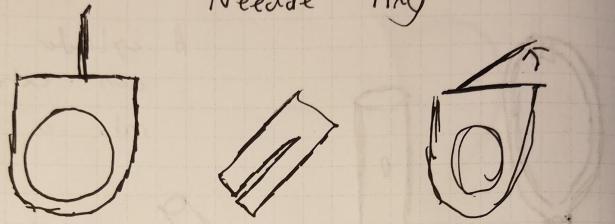
Maya's Sketches



24

Title
Sketch #3 MR

Needle ring



a needle that can hold out of the ring

4

26

Title
Sketch #5 MR

A tube that can fire one powerful rubber bullet at a person



Single shot rubber hit

27

Title
Sketch #6 MR



Cuff Bracelet Knuckles
a bracelet with hard spines that can turn into something to hit with

28

Sketch #7 MR



Protective gloves

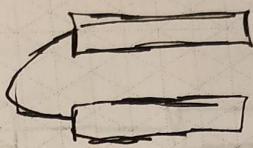
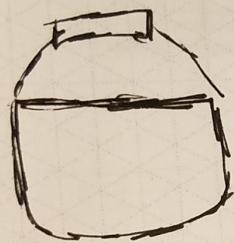


fingerless gloves
with hard pieces
inside the glove that
can deal more
damage when hitting.



TITLE
Sketch #8 MR

29

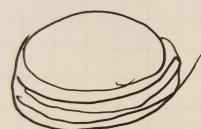
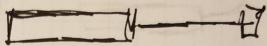


quick release
purse handle
that's a
knuckle duster

Purse knuckles



30

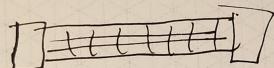
TITLE
Sketch #9 MR

Rope Bracket

a cord that can be
pulled away to trap
a toucher hands or choke them

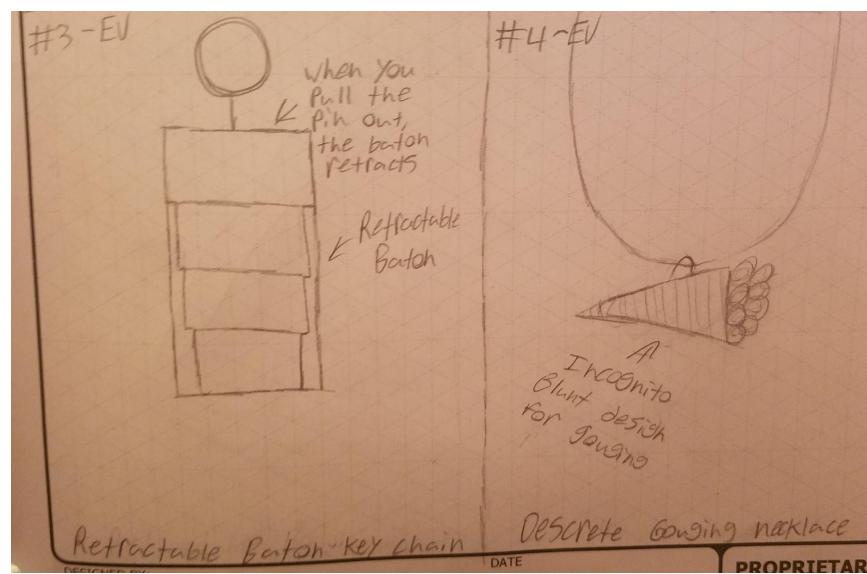
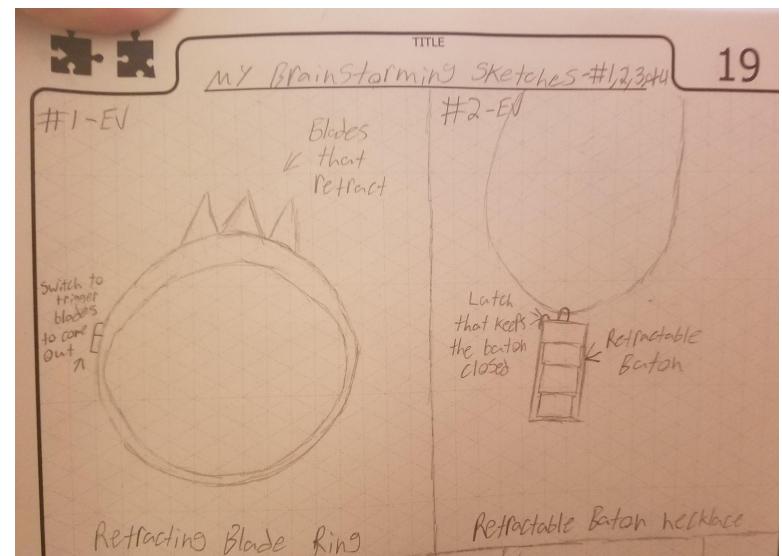
TITLE
Sketch #10 MR

31



Decorative attackr bolt
Quick release bolt with
hard metal pieces to
hit someone with.

Evalynn's Sketches



20

TITLE
MY Brainstorming Sketches - #5, 6, 7 + 8

#5-EV

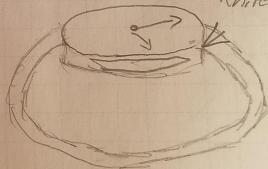
Holes
for you
to grip
it.



← Kickstand
for your phone
that twists
off and can
bounce

#6-FV

Secret compartment
for small
knife



Gonging kickstand

Knife compartment watch

Gonging kickstand

#7-EV

Underneath a
bright LED
light that
blinds the attacker



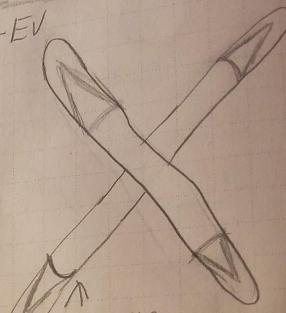
← Removable
design
over the
top

Switch on
the back
turns
on light

Blinding Necklace

#8-EV

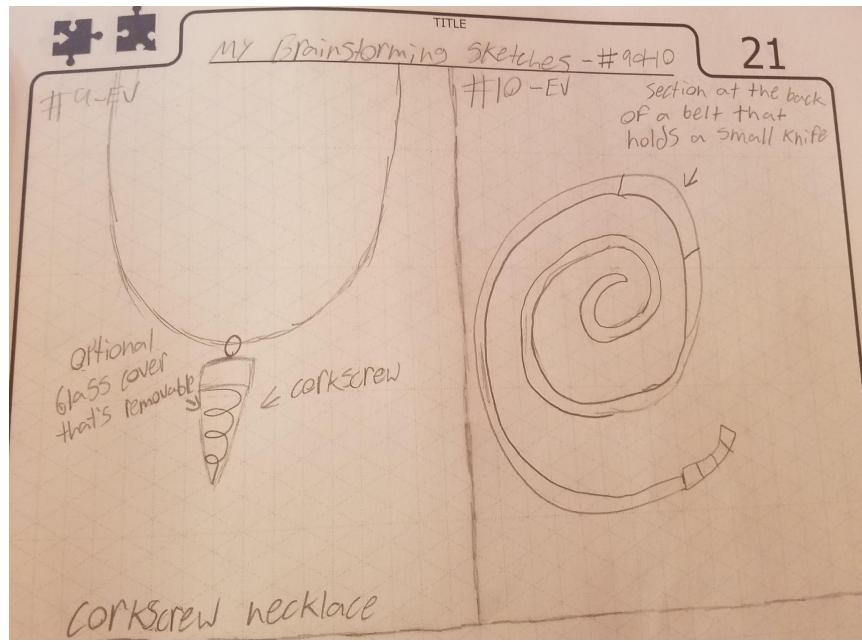
Removable
caps with small
blades underneath



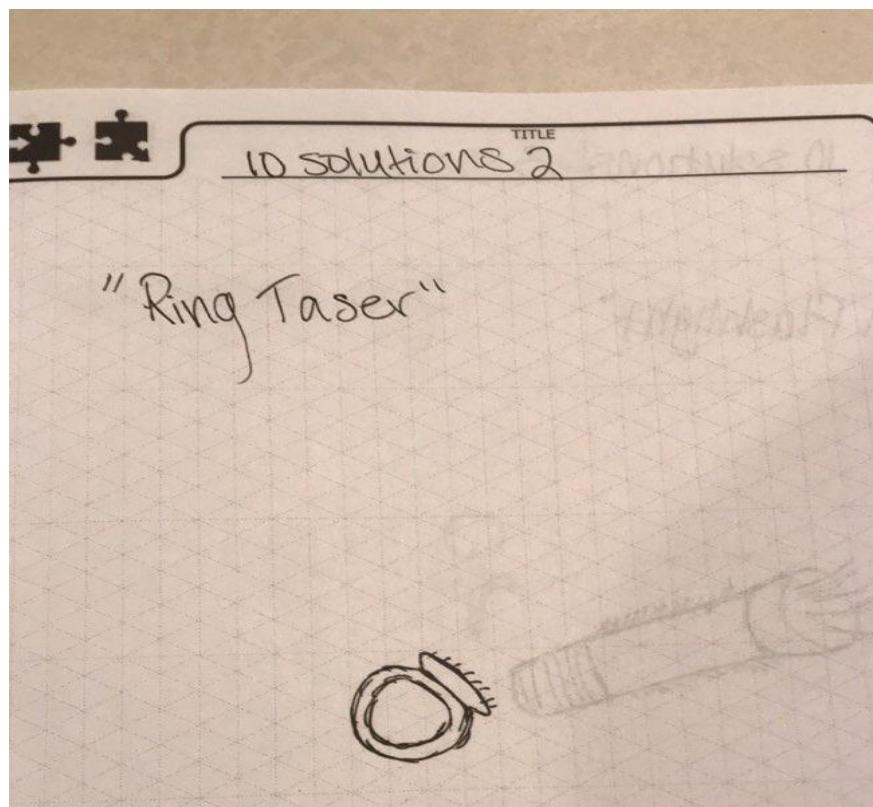
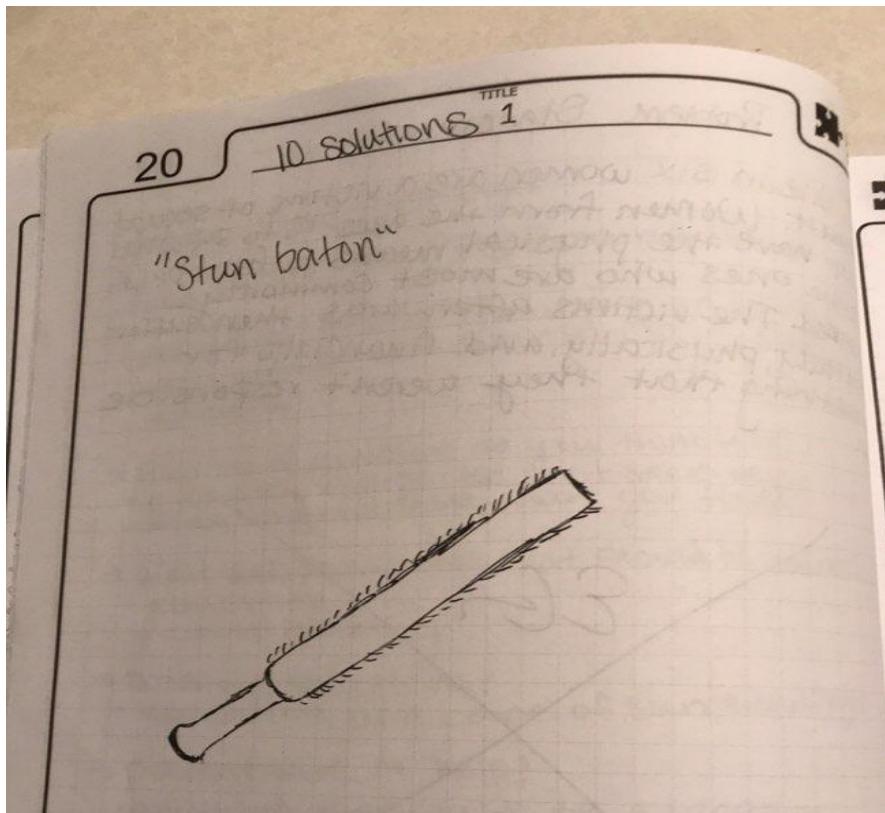
Hair chopsticks with blades

DESIGNED BY:

DATE



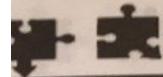
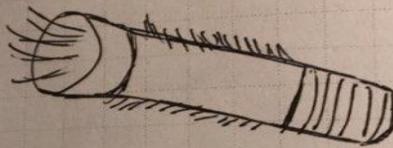
Emily's Sketches



22

10 solutions ^{TITLE} 3

"Stun Flashlight"



10 solutions ^{TITLE} 4

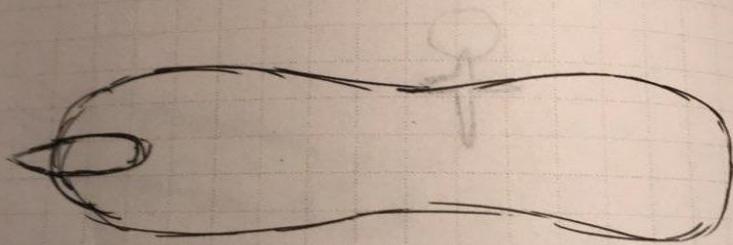
"sharp keychain ring"

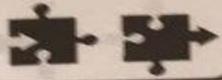


24

10 Solutions ^{TITLE} 5

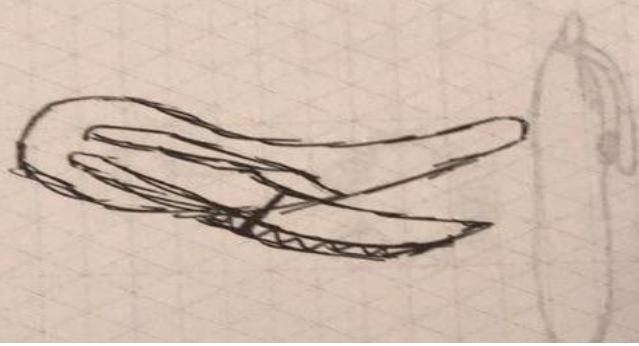
"Shoe knife"





10 solutions ^{TITLE} 6

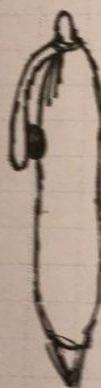
"Knife Banette"

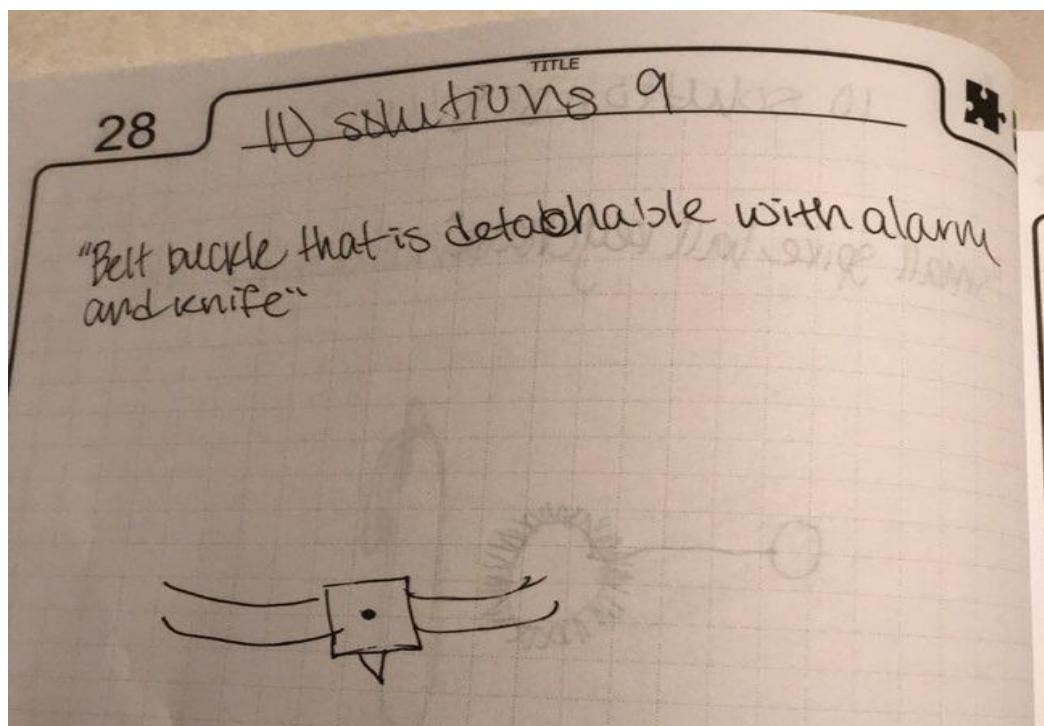
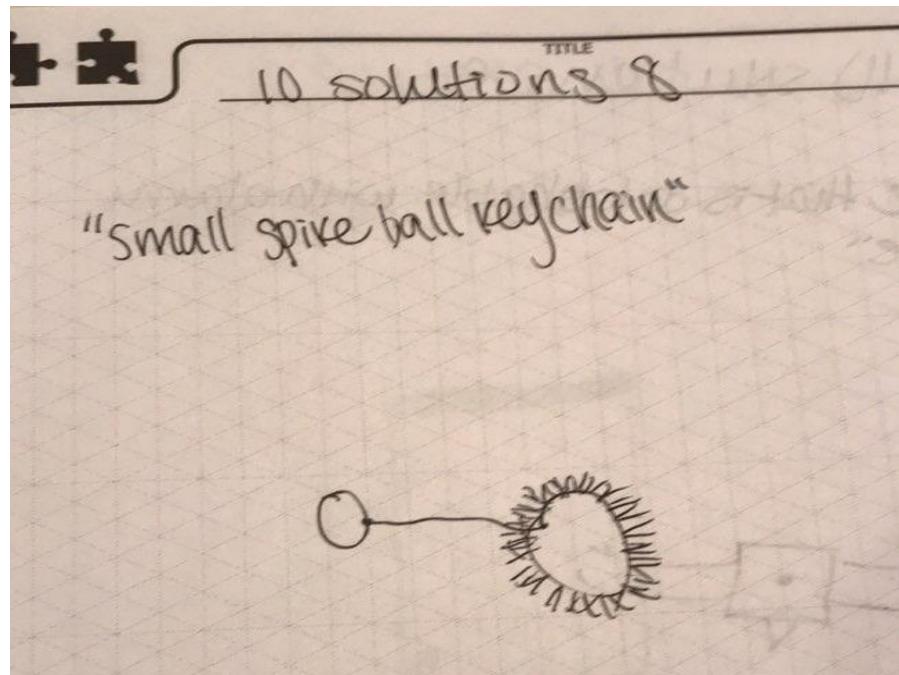


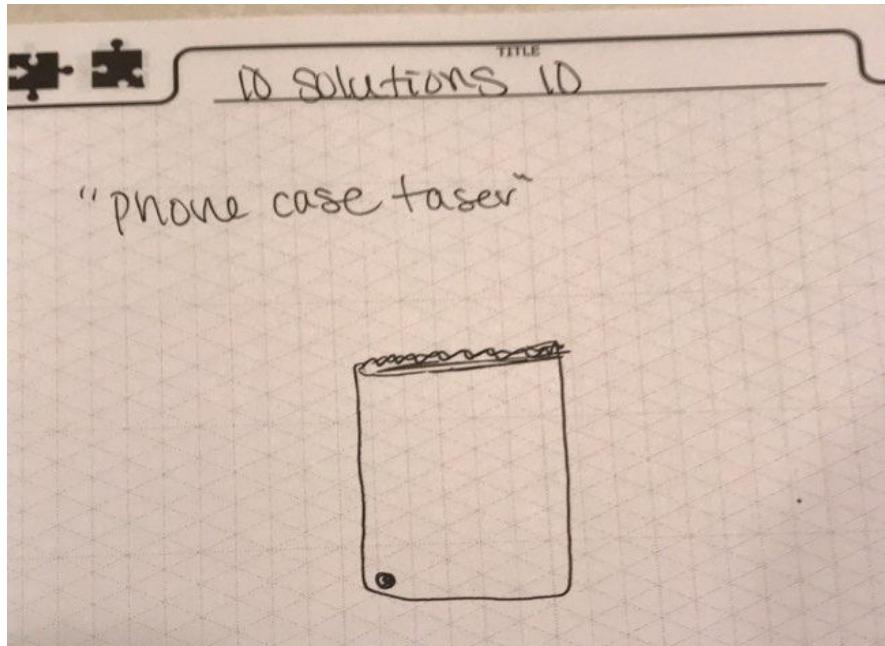
26

10 solutions ^{TITLE} 7

"pen knife/alarm"







Eliminated Design Justification

Maya's Eliminated Designs

#2 MR- the extendable staff is eliminated because it would be too difficult to use in tight quarters and would not be easy to use as listed in requirement 6.

#4 MR- the taser bracelet would not be compact as requirement 1 states and the skills/ technology that would be required to make it are not available.

#5 MR- the single shot rubber hit would be a one time deal and could potentially not even slow the attacker down. Making it not useful or reasonable.

#7 MR- the protective gloves are eliminated because consumers would not want to wear them all the time and could not be more harmful than a solid punch.

#9 MR- The rope bracelet is too close to a potential lethal weapon which is not allowed in our design.

#10 MR- The decorative attack belt is eliminated because it would not be as easy accessible and could not be worn all the time.

Evalynn's Eliminated Designs

#3EV - The retractable baton keychain does not meet design requirement #2, because if it was on your keys, say in your bag, it would not be easily accessible.

#4EV - The discrete gouging necklace does not meet design requirement #4, because if it was to be used in the event of an attack, I don't think it would actually do much harm.

#5 EV - The gouging kickstand does not meet design requirement #2 because it's not always easily accessible if you don't have your phone and it's also just a bit impractical.

#6 EV - The hidden knife compartment watch does not meet design requirement #5 because if used in the event of an attack it could potentially be considered lethal.

#7 EV - The blinding necklace mainly just wasn't practical for us to make in this time frame, plus it wouldn't technically be classified as a weapon.

#8 EV - The hair chopsticks with hidden blades do not meet design requirement #5 because in the event of an attack, it could be classified as lethal.

#9 EV - The corkscrew necklace mainly just isn't very practical, plus it doesn't meet design requirement #1 because it's not very discrete.

#10 EV - The belt knife does not meet design requirement #5 because in the event of an attack, it could be considered lethal.

Emily's Eliminated Designs

#1 EG - The stun baton is not reasonable and is too big to carry around all the time.

#2 EG - The ring taser is too small to hold enough power to include a taser.

#3 EG - The stun flashlight is too complicated to make and could be potentially lethal.

#5 EG - The shoe knife is not reasonable and could be lethal.

#6 EG - The knife barrette has the possibility of cutting the user or cutting the users hair off and is lethal.

#7 EG - The pen/knife alarm is not reasonable because most people won't carry a fake pen everywhere and it would be hard to make, and it's potentially lethal.

#8 EG - The small spike ball keychain could potentially be harmful towards the user if they aren't careful.

#9 EG - The belt buckle that is detachable with an alarm and knife is not reasonable and it is potentially lethal.

#10 EG - The phone case taser would not be big enough to hold enough power to include a taser.

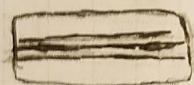
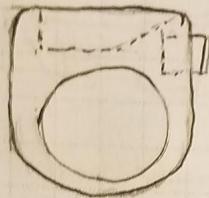
Detailed Drawings

32

Annotated Sketch #1



Hidden Blade Ring

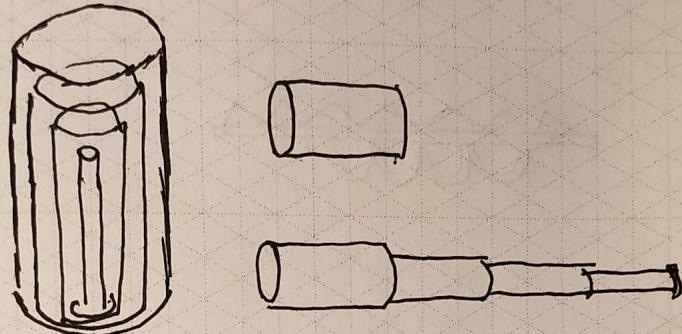


A ring with a small blade attached in the top. The blade can fold out by pushing a switch. The blade can fold out and be put back in.

Annotated Sketch #2

33

Retractable Baton Necklace

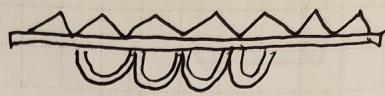
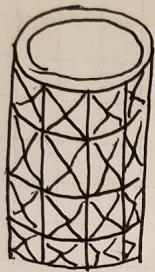


A series of four cylinders that fold into one to make a compact baton.

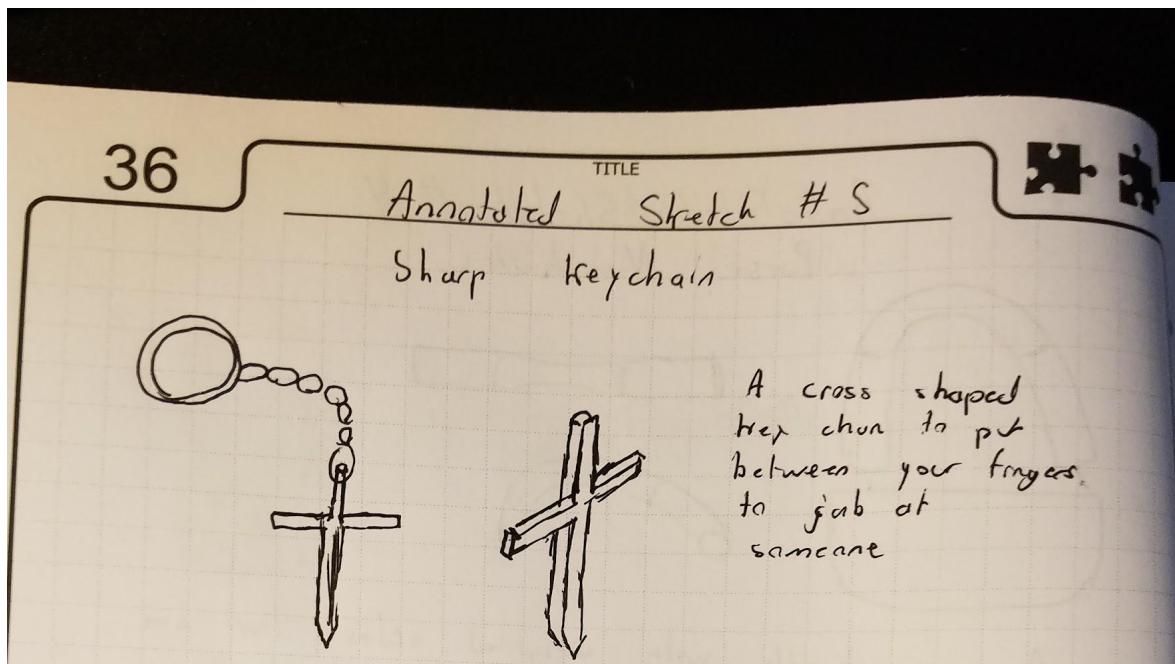
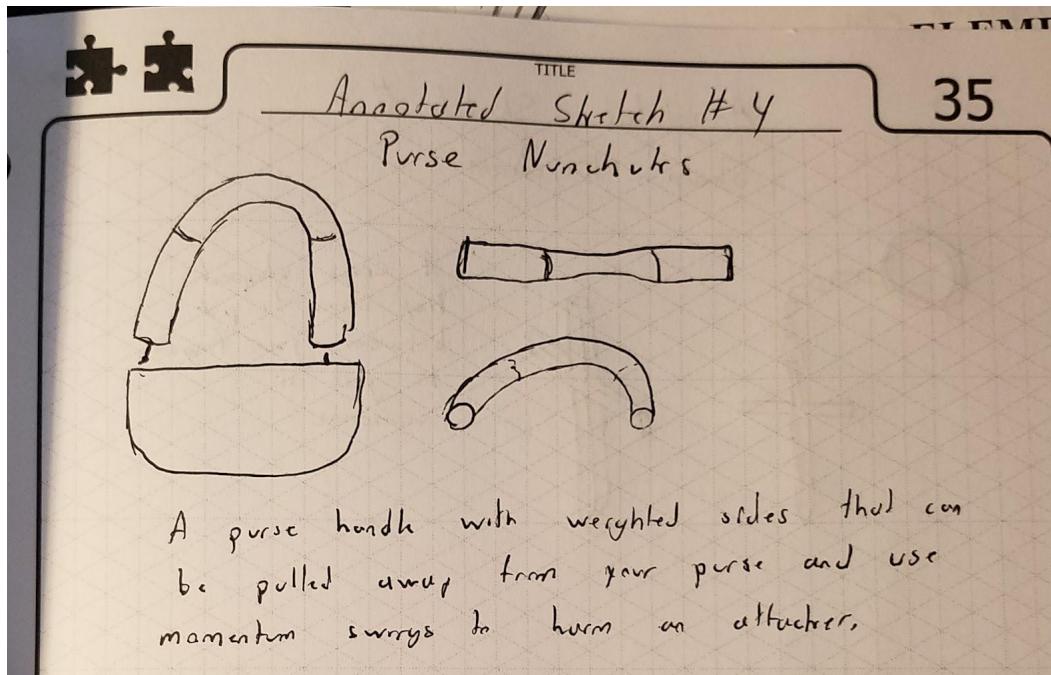
34

Annotated Sketch #3

Cuff Bracelet Knuckles



A cuff bracelet with hard pyramid shapes. The bracelet then has finger holes in order to place it over your knuckles, to increase damage in punching.



Decision Matrix

Scale: 1-5 1:Worst 5:Best	Compact/Discrete	Easily accessible	Harmful	Non-lethal	Inexpensive	Easy to use	Total
Our Solutions							
Hidden Blade Ring	5	5	4	4	5	5	28
Retractable Baton Necklace	4	3	3	5	4	4	23
Cuff Bracelet Knuckles	5	3	2	5	5	4	24
Purse Nunchucks	3	3	3	4	5	3	21
Sharp Keychain	5	4	3	5	5	4	26
Market Solutions							
Pepper Spray	2	2	4	4	5	4	21
Key Knife	4	1	3	3	5	2	18
Personal Alarm	3	2	1	5	4	4	19
Emergency Alert Bracelet	4	4	1	5	3	5	22
Voice recorder	5	2	1	5	2	3	18

Analysis and Selection

In order to begin deciding what solution we were going to go with, we all went on our own ways for the first two days of fall break with the goal of sketching 10 possible solutions each. Then we went over each of our design sketches and looked for any flaws they had before eliminating all but five of them. We then put those five into a decision matrix against five current products and put them all against our product benchmarks we specified in element C. The solution that won was the Hidden Blade Ring by two points.

The Hidden Blade Ring will work with our chosen problem of sexual assault because most importantly it's harmful, but also non-lethal. This meets Vicki Hershbergers advice that while you can make anything into a weapon, if it's a lethal weapon, it can cause a lot more harm than good. It's also very compact/discrete, easily accessible, inexpensive, and it's also easy to use which was also very important to us and is why they were our main benchmarks.

Materials Research

3D printing material (ABS Plastic)

Conclusion

For our project we each developed 10 possible solutions to our problem. We went through and talked about each sketch individually to determine whether or not it was a good idea or if it was possible. We then took two of Maya's sketches, two of Evalynn's sketches, and one of my sketches and drew final annotated sketches of each. Finally we used a decision matrix to determine which of our solutions met the requirements stated in Element C. Our final product will be the Hidden Blade Ring. As we create it, it could allow women to quickly defend themselves against an unforeseen attack.