THE SAFE DOOR OPENER

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Penny Creek Elementary

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Background

Our problem is with coronavirus happening, People are less willing to grab the handles on doors, or even have contact with your hand. Nadia and I decided to look further into this, and create an item that will allow you to easily open a door, without having contact with any body part.

Identify a problem

Did you know that next time you touch a door handle, you could possibly get sick? Now that COVID-19 exists and has spread worldwide, we need to avoid being exposed to the virus[1].Health officials and infectious disease experts stress that if you touch your mouth, nose, or eyes after touching a contaminated surface, then you can transfer the virus to these sensitive spots.[2] Door handles are an example of something we see everyday that could have thousands of bacteria on it[3]. Most places have doors, which have door handles, and thousands of people touch them. For example, whenever touched, COVID-19 will stay on it for 5 days!![4] So in this situation, we need to find a different and efficient way to open a door without touching the door handle. And that's where our invention comes in.
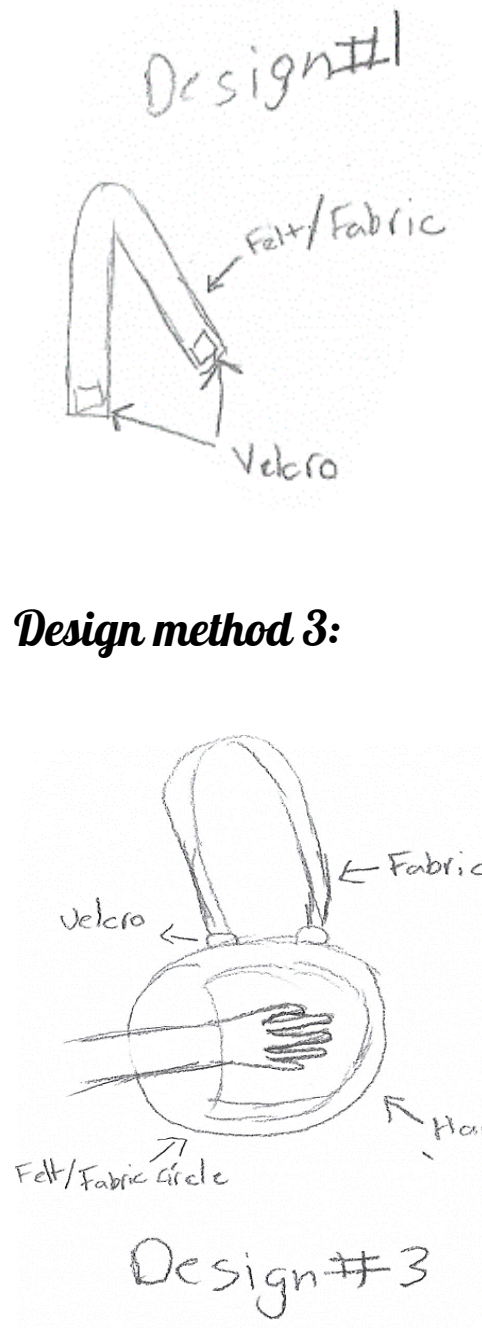
Imagining a Solution

We imagine having a solution to our problem, but one that will be 100% efficient. One solution is to use something that is easy to use and is portable so people can carry it around easily like a napkin. We can fold it in half, and push down on the door handle. Another solution is to create a Loop of fabric. We stitch it together and put silicone in it, Making it grip on sturdily. One more idea is to have a fabric pocket that will let us introduce our hands and use it to open circular knobs and locks. Our final idea is to combine the loop of fabric with a silicone that will fit on the door lock, decreasing the amount of slip so it doesn't slide off the door handle.
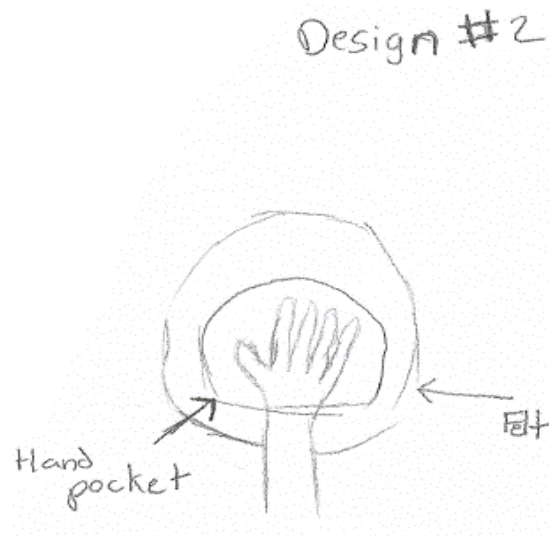
Making a plan

Our plan is to design a gadget that allows us to open doors without making any contact with hands. We have designed some ideas that will help us see what we can improve on, and which one is most helpful in this scenario. Below are our 3 design methods. We chose to combine all three solutions to make a better solution (also below) that will   serve us for all types of doors so we can use it whenever we come across any type of door and need to open it or lock it.
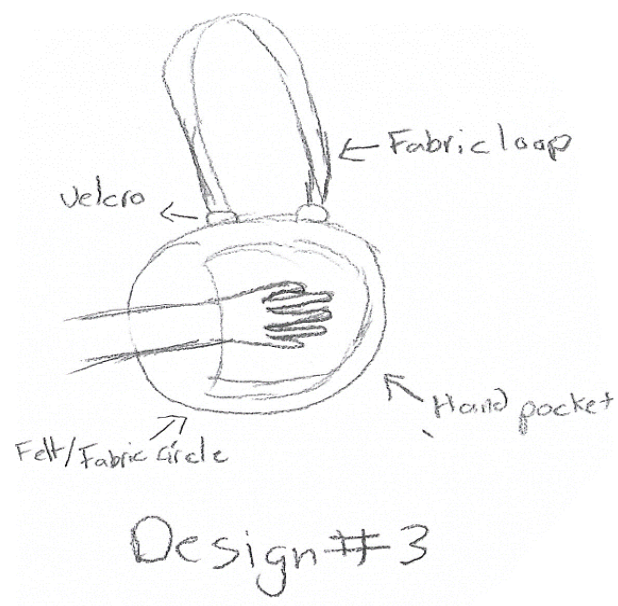
Design method 1:

Design#1

Felt/Fabric

Velcro

Design method 2:

Design #2

Hand pocket

Felt

Design method 3:

Fabric loop

Velcro

Felt/Fabric circle

Hand pocket

Design #3

Materials
- Silicone
- Felt/Fabric
- Needle
- Thread
- Scissors
- Velcro

Creating a Solution

Now that we have mapped out our solution, made our plan, and made a diagram, it's time for us to create our invention. We plan to sew the invention together with felt, a few layers, and use a sewing machine to help us complete this task. Then we will sew on the hand-pocket, loops, silicone, velcro, and the other features so it comes together. Once we finish sewing it, we can go over spots that didn't get fully sewed or if we missed a patch of fabric. Our final invention is shown below. We also did an analysis of all the Design Methods used and find out that our solution is the one that performs the best for all types of door knobs and locks.

Some of the challenges we had during this project was to find the right combination of designs that could let us open and lock most of the doors since there are different types in the market.

Test prototype	Door Handle	Closed Door Handle	Door Knob	Door Lock
DM1	Poor	Bad	Bad	Bad
DM2	Poor	Poor	Good	Good
DM3	Poor	Poor	Good	Good
DM4	Best	Best	Best	Best

Results of measurements of our analysis
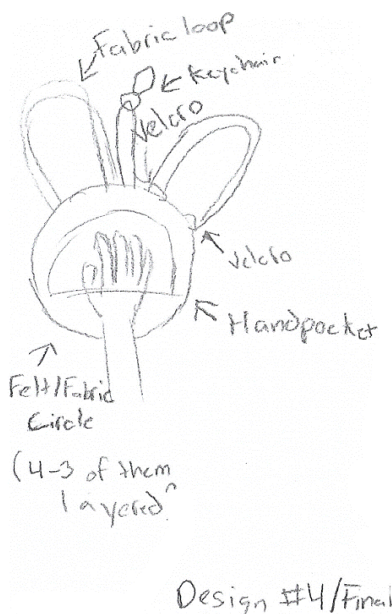
Design Method #4 and Final Prototype

Improving our Solution

This Project can affect the real world greatly, because then we can help slow down COVID-19. For improving our project, we decide to keep both loops of fabric and the pocket, but as an addition so it will not slide off the door handle, we will add silicone to the loops so they don't slide off when opening doors. We think these additions will be really useful to our invention, hoping that we can make an impact.

References:

1. Center for Disease Control and Prevention. Protect your Yourself.U.S Department of Health and Human Services https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html

2. Baptist Health. By John Fernandez.Coronavirus and Surfaces: Know This Before Grabbing That Door Knob. https://baptisthealth.net/baptist-health-news/coronavirus-and-surfaces-know-this-before-grabbing-that-door-knob/

3. Wikipedia. Door Handle Bacteria. https://en.wikipedia.org/wiki/Door_handle_bacteria

4. WebMed. WebMD Medical Reference. Coronavirus and Surfaces: How Long Does COVID-19 Live on Surfaces?

Our Experience