WEATHERIZATION KITS

FREEDOM BY DESIGN
CARNEGIE MELLON UNIVERSITY

SPECIAL THANKS TO OUR SPONSORS:

NCARB

PROJECT RE_

I-SHAN TAN

THE HOME DEPOT

THE AMERICAN INSTITUTE OF ARCHITECTURE STUDENTS

FREEDOM BY DESIGN

Carnegie Mellon University

WHO WE ARE

This was our first year as an organized Freedom By Design chapter. In spring of 2016 our AIAS chapter hosted the Northeast Quad Conference. We focused on four aspects of the architecture scene in Pittsburgh: sustainability, arts and culture, technology, and public interest design. Our public interest design track was a success, and our board began to wonder why we did not pursue public interest design projects as an organization.

That summer, we attended Grassroots with the goal of learning more about Freedom By Design and the steps to creating a chapter. The following semester we met with John Folan, an expert in the field of public interest design, and director of the Urban Design Build Studio **to begin to develop a plan to found a chapter that could sustain itself and engage with the community in a truly meaningful way.**

In the Spring of 2016 we elected our first executive board. This board worked over the summer to lay down groundwork for the following semester by researching local organizations that we had potential of partnering with and studying projects completed by other Freedom By Design chapters. **Our goal was to have a list of potential projects for members to discuss in the fall.**

Our first semester we hoped to talk with our members about the research we had done, but there were no specific interests or goals that everyone shared. It seemed that **there was a split between our members: those who wanted to build a physical project, and those who were more interested in a project focused on information access.**

We had mentioned a "small" project idea to get our chapter started that covered aspects of both types of projects. We thought maybe we could create a book that could help residents winterize their homes in order to save money in the winter. This book could stand alone, or come with a physical kit with some of the most essential products for insulation. **This gave us the ability to create a comprehensive publication as well as a physical element that had to be designed and produced.** We decided to pursue this project because it would allow us to **set our own time line**, and **could be scaled** as we acquire funding. This meant that if we failed to produce the kits in time, we were not failing anyone but ourselves.

Guiding Principles:

1) To succeed **we must work WITH the community**, not FOR the community.

2) To be sustainable as and organization there must be a **high level of engagement on both sides**; the students will feel more invested in the projects, and this gives the community more ownership over the final product.

3) Be wary of those who want to build only for the sake of building, public interest design is not about building the most, **it is about having the most impact.** Completing vanity projects will do more harm than good.

4) We must EARN the trust of our clients; working with vulnerable communities means that **we must always be reliable and accountable.** Failing our clients not only results in those clients being let down, but also creates a loss of trust that we may not be able to get back.

LEADERSHIP

DIRECTOR

SOPHIE NAHRMANN
ALISON KATZ (INCOMING)

The Director acts as the primary link between the local AIAS Chapter, FBD Program and the AIAS National Office. Directors are responsible for general oversight of the program, attending the annual AIAS Freedom by Design tracks and Orientation each year at AIAS Grassroots, leading client interviews and overseeing the selection process.

PROJECT MANAGER

ELIZABETH LEVY
CHRISTOPH ECKRICH (INCOMING)

The Project Manager is responsible for overseeing a specific Freedom by Design project, including establishing the schedule, coordinating the building approval process, and coordinating team members.

DEVELOPMENT MANAGER

ALISON KATZ
ALINA KRAMKOVA (INCOMING)

The Development Manager is responsible for developing a fundraising strategy, locating donated materials.

PUBLIC RELATIONS MANAGER

KATELYN SMITH AND MICHAEL POWELL
MICHAEL POWELL (INCOMING)

The PR Manager is responsible for recording the progress of the team, social media activity, student outreach, and assembling presentations for the AIAS Office.

DESIGN MENTOR

JOHN FOLAN

AIA, LEED AP
T. David Fitz-Gibbon Associate Professor, director of the Urban Design Build Studio (UDBS), and member of the Urban Laboratory Faculty at Carnegie Mellon University.

CONTRIBUTING MEMBERS

COTEY ANDEREGG, CHRISTINA BROWN, JOHN BUTLER, CHRISTOPH ECKRICH, EDWARD FISCHER, GISSELT GOMEZ, MARTIN HE, ALISON KATZ, TIMMY KHALIFA, ALINA KRAMKOVA, JESSICA KUSTEN, GARGI LAGVANKAR, ELIZABETH LEVY, ALEX LIN, ZHUOYING LIN, LONGNEY LUK, SOPHIE NAHRMANN, NIKA POSTNIKOV, MICHAEL POWELL, ANTHONY RA, KATELYN SMITH, OPHELIE TOUSIGNANT, CHITIKA VASUDEVA

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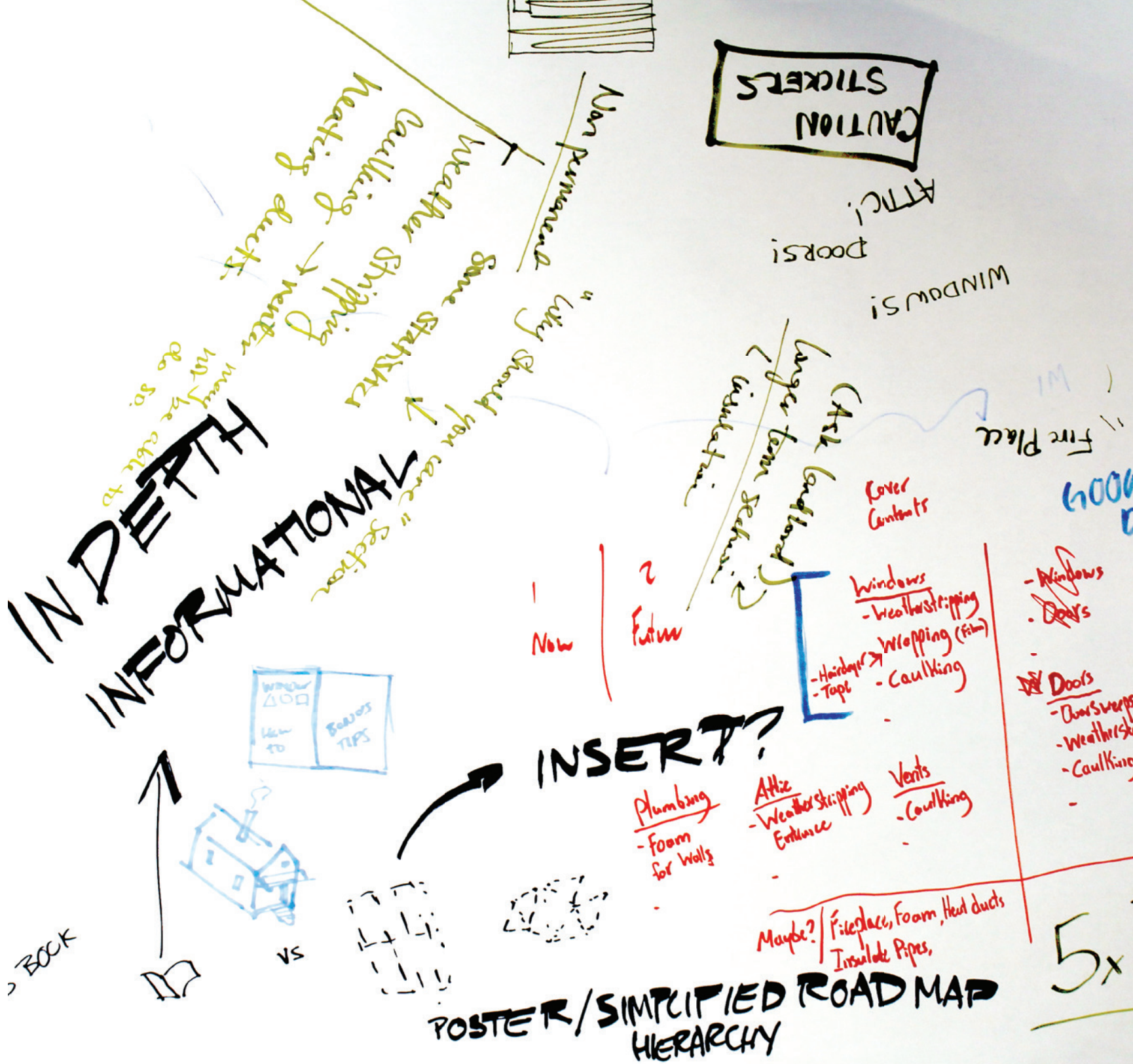
CONCEPT


IN DEPTH
INFORMATIONAL
INSERT?
POSTER/SIMPLIFIED ROAD MAP
HIERARCHY
CAUTION STICKERS
WINDOWS!
DOORS!
ATTIC!
Now
Future
Windows
- Weatherstripping
- Wrapping (Film)
- Caulking
- Hairdryer
- Tape
Cover Contents
Plumbing
- Foam for Walls
Attic
- Weatherstripping
Entrance
Vents
- Caulking
Maybe?
Fireplace, Foam, Heat ducts
Insulate Pipes,
Windows
Doors
Fire Place
5x
VS
BOOK

THE REAL COST OF HEAT

In Pittsburgh 66% of working families make the choice between paying for rent or paying for utilities.[1] When the house you are renting is poorly maintained and you can't afford to make the repairs, much of the heat you are paying for will go out the window. Simple initiatives such as caulking and weatherstripping your home can reduce infiltration rates by 20% which can amount to significant savings on utilities, and reducing the need to make tough choices about which bills to pay.

We are putting together weatherizing kits for people in need from the East Liberty, Larimer and Homewood communities in Pittsburgh. These kits are both addressing a need for information on how to perform these energy and cost-saving initiatives, as well as providing the materials necessary to do so.

https://www.pittsburghfoodbank.org/resources/about-hunger/workingpa/

BUDGET

Our project was designed to be scalable depending on the amount of funding we were able to receive. Since this is our first project, we had no money left over from other projects so all funds we needed would have to be raised from scratch.

We applied for the NCARB grant through AIAS and luckily we received $1,500. We then scaled our project to fit the budget. Outside of the NCARB funds, we also received a $200 donation from a former Carnegie Mellon student, and a $25 gift card from our local Home Depot. These extra funds are being used for our prototyping, event costs, and contingency.

This summer we are applying for grants and creating a fundraising plan to create more kits. **Currently we will be able to supply 20 kits at our distribution event, however, in October if we are able to produce more kits, we will be able to help more people.**

INCOME

NCARB	Grant	$1,500
Home Depot	Gift Card	$25
Individual Donations	Cash	$200
TOTAL		**$1,725**

EXPENSES

PAST (TESTING + PROTOTYPES)

OBJECT	COST
Cardboard	$24.22
Home Depot Box Stuff	$45.87
Door Sweep	$5.87
Rail Road Board	$14.08
Velcro	$11.20

FUTURE COSTS (BOX)

OBJECT	$	# / BOX	$ / BOX	# BOXES	COST
Window Plastic	$10.94	1	$10.94	20	$218.80
Weatherstripping	$3.97	5	$19.85	20	$397
Door Sweep	$6.48	2	$12.96	20	$259.20
Socket Insulator	$2.28	2	$4.56	20	$91.20
Cardboard	$3.00	1	$3.00	20	$60.00
Screwdriver	$0.87	1	$0.87	20	$17.40
Spray Paint	$11.99	N/A			$11.99

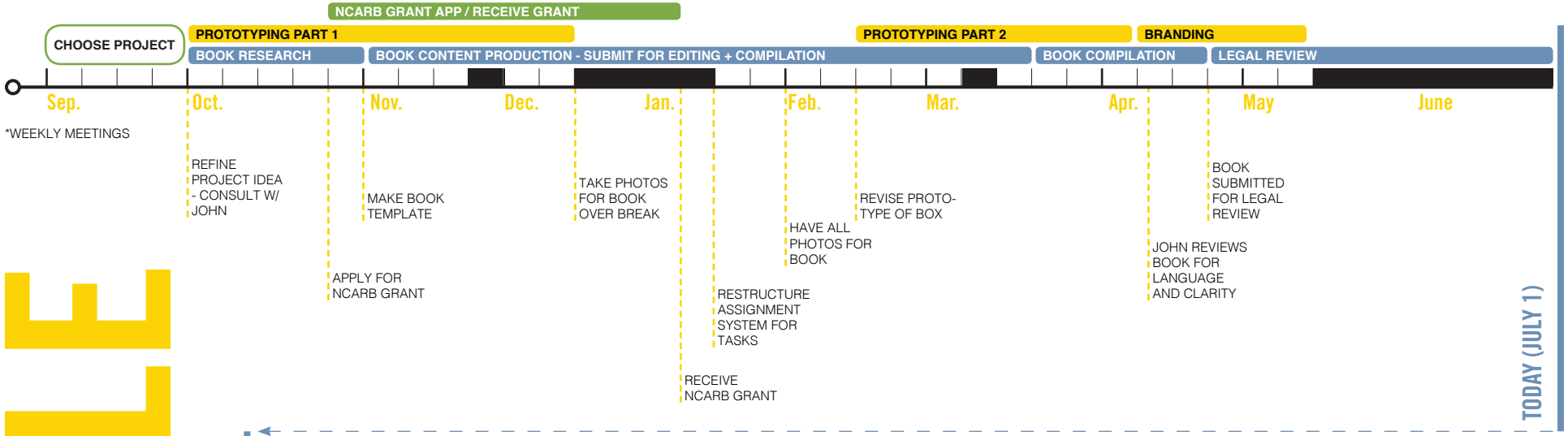
FUTURE COSTS (BOOK)	$ / BOOK	# BOOKS	COST
Book Printing	$7.00	50	$350.00

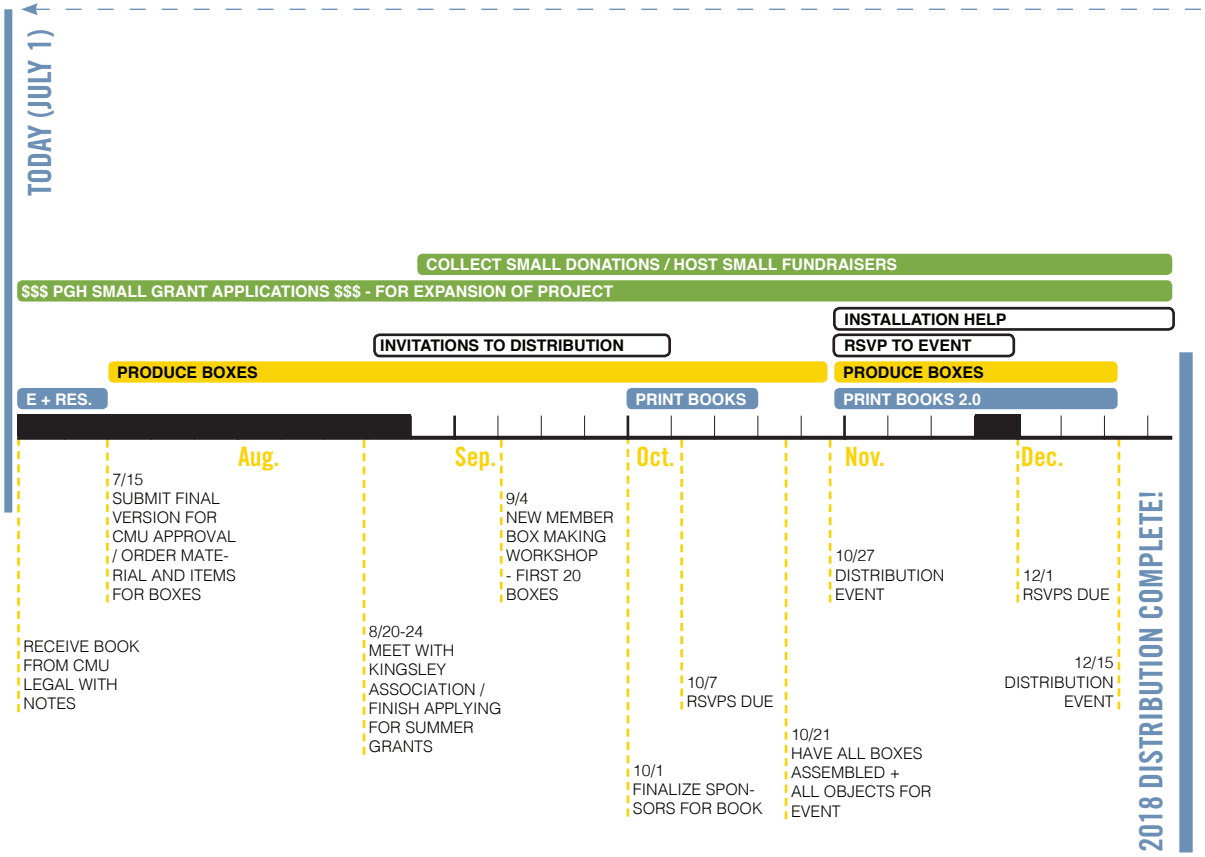
FUTURE COSTS (EVENT)	COST
Door (USED)	$20
Window (USED)	$20

TOTALS

TOTAL INCOME	$1,725
TOTAL COST	$1,547
BALANCE	**$178**

SCHEDULE





Because this project is designed to be repeated, the end of the year does not mark the end of this project. We hope to take what we learn from our experiences this year and improve upon this project. **We plan to continue to produce these kits as a resource for our community.**

THE KIT

WINTER PREPARATION

Energy and Cost Saving Strategies

Weatherization kits contain door sweeps, window plastic, weatherstripping, electrical socket insulators, and an instructional booklet. The booklet adds a resource not only to those who receive the kit, but those who we are not able to initially reach. These kits are targeted towards low income renters who cannot make permanent alterations to their homes. These elements were always meant to come together, however, the booklet can be used as a stand-alone resource.

Through this publication we give residents some information to help them reduce the cost and energy consumption throughout winter. We created a book that gives step by step instructions for each of the items provided in the kits, as well as explanations for why installing the items helps them reduce their costs. Its also contains an index of cheap alternative and additional products that residents can buy in order to continue to insulate their home.

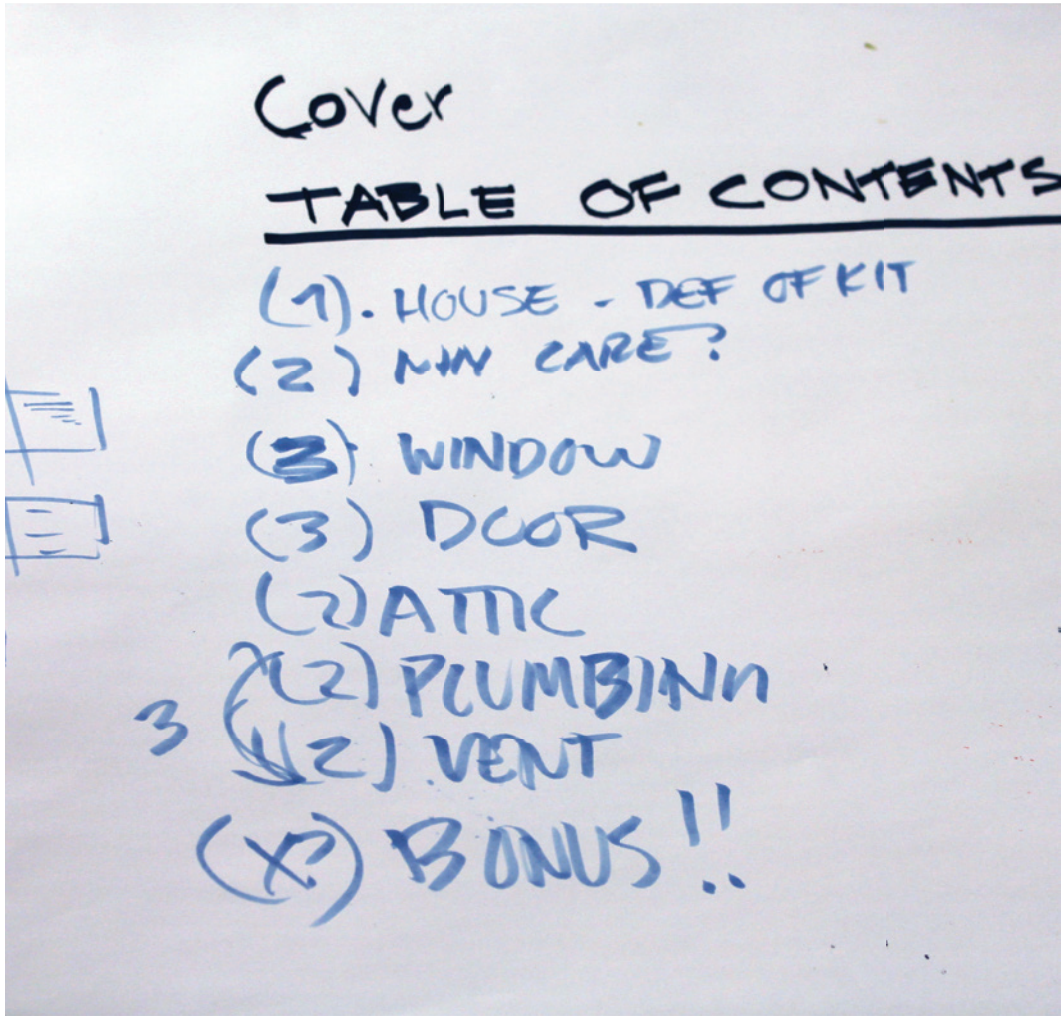
The book was written and illustrated based off of research we had done, and our personal experiences with weatherizing our homes.

Currently the book is in its final review process.

The kit has been given to Alexis McCune, the advisor for AIAS in order to review the ease of use. Alexis's husband has been asked to use the instructions to install the items, and to let us know if wording is confusing and if all the images are clear.

John Folan is aiding us in addressing the Carnegie Mellon University legal team in order to use the Carnegie Mellon name on the kit. They are making sure that our disclaimers cover the content of the book, and that none of our suggestions are likely to cause anyone injury.

Once we receive the notes from CMU legal and Alexis, our kits will be ready to move into the next phase: production.



WHY?

Pittsburgh's long winters can cause high heating costs, this kit provides you with the means to help you insulate your home, and reduce those costs. With this kit, you will be able to take control of the cost of heating, and increase the comfort in your home. **The fabricated box provides materials and instructions for Pittsburgh residents.** Door sweeps, window plastic, weatherstripping, and electical socket insulation are included in the kit and are labeled to match the descriptions and instructions within this booklet. **This booklet will help you see the energy and cost savings attributed to these small improvements.**

This book is for reference purposes only. Content included does not address specific conditions of existing construction where weatherization materials may be implemented. Use of the book and weatherization material is completely elective. The authors and entities identified in the booklet are indemnified by individuals using the practices represented and content included herein. Authors and entities identified in the booklet are not responsible for improper installation, personal injury, or damage to property caused by use of the booklet or content contained herein.

Table of Contents

1 Box Contents
- Electrical Socket Insulator
- Door Sweep
- Weatherstripping
- Window Plastic

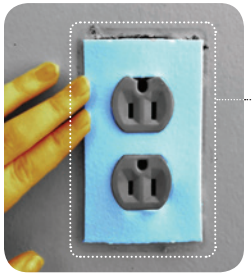
24 Window
- Weatherstripping
- Window Plastic
- Caulk
- Curtains

30 Door
- Door Sweeps
- Draft Stoppers

36 Sockets
- Electrical Socket Insulator
- Spray Foam

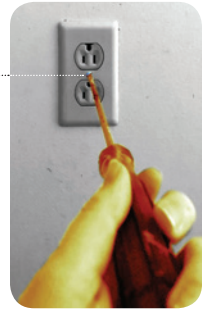
40 Plumbing
- Pipe Insulation
- Spray Foam

3
Remove plastic socket cover



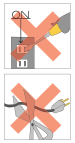
4
Place socket insulator in the wall cut-out

5
Re-install the socket cover



You are done! Seemingly small improvements such as this can reduce your heating bills greatly!

Electric Socket Insulator

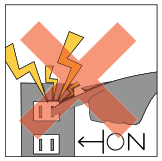


WHY?

The spaces behind electrical outlets and light switches are often the least insulated places in a wall. In older houses it is common to feel cold drafts coming from electrical outlets, especially on exterior walls. This may not seem significant, but any air leakage can increase heating bills during the winter. On average, an estimated 2-4% of heat loss occurs through electrical outlets and light switches.

*The following should be considered before installing electric outlet and switch sealers as there is a risk for electric shock:
*Do not push insulators too far into socket.
*Do not touch the relay terminal (live parts) or socket terminal (live parts) while the power is on.
*Do not insert screws or screwdriver into wall socket ports.
*Do not cut or tamper with any wires on the duplex receptacle.
*CMU Freedom by Design is not responsible for any injury sustained during installation.

Sources:
Thiele, Timothy. "How to Stop Heat Loss Around Outlets, Switches, and Light Fixtures." https://www.thespruce.com/stop-drafts-around-outlets-1152297



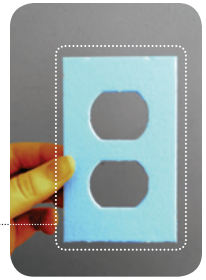
Beware of Electric Shock

Required Tools:
Screwdriver (Included)

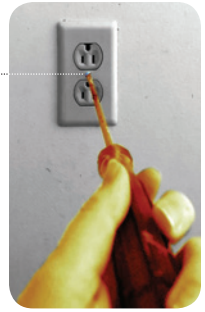
Turn power off before installation by:

Tripping circuit switches to off position
or
Temporarily removing fuses during installation

1
Example of Foam Socket Insulator



2
Unscrew plastic socket cover



Door Sweep

WHY?

A door sweep is a small piece of plastic or rubber attached to an aluminum carrier strip and fitted across the bottom of a door. It provides a weatherproof seal and prevents drafts from coming in under the door. Door sweeps have the ability to protect against drafts, moisture, and outside insects. The draft protection against colder outdoor temperatures can save energy and reduce energy bills up to 10%.

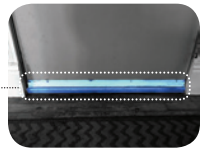
*Make sure door is secure and will not be in motion during installation.
*CMU Freedom by Design is not responsible for any injury sustained during installation.

Sources:
Green, Carolyn. "What Is a Door Sweep?" https://www.hunker.com/12000284/what-is-a-door-sweep

If you already have a door sweep installed it might look like this:

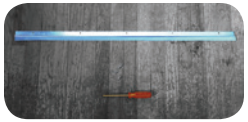
Door Sweep

Door Sweep



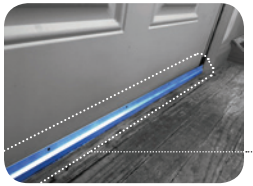
Door Sweep

If your door already has a sweep installed, there is no need to install a new one, however, a draft stopper could prevent heat from further escaping your home. Recommendations can be found on page 33.



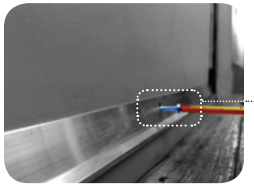
Required Tools:
Screwdriver (Included)

In Box Supplies:
Door sweep
Screws



1
If the sweep is longer than the door is wide, cut with a saw.

2
Position sweep against door with bottom brushing against floor.



3
Screw sweep into place. (May need to pre-drill holes for metal doors)

Installation complete! Installing door sweeps blocks warm air from escaping your house, reducing infiltration rates. This translates to a much smaller heating bill in the winter.

Weatherstripping

WHY?

Poorly sealed doors and windows can leak the heat outdoors in the winter. Heating bills can be reduced by 20% if windows and doors are weatherstripped.

*Do not use this product to adhere to anything other than the items listed above.
*Do not consume or wrap around any body parts with this product, as it is a choking or injury hazard.
*CMU Freedom by Design is not responsible for any injury sustained during installation.

Source:
US Department of Energy. "Weatherstripping." Weatherize, US Department of Energy, energy.gov/energysaver/weatherize/air-sealing-your-home/weatherstripping.

Required Tools:
Paper Towels / Rags
Scissors

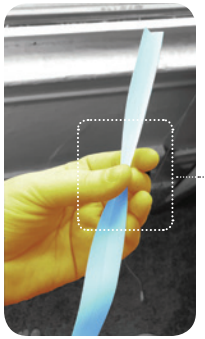
Weatherstripping will be applied to all sides of the windows, the top of the upper window, and the bottom of the lower window.

In Box Supplies:

V-Seal Weatherstrip

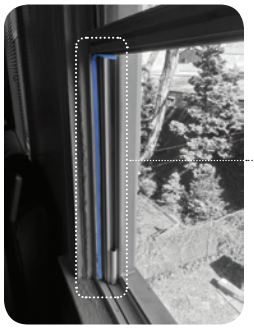
1
Wipe clean inside of window frame and bottom and top of window

2
Measure window and trim weatherstripping (for sides, give yourself an extra inch or so)



3
Bend V-Strip

4
Peel off wax paper to expose adhesion

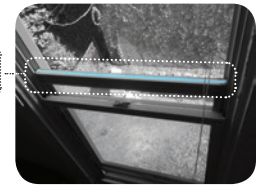


6
Apply to sides of windows, giving yourself an extra inch or so to slide past window.

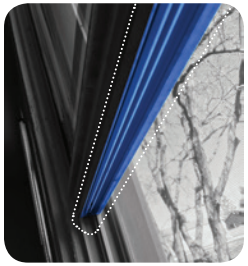
7
Loop weatherstripping under frame and retrieve on other side

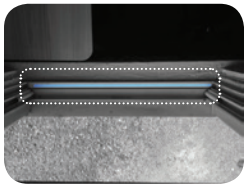
5
Apply to top of upper window and bottom of lower window

Place adhesive inside window frame with the point of the "v" facing inside.

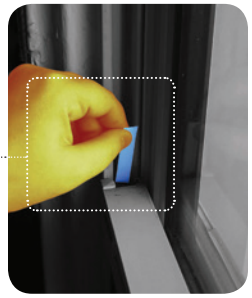


If the surface is not flat, apply to outer frame.





8
Remove wax paper and press to frame



Installation complete! Your windows are almost ready for winter! Now time to install the window plastic...

Window Plastic

WHY?

Roughly 30% of all heat loss in a home occurs through windows. Plastic Window Insulation sheets can reduce this heat loss, and your heating bill. Each sheet covers a standard window and saves up to 25% (for every 9 windows) in heating costs seasonally.

If your home has more than 9 windows Frost King Window Insulation Kits are available at the following locations: The Home Depot, Lowe's, True Value, Do it Best, Walmart and Menards.

*Keep plastic out of reach of children.
*Do not wear on body in order to prevent suffocation or lack of circulation.
*Double sided tape may cause pint to peel or chip.
*CMU Freedom by Design is not responsible for any injury sustained during installation.

Sources:
Martin, Brett. "11 Tips to Save You $1000 This Year," Popular Mechanics. https://www.popularmechanics.com/home/how-to/g1065/11-tips-to-save-you-1000-this-year/

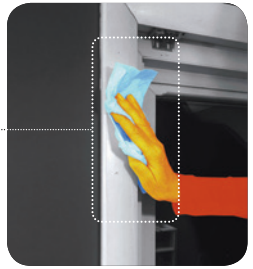
Required Tools:
Glass Cleaner
Paper Towels / Rags
Scissors
Hair Dryer

Area to clean and later apply tape

If you have flat window trim surrounding your window, you will be applying the tape to that.

If you do not have a window trim, you will applying it directly to the wall.

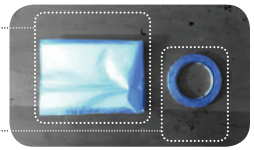
1
Wipe clean window and trim or surrounding wall

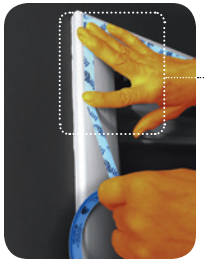


In box supplies:

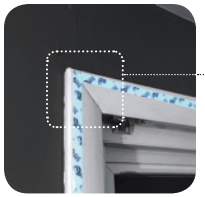
Heat Shrink Plastic

Double Sided Tape



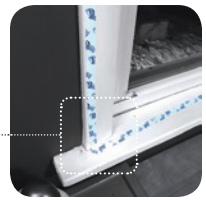


2
Apply double sided tape to flat trim, or surrounding wall



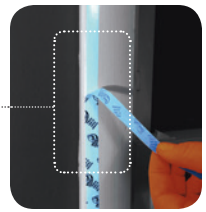
3
Overlap tape at corners

4
If the bottom of the window is a horizontal sill that sticks out, apply the tape to that surface, but make sure that the tape overlaps at the corners.



Press tape firmly to the surfaces

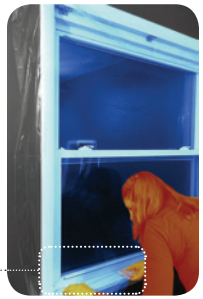
5
Remove the wax paper film to expose the other side of the tape.



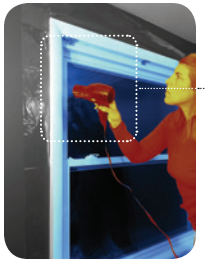
6
Make sure the plastic sheets are the correct size for your windows; it is recommended that you measure the size of the window opening and make the plastic sheet 4" bigger on each side

7
Trim your plastic down to size if it is too large

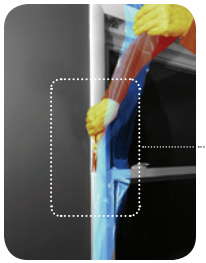
8
Lightly press the plastic into place



9
Adjust edges of plastic so that the sheet is taught around the window. Press the plastic firmly against the tape once in its final place



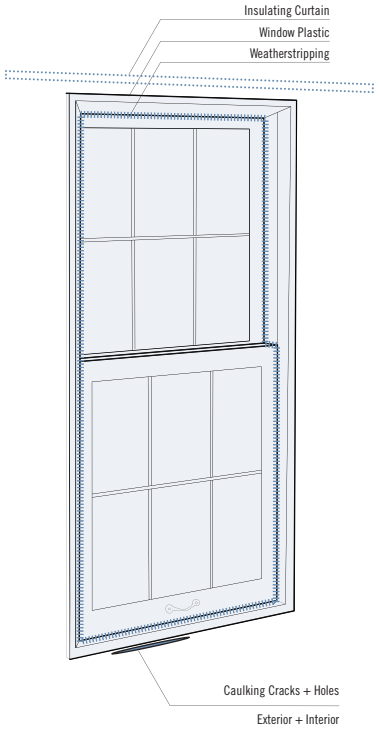
10
Use a blow dryer to tighten the plastic. The plastic should be wrinkle-free.



11
Trim the access plastic from the sides

***Check for holes or gaps along the edge, you can seal these with packaging tape.**

Installation complete! Applying window plastic over your windows doubles their efficiency in the winter, but don't forget to remove the plastic in the spring!



Windows

Roughly 30% of all heat loss in a home occurs through the windows. Loss of heat happens through the glass itself, but also around the window frame. Windows with poorly insulated or sealed frames allow the heat and air to escape outdoors, and create drafty rooms indoors. Stopping this air and heat exchange reduces heat bills, and keeps the temperature inside more comfortable and consistent.

Products that stop this exchange include:

Weatherstripping (GOOD FOR RENTERS)
Weatherstripping is the process of sealing openings such as doors, windows, and trunks from the elements. The term can also refer to the materials used to carry out such sealing processes. The goal of weatherstripping is to keep interior air in, thus saving energy on heating and air conditioning.

Window Plastic (GOOD FOR RENTERS)
Window insulation film is a ubiquitous, low cost way to improve your window's insulation and reduce drafts. It consists of a clear oversized plastic film designed to fit over the interior of a standard-sized residential window. The kits usually include double-sided tape to adhere the plastic around the edges of the window frame. Once secured on all four sides, applying heat from a hair dryer or other source will shrink the plastic, tightly sealing the window.
*Seasonal tape removal may result in paint chipping around windows.

Caulk
Caulk is a flexible material used to seal air leaks through cracks, gaps, or joints less than 1-quarter-inch wide between stationary building components and materials. For components that move -- doors and operable windows, for example -- weatherstripping is the appropriate material.
*Discuss caulking with landlord before application if you rent.

Insulating Curtains (GOOD FOR RENTERS)
Insulated curtains, panels and shades help stop drafts and block the sun. Thermal curtains and insulated drapes have lined backs that help create a barrier at your windows. They provide year-round insulation and can help lower your utility bills.

Sources:
https://www.lowes.com/projects/repair-and-maintain/weather-strip-windows/project
http://www.energyauditingblog.com/do-insulating-window-kits-work/
https://energy.gov/energysaver/weatherize/air-sealing-your-home/caulking
https://home.howstuffworks.com/home-improvement/heating-and-cooling/insulated-curtains.htm

Caulking

Products

GE
Supreme Paintable Silicone 10.1 oz. White Window and Door Caulk
Why: Suitable for application on windows, doors, siding, trim, filling holes to prevent loss of heat, comes in multiple colors
Buy at: Home Depot
Price: $8.22

DAP
18109 Acrylic Latex Caulk With Silicone, 10.1-Ounce, Dark Bronze
Why: Suitable for application on windows, doors, siding, trim, filling holes to prevent loss of heat, comes in multiple colors
Buy at: Amazon
Price: $3.05

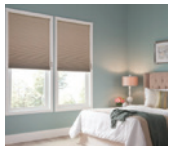
Window Curtains

Products

Smart Sheer
Insulating Voile 63-Inch Window Curtain Panel
Type: Insulating Curtains
Why: Curtains slow drafts within the home, in the winter, and block solar heat in the summer. Curtains that specify their insulation value can help keep your home warm in the winter.
Buy at: Bed Bath and Beyond
Price: $9.99

Thermalogic
Ultimate Window Liner
Type: Insulating Curtain Liner
Why: This product can add insulation value to curtains that you already own.
Buy at: Amazon
Price: $20.29

Blinds.com
Economy Blackout Cellular Shade
Type: Insulating Window Shade
Why: For problematic windows, you can order custom cellular shades that preform better than a simple curtain, this is one of the more expensive options, with a more intensive installation.
Buy at: blinds.com
Price: $57+ per window



Weatherstripping

Provided in Box (pg 10)

Frost King
E/O 7/8 in. x 17 ft. Self-Adhesive V-Seal Weatherstrip
Type: Plastic V Seal
Why: Adhesive seal for fairly even gaps around poorly sealed windows
Installation: Adhesive Strip
Buy at: Home Depot
Price: $3.97 per window

Other Products

Frost King
E/O 1/2 in. x 17 ft. White Tubular Vinyl Gasket
Type: Tubular Vinyl
Why: Seals out drafts around loose-fitting, warped or rattling windows
Installation: Nail / Tack / Glue / Staple
Buy at: Home Depot
Price: $3.57 per window

Frost King
3/8 in. x 5/16 in. x 20 ft. White Weatherseal
Type: Rubber Foam Tape
Why: Easy installation, long lasting, washable, flexible for loose fitting windows
Installation: Adhesive Strip
Buy at: Home Depot
Price: $8.87 per window

Window Plastic

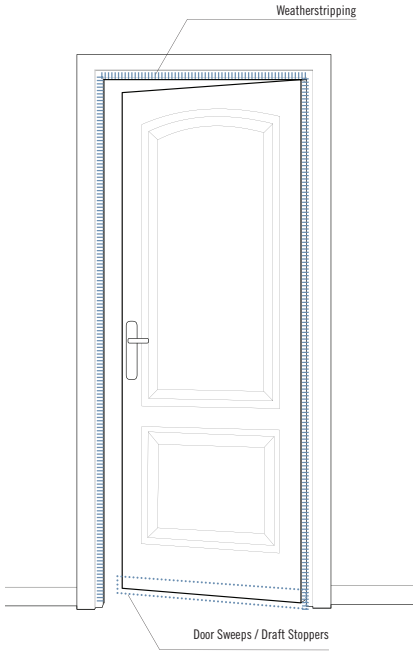
Provided in Box (pg 16)

Duck
62 in. x 420 in. Crystal Clear Window Kit Shrink Film (10-Pack)
Type: Window Insulation Plastic
Why: Large Sheets allow for variety of window sizes to be cut in case windows are not standard size
Installation: Adhesive Strip + Heat Shrink
Buy at: Home Depot (Similar kits at Lowes)
Price: $1.10 per window

Other Products

Frost King
E/O Indoor Window Insulation Kit (9 per Pack or 4 per Pack)
Type: Window Insulation Plastic
Why: Individual Sheets pre-cut to allow for easier install for standard size windows (62" x 42")
Installation: Adhesive Strip + Heat Shrink
Buy at: Home Depot (Similar kits at Lowes)
Price: $1.50 per window

3M
62 in. x 84 in. Clear Plastic Indoor Window Kit
Type: Window Insulation Plastic
Why: Individual Sheets pre-cut to allow for easier install for standard sliding patio door, or two 3' x 5' windows
Installation: Adhesive Strip + Heat Shrink
Buy at: Home Depot (Similar kits at Lowes)
Price: $2.50 per window



Doors

Similar to the windows, heat loss happens around door frames and through the space underneath the door. The best way to stop this heat and air exchange is through the sealing of these spaces. This reduces heating bills, and keeps the temperature inside more comfortable and consistent.

Products that stop this exchange include:

Door Sweeps (GOOD FOR RENTERS)
A door sweep is a small piece of plastic or rubber, attached to an aluminum carrier strip and fitted across the bottom of a door. It provides a weatherproof seal and prevents drafts from coming in under the door. Door sweeps have the ability to protect against drafts, moisture, and outside insects. The draft protection against colder outdoor temperatures can save energy and reduce energy bills up to 10%.

Draft Stoppers (GOOD FOR RENTERS)
Draft stoppers are long thin objects that are placed at the bottom of a door to prevent the movement of air in between spaces. They can work with a door sweep, or if a door sweep cannot be installed, they can be used in their place.

Weatherstripping (GOOD FOR RENTERS)
Weatherstripping is the process of sealing openings such as doors, windows, and trunks from the elements. The term can also refer to the materials used to carry out such sealing processes. The goal of weatherstripping is to keep interior air in, thus saving energy on heating and air conditioning.

Sources:
https://www.doityourself.com/stry/doorsweeps
https://www.apartmentguide.com/blog/make-draft-stoppers/
https://www.lowes.com/projects/repair-and-maintain/weather-strip-your-doors/project

Door Sweeps

Provided in Box (pg 6)

Frost King
E/O 1-5/8 in. x 36 in. Aluminum White and Vinyl Door Sweep
Why: Fills up to 3/4 in. gap between the door bottom and threshold
Installation: Screws
Buy at: Home Depot
Price: $6.48 per door

Other Products

Frost King
2 in. x 36 in. Heavy-Duty Aluminum/Brush White Door Sweep
Why: Brush bottom prevents scratches on floor
Installation: Screws
Buy at: Home Depot
Price: $10.72 per door

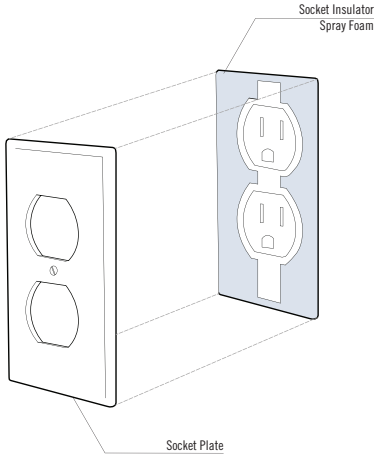
Draft Stoppers

Products

Frost King
E/O Designer Cloth Draft Seal
Why: This is simple, cheap, requires no installation, and prevents drafts from entering the home from underneath the door.
Buy at: Home Depot (Similar kits at Lowes)
Price: $7.88 per door

Morgan Home
Solid Fleece Draft Guard
Why: This is simple, cheap, requires no installation, and prevents drafts from entering the home from underneath the door.
Buy at: Bed Bath and Beyond
Price: $9.99 per door

Frost King
1.25-in x 36-in Brown Aluminum Door Threshold
Why: This is simple, cheap, and prevents drafts from entering the home from underneath the door.
Installation: Slide onto door
Buy at: Home Depot
Price: $7.97 per door



Electrical Sockets

The spaces behind electrical outlets and light switches are often the least insulated places in a wall. In older houses it is common to feel cold drafts coming from electrical outlets, especially on exterior walls. This may not seem significant, but any air leakage can increase heating bills during the winter. On average, an estimated 2-4% of heat loss occurs through electrical outlets and light switches.

Products that stop heat loss include:

Socket Insulators (GOOD FOR RENTERS)
Socket insulators are flat pieces of solid foam insulation that can be installed behind the socket plate to reduce heat transfer through the electrical sockets, it can be applied inside light switches as well.

Spray Foam
Spray foam comes in a can, and is a spray-able foam insulation that can be applied behind the socket plate to reduce heat transfer through the electrical sockets, it can be applied inside light switches as well.
*Discuss spray foam with landlord before application if you rent.

Sources:
Thiele, Timothy. "How to Stop Heat Loss Around Outlets, Switches, and Light Fixtures." https://www.thespruce.com/stop-drafts-around-outlets-1152297

Weatherstripping

Products

Frost King
E/O 1/2 in. x 17 ft. White Tubular Vinyl Gasket
Type: Tubular Vinyl
Why: Seals out drafts around loose-fitting, warped or unevenly cut doors
Installation: Nail / Tack / Glue / Staple
Buy at: Home Depot
Price: $3.57 per door

Frost King
3/8 in. x 5/16 in. x 20 ft. White Weatherseal
Type: Rubber Foam Tape
Why: Easy installation, long lasting, washable, flexible for loose fitting doors
Installation: Adhesive Strip
Buy at: Home Depot
Price: $8.87 per door

Frost King
E/O 9/16 in. x 5/16 in. x 10 ft. White EPDM Cellular Rubber Weather-Strip Tape Cushioned Ribbed
Type: Rubber Foam Tape
Why: Easy installation, long lasting, washable, flexible for loose fitting doors with a 10 year guarantee.
Installation: Adhesive Strip
Buy at: Home Depot
Price: $16 per door

Socket Insulator

Provided in Box (pg 2)

Frost King
1 Gang Socket Switch and Deco Wall Plate (14-Pack)
Why: Stops heat from escaping through poorly insulated socket spaces in wall
Installation: Screws
Buy at: Home Depot
Price: $2.28

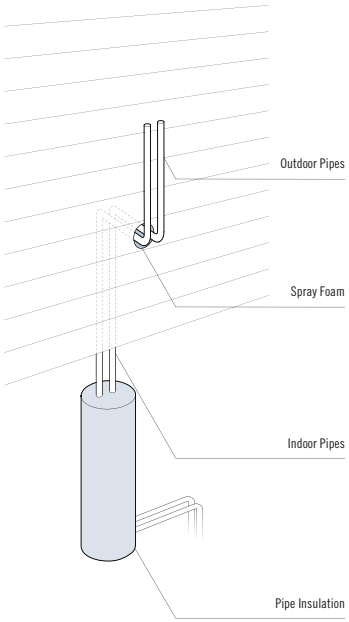
Spray Foam

Products

Touch 'N Foam Max
Fill Expanding Foam Sealant- 12 Oz
Why: This super-expanding foam creates an airtight, weather-resistant bond that seals out drafts while blocking insects and other pests. MaxFill Foam Sealant is ideal for filling larger gaps and cracks. It can be used indoors or outdoors.
Buy at: Dollar General
Price: $4.95 for 12 Oz

GREAT STUFF
16 oz. Big Gap Filler Insulating Foam Sealant Quick Stop Straw
Why: This product can fill gaps larger than 1 in. It's airtight, paintable, stainable and sand-able. It's polyurethane-based and perfect for all sorts of materials like wood, drywall, metal, masonry, glass and most plastics.
Buy at: Home Depot
Price: $5.25 for 16 Oz

Loctite
12 fl. oz. Tite Foam Insulating Foam
Why: This product is the best insulator. It can be used for multiple applications including sealing out drafts, moisture and pests. It can be used on both interior and exterior projects and is paintable, sandable and stainable, and cures white.
Buy at: Home Depot
Price: $5.78 for 12 Oz



Plumbing

Uninsulated hot water pipes allow for the waters heat to radiate out of the pipes and add unnecessary heating costs to your energy bills. A relatively inexpensive way to lower heating costs and conserve energy is to insulate your hot water pipes, which can lead to savings of 3 to 4% per year. Insulating pipes can raise the waters temperature 2 to 4 degrees Fahrenheit, allowing you to lower the hot water temperature setting. This also means you will not need to wait as long for your water to heat up when you go to use your shower, or another faucet helping to conserve water. While it is possible to get an outside party to insulate your pipes for you, this is not necessary. It is also recommended to insulate all your pipes during new construction as they are installed.

Products that stop this exchange include:

Pipe Insulation (GOOD FOR RENTERS)
Pipe insulation is usually a tube made of foam insulation that surrounds a pipe. Interior pipe insulation is usually used to keep heat in hot water pipes, reducing energy costs, while exterior pipe insulation is used in order to prevent the pipes from freezing and bursting outside the home, or in unheated parts of the home. When buying tube insulation, first measure the diameter of your pipes so that you know what size to get at the store. The thicker the foam, typically the better the insulation.

Spray Foam
Spray foam comes in a can, and is a spray-able foam insulation that can be applied inside the holes in the wall created for the passage of pipes, reducing the transfer of heat from inside to outside.
*Discuss spray foam with landlord before application if you rent.

Source:
https://energy.gov/energysaver/projects/savings-project-insulate-hot-water-pipes-energy-savings

Pipe Insulation

Products

M-D Building Products
3/8 in. x 3/4 in. x 6 ft. Tube Pipe Insulation Kit
(Other sizes available)
Why: The insulating tape blocks heat loss or gain to help save energy, as well as halting condensation on cold pipes to help prevent water damage. It is easy to install.
Installation: Self Adhesion
Buy at: Home Depot
Price: $1.92 per 6 ft

Everbilt
3/4 in. x 6 ft. Foam Self Seal Pipe Insulation
(Other sizes available)
Why: For an economical and energy efficient way to help prevent your pipes from freezing use the Everbilt Self Sealing Foam Pipe Insulation.
Installation: Self Adhesion
Buy at: Home Depot
Price: $2.63 per 6 ft

Everbilt
3/4 in. Rubber Pipe Insulation Pre-Slit Elbow
(Other sizes available)
Why: This 3/4 in. Rubber Prefabricated Elbow helps save energy by protecting copper and iron pipes from freezing and condensation.
Buy at: Home Depot
Price: $5.53

Spray Foam

Products

Touch 'N Foam Max
Fill Expanding Foam Sealant- 12 Oz
Why: This super-expanding foam creates an airtight, weather-resistant bond that seals out drafts while blocking insects and other pests. MaxFill Foam Sealant is ideal for filling larger gaps and cracks. It can be used indoors or outdoors.
Buy at: Dollar General
Price: $4.95 for 12 Oz

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Quick Stop Straw
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Buy at: Home Depot
Price: $5.78 for 12 Oz

BOX PROTOTYPES

EXPLORING MATERIALS AND FORM

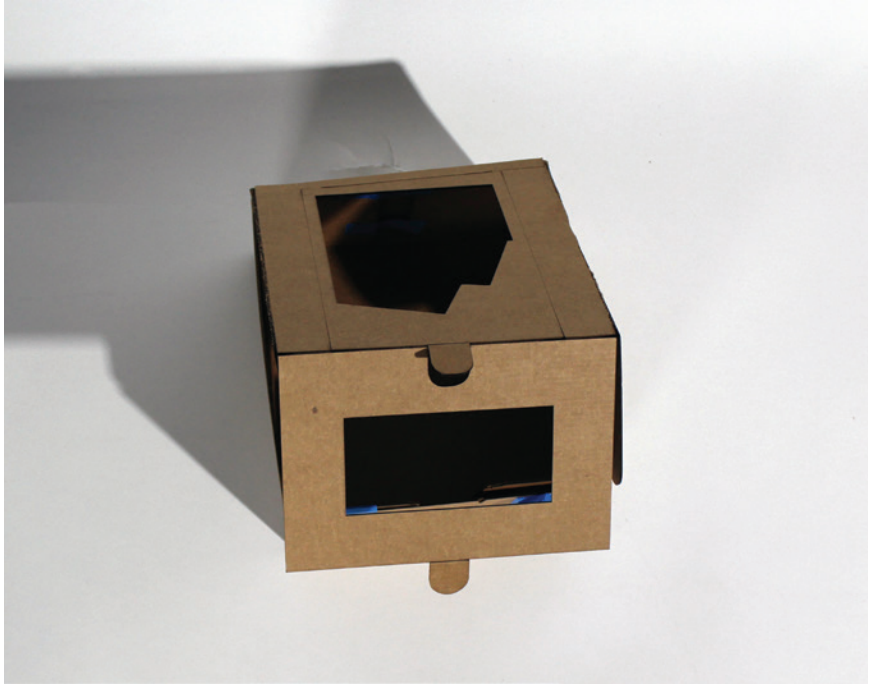
We began to prototype boxes right away. Our original designs focused on creating a design that cradled each item inside the kit. This series of boxes used railroad board and corrugated cardboard to created a rigid box that held all of the kit items. Doing this used a lot of material, however, and after reflecting on the size of our box we saw that it was way too big because of the door sweeps.

We re-evaluated our design and found a thinner corrugated cardboard at a local art store that was much more suited for box-making than the cardboard found at our school's art store. We decided to trim down the size and simplify it a lot in order to save material and space. This new design used only the thin cardboard, and allowed for all of the kit items to be neatly stacked inside while the door sweeps were held outside the box by the handle.

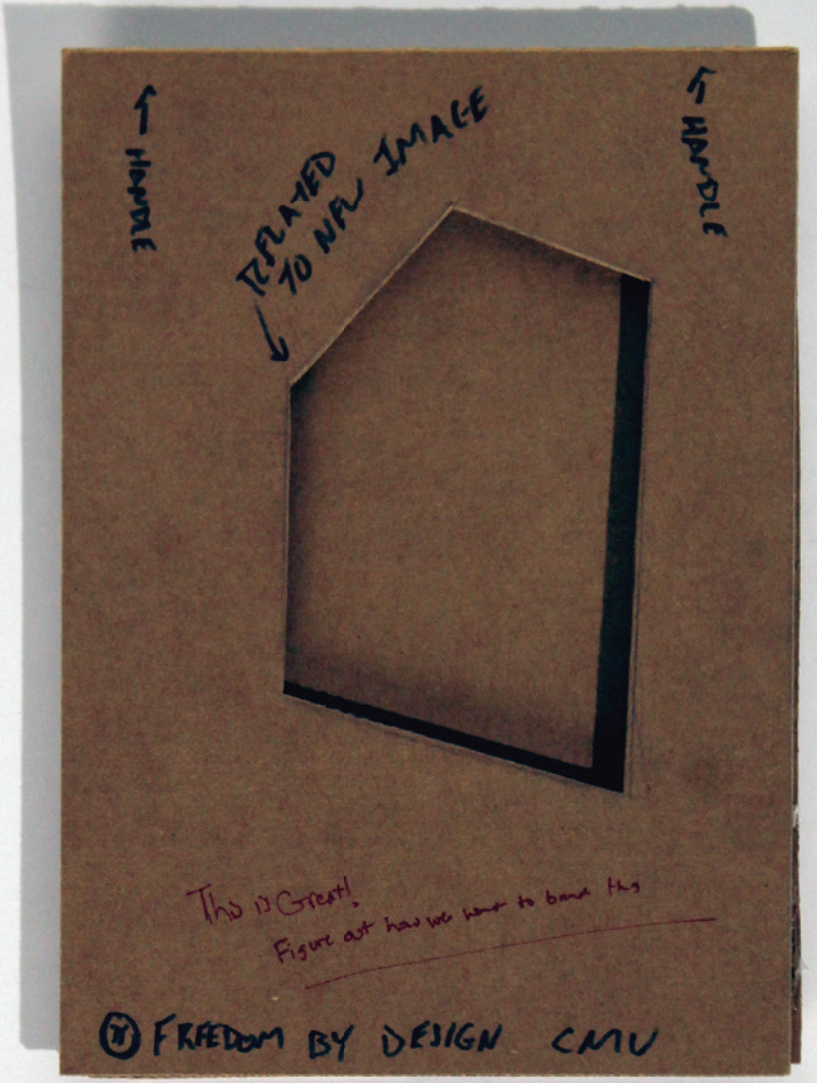
This size was much more manageable for transportation, fabrication, and distribution. As we refined the final prototypes, we developed a movable handle and a book-holder that both functioned well, and were easy to build.

The handle pops out of the box, and has slots large enough to slip two door sweeps through securely.

The top of the box has a hole that displays the booklet, in order to show off the cover design, and to keep the book in a secure in the box.



FILL

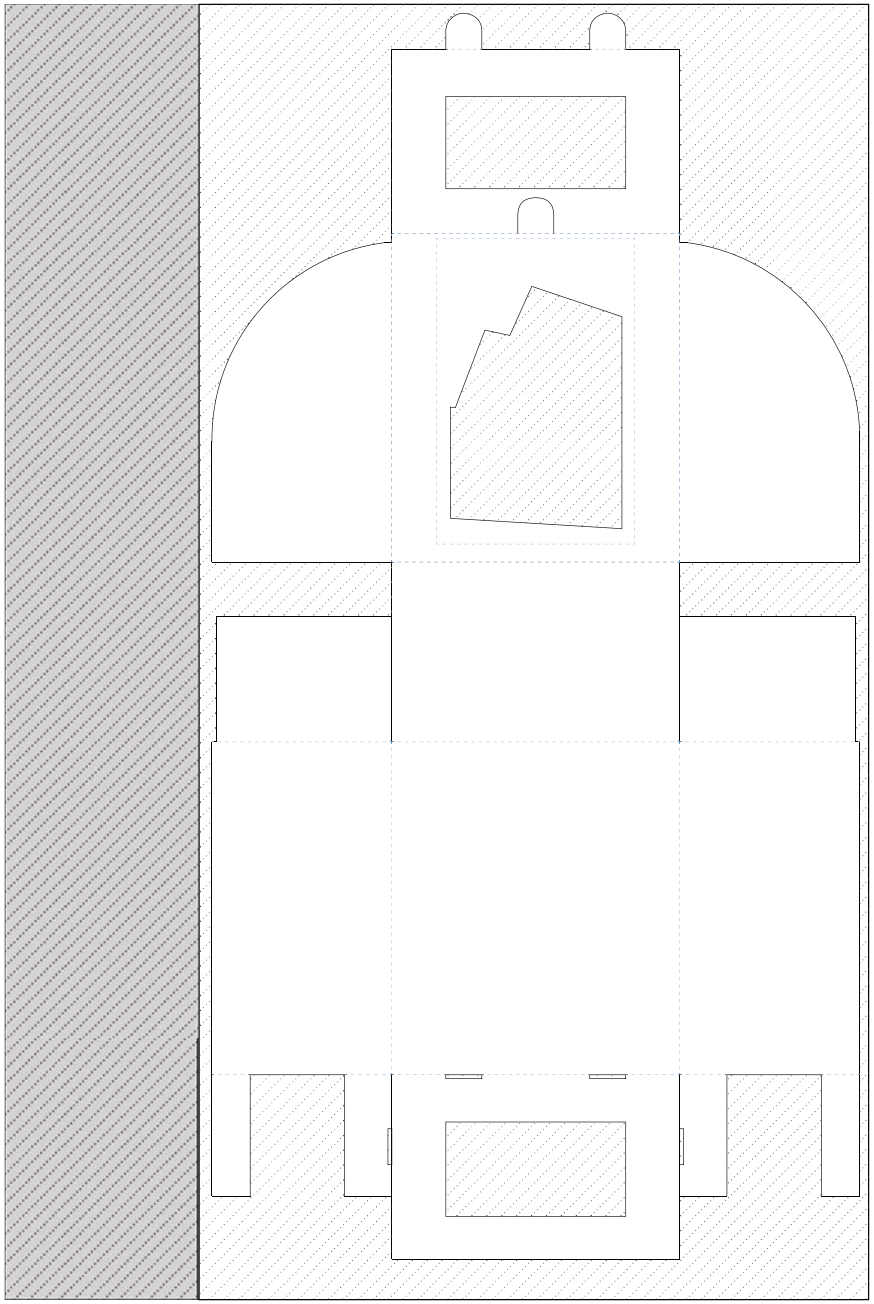

HANDLE
HANDLE
RELATED TO NFL IMAGE
This is Great!
Figure out how we want to bend this
FREEDOM BY DESIGN CMU

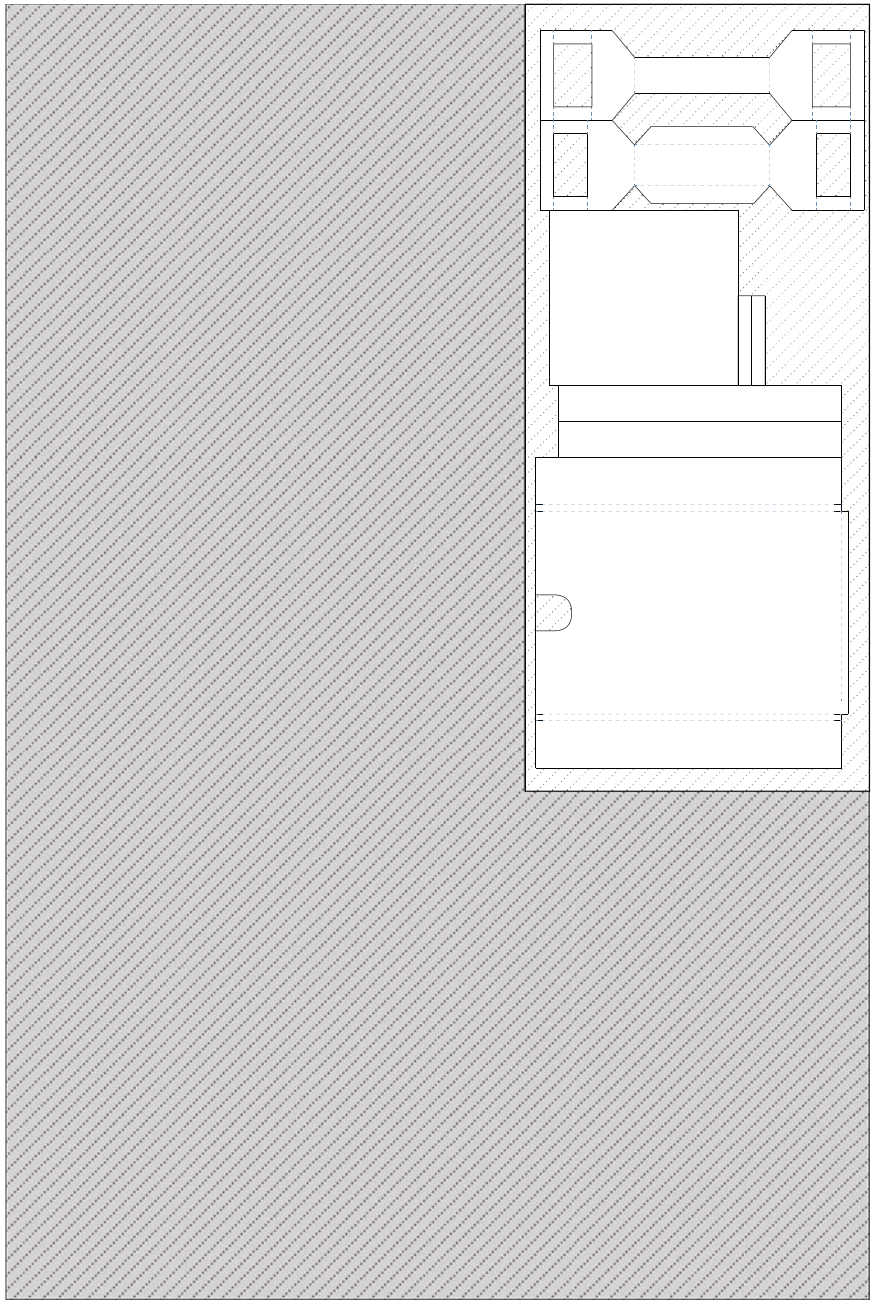
THE FINAL BOX
ASSEMBLY AND USE

The final box is strong, sturdy, easily stackable and storable. It uses the equivalent of 1 32”x40” sheet of 1/16” cardboard. Our laser cutters have 24”x36” beds so we will cut the boards down to the minimum size in order to conserve material while cutting.

The laser cut time per box is about 7 minutes, and each box takes about 20 minutes to assemble (10 once you get the hang of it.)

Next semester we will have an event for the assembly of these boxes to celebrate the new year and new members. This activity will be a simple and easy way for incoming first years to interact with Freedom By Design and be a part of our project as it nears its end.





WEATHERIZATION KIT
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WEATHERIZATION KIT
WEATHERIZATION KIT

Our boxes needed a final piece of design to feel complete. Although they display the book as a way to show what they are, and do a good job of incorporating the cover into the design of the box, we wanted to spray paint the boxes as well with AIAS, FBD, and CMU, as well as create an abstraction of the words “Weatherization Kit.”

We were inspired by sneaker boxes and the way they work together in order to become a readable surface. So like sneaker boxes, we decided to break up the lettering of “Weatherization Kit” so that when they are stacked at the event, they are readable, but separately, the letters become more of an abstracted design.

Our final group of boxes will be painted with a few different colors so that they can be mixed and matched while stacked at the distribution event.

In the future, if there are boxes that contain different things, this system could be used to signify something more important.

STENCIL LASER CUT FILE

CRIZAI

FREEDOM BY DESIGN

EDIZAT

CINVIN

CMU

INVIT

WALTER

AIAS

WALTER

DISTRIBUTION

UPCOMING...

We will be meeting with the **Kingsley Association** in Homewood this August to form a partnership and to get advise on the best way to invite people to our event. It is likely that they will be able to connect us with other sources of funding and will know individuals that should be recipients of the kits. We will use this partnership to reach out to people on an individual basis to limit the number of RSVPs to our event. **We need to be careful to avoid promising more kits than we can provide** so we will have to be careful about advertising to too many people.

The distribution and demonstration event will be held in the Project RE_ community space on October 27th. At this event, students will **demonstrate how to install the products in the kits and give the recipients a risk free attempt at the installations before they install the products in their homes.** This will be an opportunity for the clients to ask questions in person, and we will have a sign up sheet for assistance home installations.

We will set a few dates for students to help our clients install their insulation kits. Students will work in groups of 2 or more and will bring all installation equipment needed (hacksaw and hairdryer) for those who do not have these objects in their homes.

Additional booklets will be left with the local libraries to be distributed as a resource to other community members, and **an online version will be available for distribution** as well.

We hope that the immediate impact will be that the people who receive the kits will be able to live more comfortably this winter without having to dig into their food or rent budgets. **The booklet adds a resource not only to those who receive the kit, but those who we are not able to initially reach**. Through this publication we hope to give residents some information to help them reduce the cost and energy consumption throughout winter.

Our hope is that this project can be replicated, and if we are able to secure more funds for these kits, even after the initial event, we could make kits to be distributed later in the year, and in the following years.

LONG TERM GOALS

This is not a project that will solve the problem at a large scale, but it aims to provide a solution for the immediate season and provide access to easily digested information on what longer term solutions residents could pursue, should they become a homeowner or be moving in the future. **This is intended to be the beginning of an annual initiative for our chapter allowing new members to Freedom by Design** and have a lasting relationship with communities in Pittsburgh. In doing this every year, we develop a sustained relationship and presence within the community which is critical if we want to pursue other larger scale build projects in the future.

Our connection through the Kingsley Association will be a great resource for use moving forward, and they will likely be a partner of ours for future projects.