



PREPARE AND PRESERVE
DISASTER RELIEF PACK



PROCESS BOOK



Ian Barr Senior Capstone 2021

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Capstone Narrative

Ian Barr
IN 426 Living Systems Design
Project 1: Capstone Narrative

Picture yourself as you are now. You might be sitting, lying, standing, or walking, but as of right now your mind is on this page and in the present. What would you do if you were alerted that a natural disaster would strike in a matter of moments? What items of value or resource would you grab in your vicinity? Would you run, brace, hide or freeze?

These are the questions that I've asked myself through every phase of my capstone project. When a disaster strikes, be it wildfires, earthquakes, Hurricanes, or others, it can be immediate and unforgiving, leaving many unprepared for the situation ahead. Time is lost, by packing and searching for items to evacuate or brace with while Homes and livelihoods are quickly swept away.

Reactions Of Three Natural Disaster Survivors

I began my research by looking at three primary accounts of natural disaster survivors. Each experience had such distress and hardship, but a common factor among all of them is they had little to no time to prepare before the disaster hit.

The first experience is from a woman named Whitney Vaughan who was caught in California Wildfires in 2018. Whitney and her husband had just enough time to grab a laundry basket of dirty clothes and some pictures before escaping their home. "They had just fled their home as flames rushed them, Vaughan said. She saw a man sprinting past our house carrying a little baby, running as fast as he could." The couple soon found themselves trapped with other evacuees in standstill traffic as the Camp Fire closed in. Vaughan and her husband escaped before flames could engulf their car." - CNN.

The second experience comes from a man named Mike, a hurricane Sandy survivor in 2012. During the storm, he realized he was in grave danger when his house started flooding. While trying to evacuate his home, he was swept away by the current. The floodwaters took him down the street, where he was able to seek shelter in a neighbor's house. There, he did everything he could to stay warm because he was suffering from hypothermia at that point. He took blankets to warm himself up and even left a note to call his dad because he did not think he would live. Luckily, Mike was rescued and just made it through the hurricane.

The third experience comes from a man names Emmanuel Buso, who was trapped in rubble in the Haiti Earthquake, 2010. He was coming out of the shower when the earthquake hit. "I felt the house dancing around me, I didn't know if I was up or down." He had passed out in the rubble, and that he had heard his mother's cries in his dreams. He had had a little space around him when the furniture in his room collapsed, but he didn't have any food. Rescuers pulled away debris from where his house. They had called out and to their surprise, he responded. -

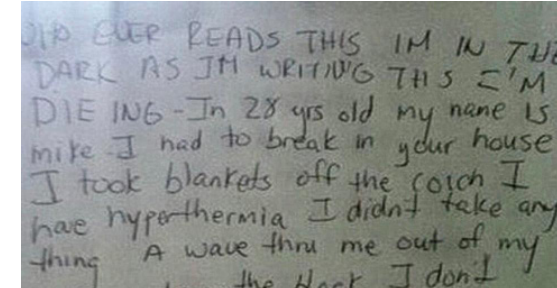
Really understanding and dissecting these stories was crucial for creating and justifying certain elements in my design. I gathered that when people are in distress, they will grab anything of value and survival if they have time. If they don't have time and are caught immediately off guard, they will still try and use anything within their vicinity to try and survive.

The Deeper Psychology and Timeline of Focus

To understand the active and post an emotional response that an individual might have, I took a deep dive into the psychology of perspective. In the study called, "The Australasian Journal of Disaster and Trauma Studies: Natural environment disaster survival experiences: narrative research from two communities", researchers analyzed journalistic narratives collected from individuals experiencing natural disasters in two culturally diverse communities.

They recorded short-term vivid memory traces of survivors who project their interpretations of events and experiences, reflected in their narratives. The other portion of the study was to compare and see how religion influenced the narratives between each community, but for the purpose of my research, I focused on individual's initial reactions.

Mike: Hurricane Sandy



- Floating to safety
- Hypothermia
- Blankets for survival

Whitney: California Wildfires



- Running with Possessions
- Pictures
- Clothes
- Trapped in flames before escaping

Emmanuel: Haiti Earthquake



- Calling for help
- Trapped in rubble for days

Capstone Narrative

I created my own table using my findings and relevant information from the Trauma Study. My table is loosely structured on the Trauma studies table of "Psychological Processes. "Threat, Impact, and aftermath" refers to three stages of situational distress a person may experience. The Psychological category refers to key points distilled from the narratives gathered in the Australasian Journal of Disaster and Trauma Studies. The physical category is the information I distilled based on the three survival narratives I found. Lastly, the Phases of Disaster Recovery is the general stages of operation after a disaster hits.

Project Case Studies

After exploring the mental and emotional responses to a natural disaster, I turned to existing projects that served as points of inspiration through the case studies.

Hope On Water, Istanbul, by SO?

Design firm, "SO" in Istanbul, created prototype folding temporary housing in response to emergency earthquake points being built on. Its light and foldable structure provide rapid and easy installation in the case of an emergency.

Life Clock by Gyeonggido Company & SWNA design:

"Disaster supplies, which invariably feel heavy, are necessary items in life. So, we wanted to use a 'clock' as a metaphor, which is an everyday item that lives and breathes with the people that uses them rather than a weighty object."

Urban rough sleepers backpack, by Ragnhild Lübbert Terpling (Student Project)

The 'urban rough sleeper' backpack supports and improves the current lifestyle of the impoverished by meeting some of their most basic needs: storage, mobility, and shelter.

Prepare and Preserve, Disaster Relief Pack: Decisions In Form

The three variations of the Disaster Relief Pack aims to provide a meaningful and humane approach to the emotional and physical effects of an individual during a natural disaster.

By creating variations in the size, its form allows for each unit to perform at maximum efficiency for the specific disaster it's designed for.

Starting with the wildfire pack, the form is the smallest of the three. In a wildfire scenario, as represented in the first narrative of Whitney Vaughn, the initial reaction is to escape as fast as possible. In this situation, there is very little time to gather essential resources and as stated with the case study project "Life Clock", "disaster supplies feel heavy." The form of this pack is designed for a grab-and-go situation, its compact size allows for the user to flee without being over cumbered by materials. In addition to this, many people often flee to their cars if there is enough time. The pack takes up very little space and it's optimized for flat storage.

The form of the hurricane pack is designed for long-term reliance, water resistance, and floating. The Pack is shaped for buoyancy as it allows for a larger cavity space. As seen in the second narrative with, Mike, if you are in a situation where the house is flooded and you become swept in the current, the rolling ship features multiple grabs and weight distribution points to allow the user to stay above water at all costs.

The Earthquake pack is formed for impact protection. As seen in the case of Emmanuel Buso, an earthquake can leave little to no time to prepare. In the case where you are able to access the backpack during the earthquake, the form is designed to shelter in place with you. The pack protects the most essential parts of the body in a brace position and provides reinforced support around the neck.

Period	Psychological	Physical	Phases Of Disaster Recovery (Emergency Response)
Threat	<ul style="list-style-type: none"> warning Que's Vigilance Surveillance 	<ul style="list-style-type: none"> Quickly Grabbing possessions 	Evacuation or Shelter in Place
Impact	<ul style="list-style-type: none"> Sense of Vulnerability Emotional State Collective Flight Struggle for survival Spiritualism 	<ul style="list-style-type: none"> Floating to safety Blankets for survival Running with Possessions 	
Aftermath	<ul style="list-style-type: none"> Mental Anguish Personal Injuries Community Cohesion 	<ul style="list-style-type: none"> Calling for help Surviving 	<ol style="list-style-type: none"> Search and Rescue: hours- days Emergency Relief : Basic Needs Early Recovery: Out of tents into built shelter, access to basic needs Medium to Long-Term Recovery: Rebuilding Society

Hope On Water, Istanbul, By SO?



- Light Weight
- Rapid Deployment
- Able To Fold

Life Clock, By Gyeonggido Company & SWNA design



- Basic Medical Equipment
- Basic Survival Equipment
- Additional Storage

Urban rough sleepers backpack, by Ragnhild Lübbert



- Mobility
- Protection
- Shelter

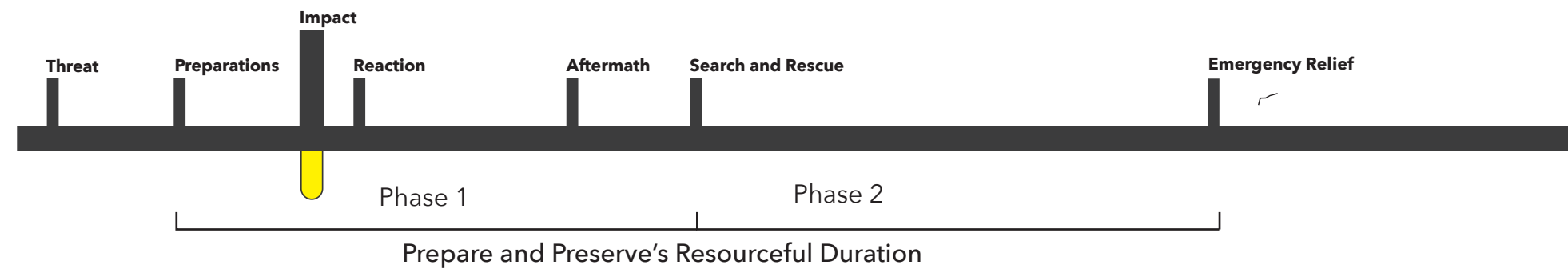
Statement Of Intent:

Challenge:

The effects of a natural disaster are not only physically destructive, but mentally. Often times when a disaster strikes, it can be immediate and unforgiving, leaving many unprepared for the situation ahead. Time is lost, by packing and searching for items to evacuate or brace with while Homes and livelihoods are quickly swept away. This threatens the immediate survival of an individual.

Solution:

I created "Prepare and Preserve", a new system of disaster relief pack that shortens preparation time and provides safety for individuals during the first critical moments of a natural disaster. Each backpack-sized container will offer dedicated open storage for personal items (digital and Physical), compartments for medical/ survival equipment, as well as disaster specific resources. Each pack is offered in three variations and built to be most efficient and adapted for Wildfire, Hurricane or Earthquake scenarios.



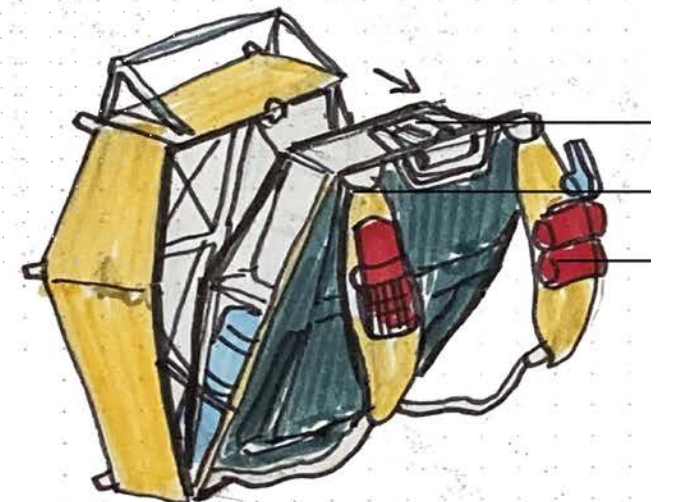
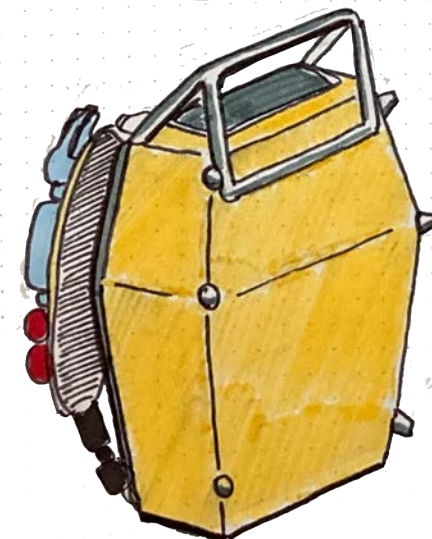
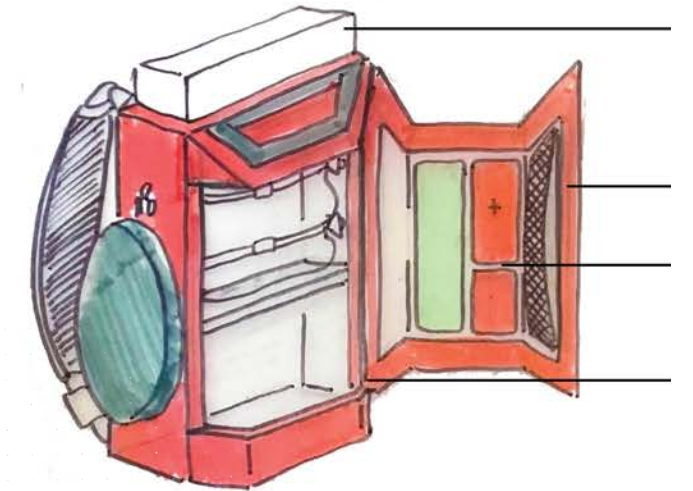
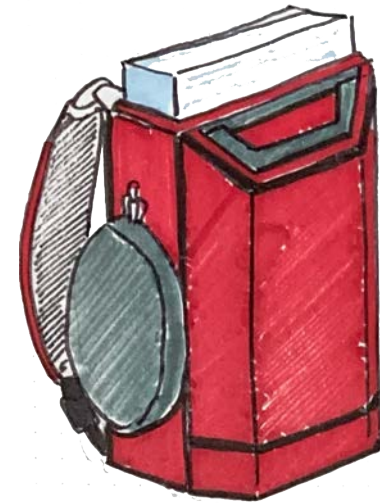
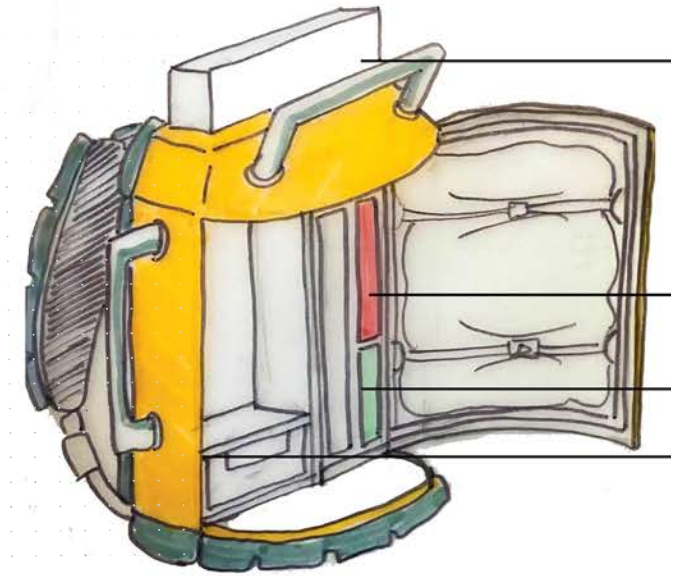
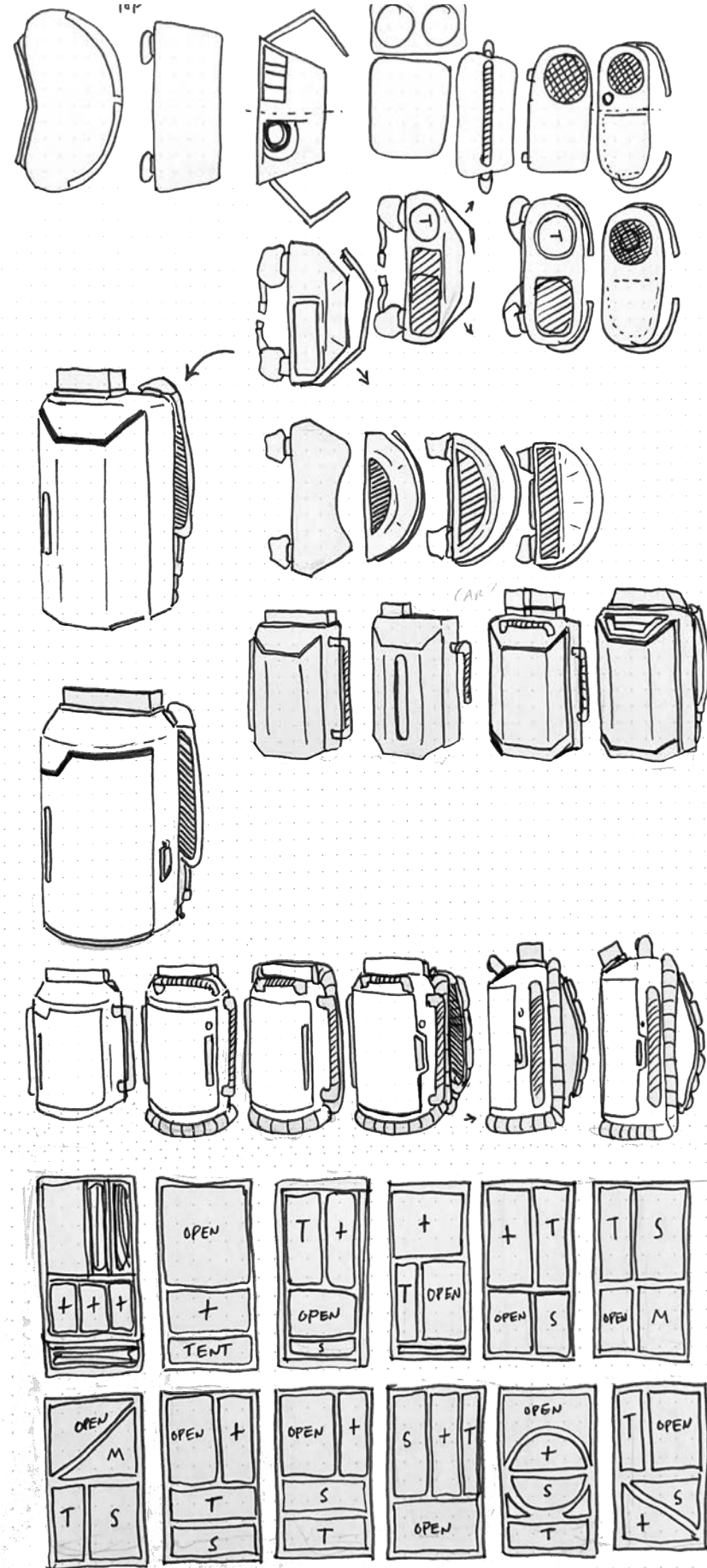
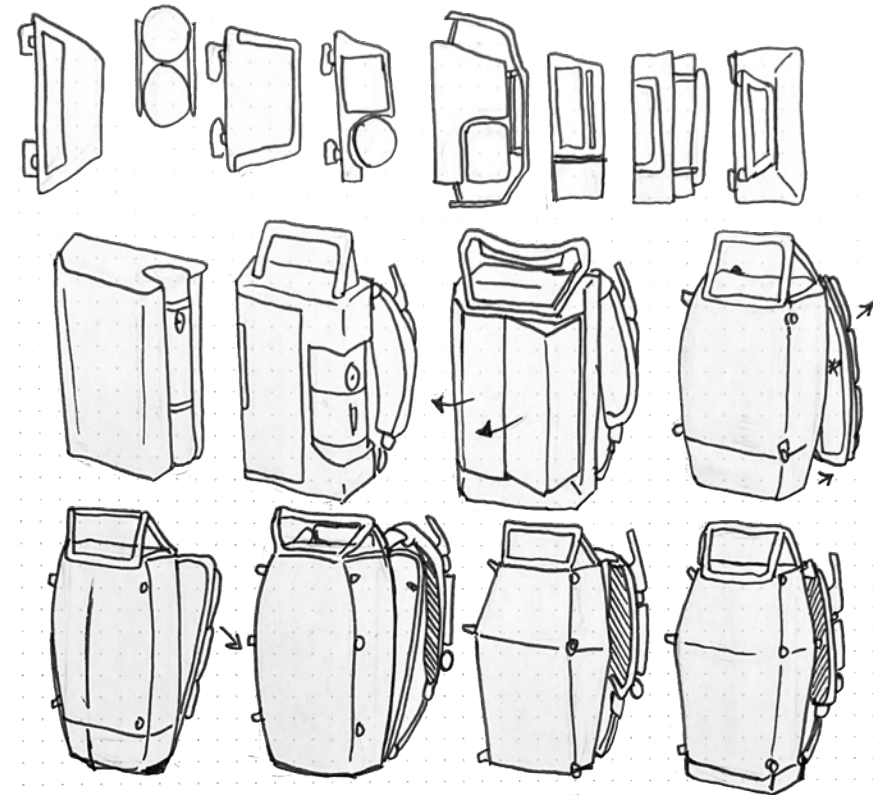
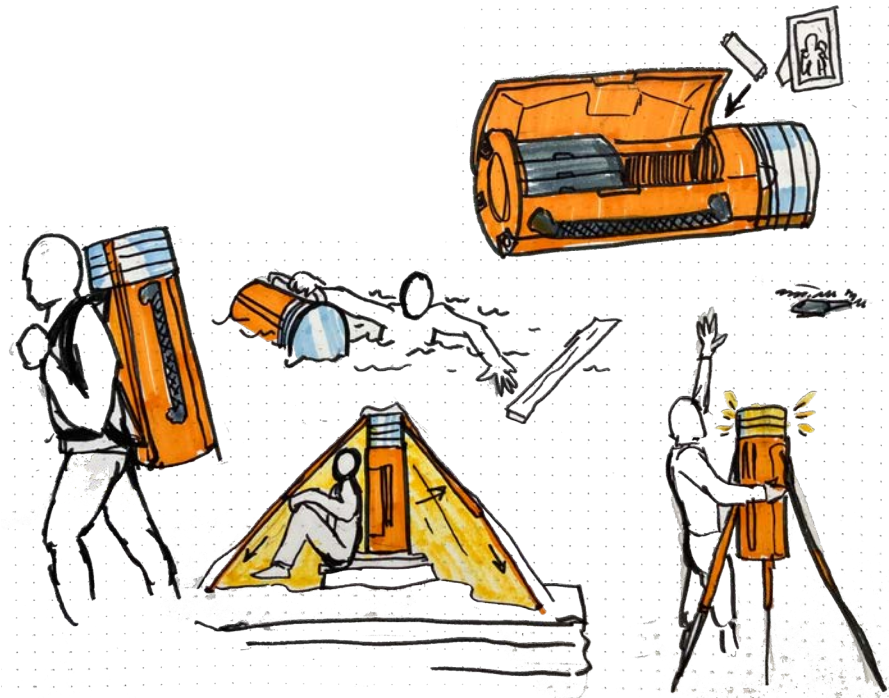
Without Prepare and Preserve



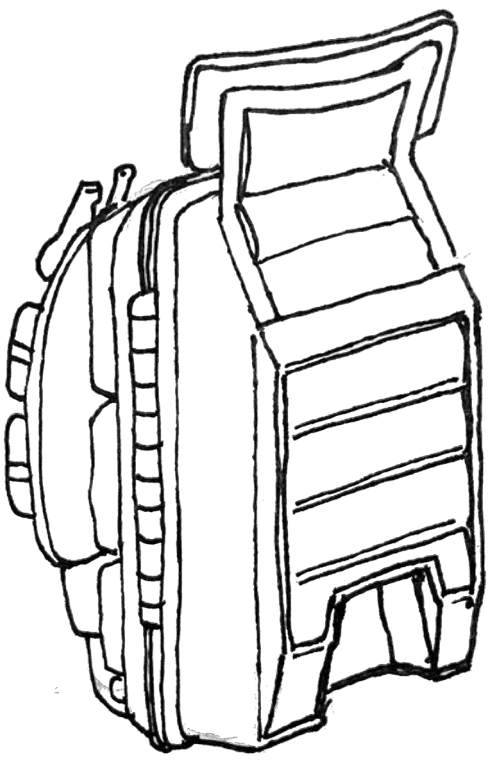
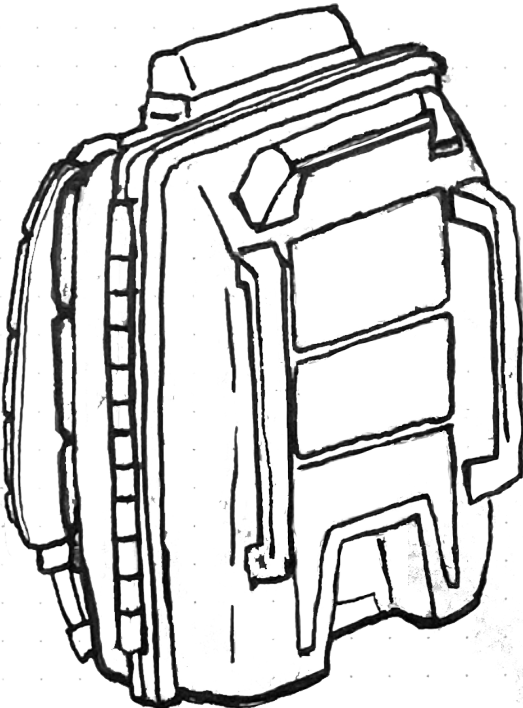
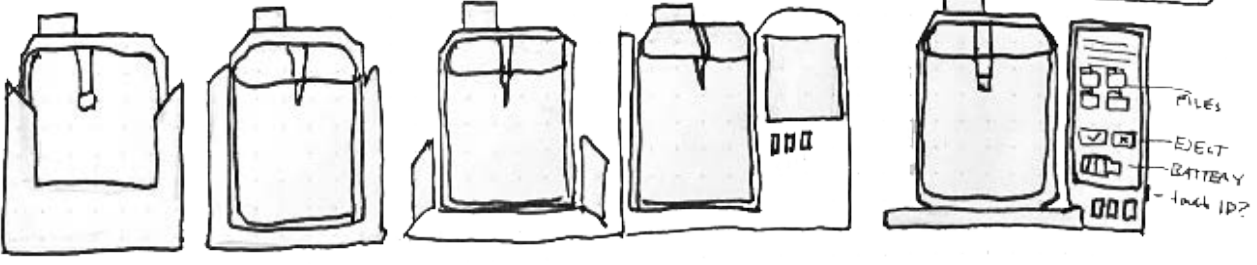
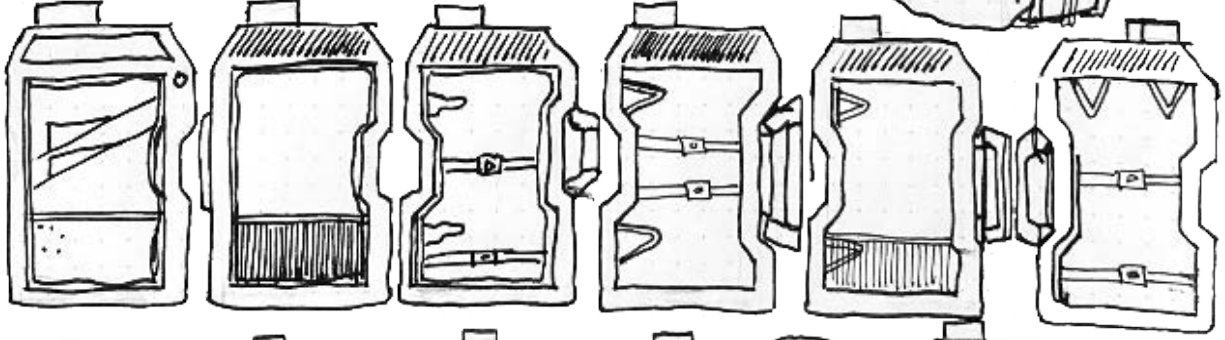
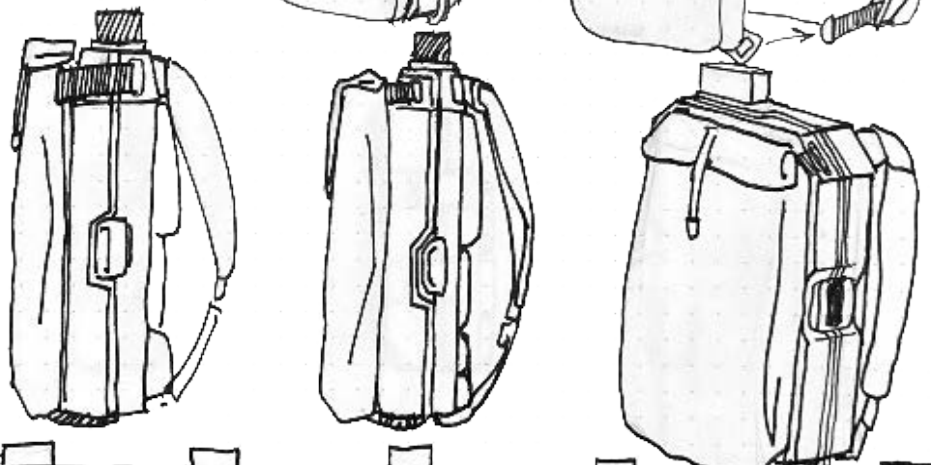
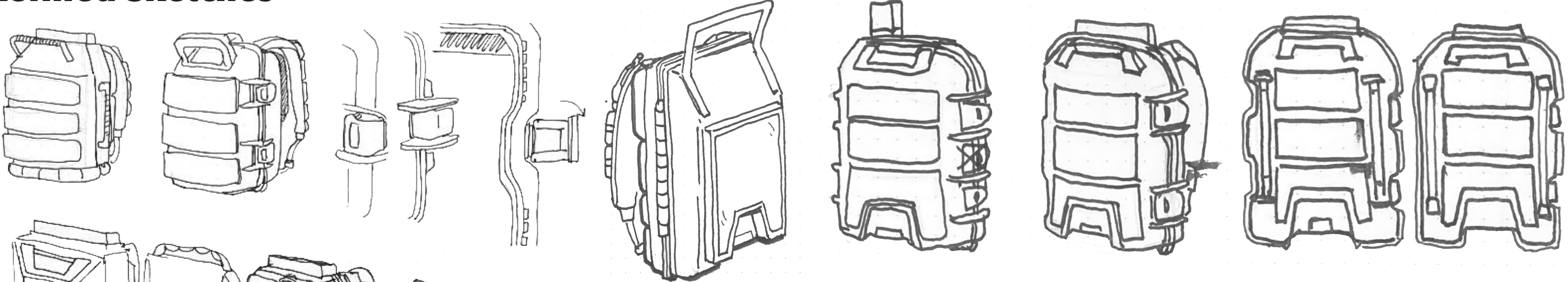
With Prepare and Preserve



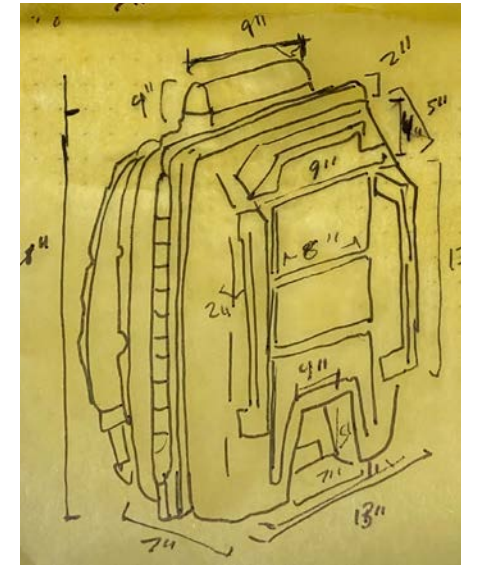
Early Concept Development



Refined Sketches

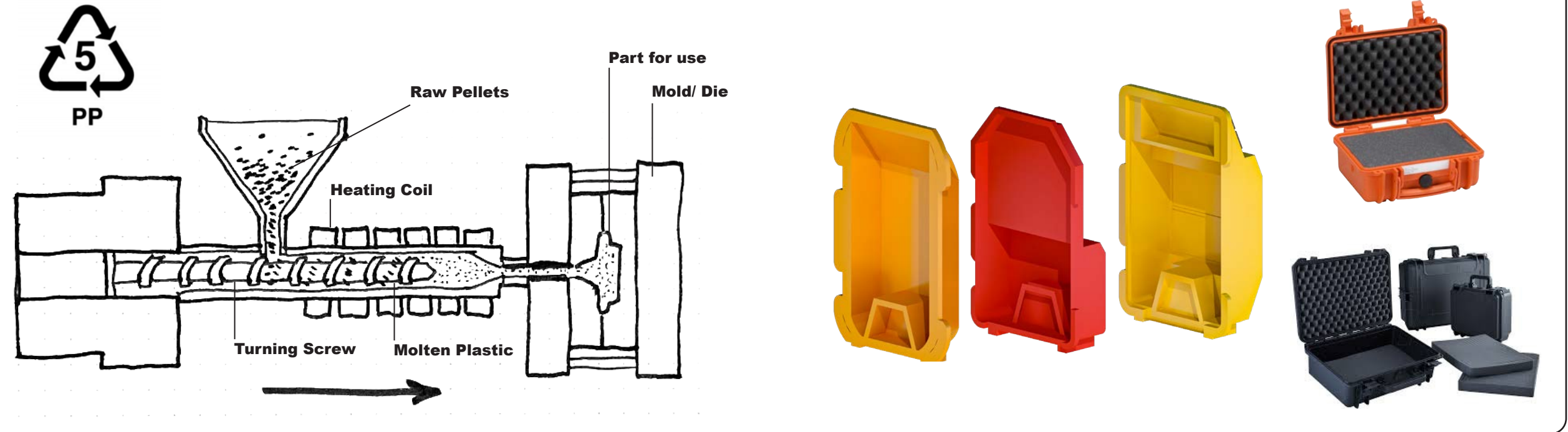


Form Finding and Study Models



Manufacturing/ Feature Materials

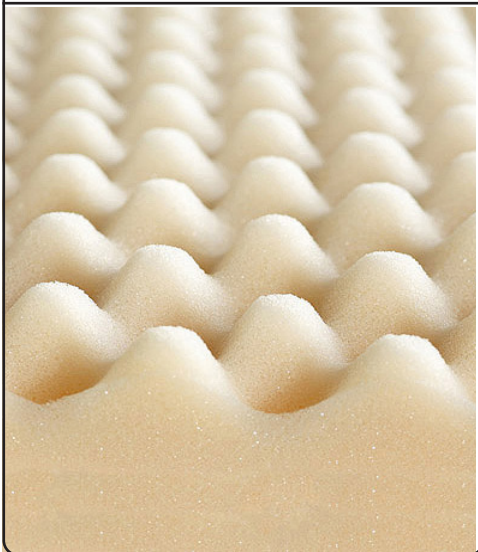
Injection Molding: Polypropylene Co-Polymer Resin



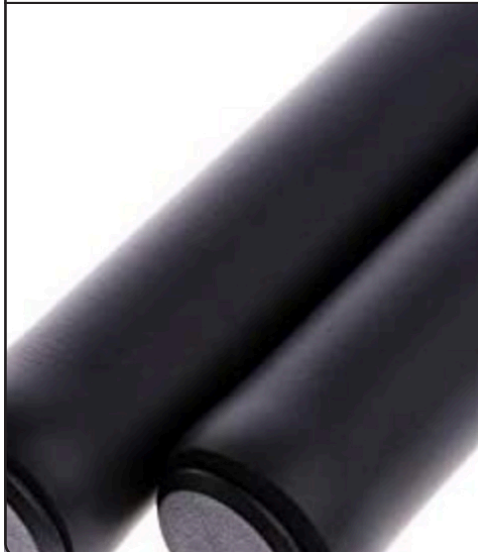
**Silicone Coated
Fiberglass**



**Polyurethane
Foam**



Rubber Coating



XRD Impact



Carbon Fiber



Final Form and Specifications Of Each Pack



Weight:

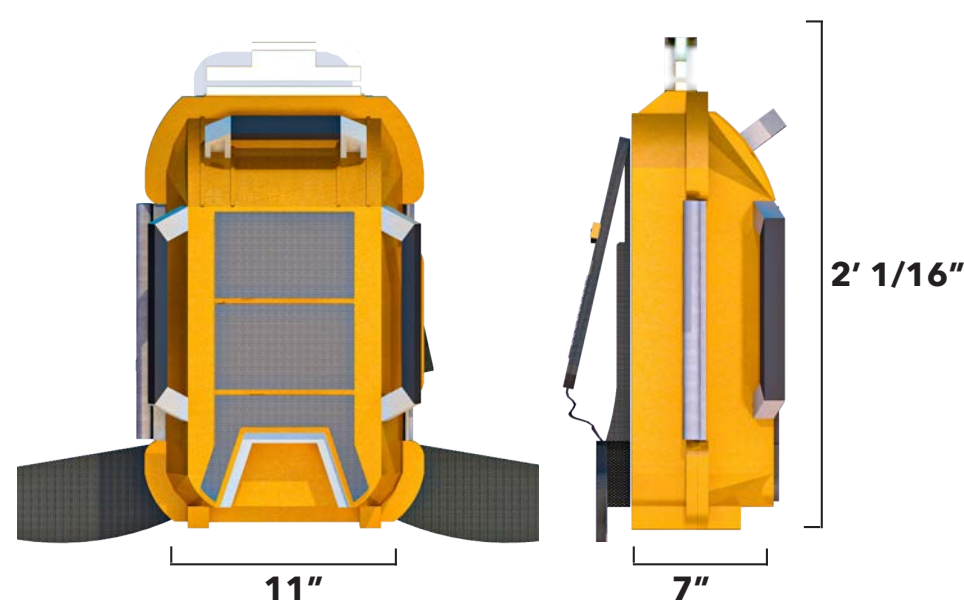
Approx 6.5 LBS

Resistance:

Chemical, Corrosion, Water, Shock

Target Approval Ratings:

IP67, STANAG 4280/AEPP-3D



Weight:

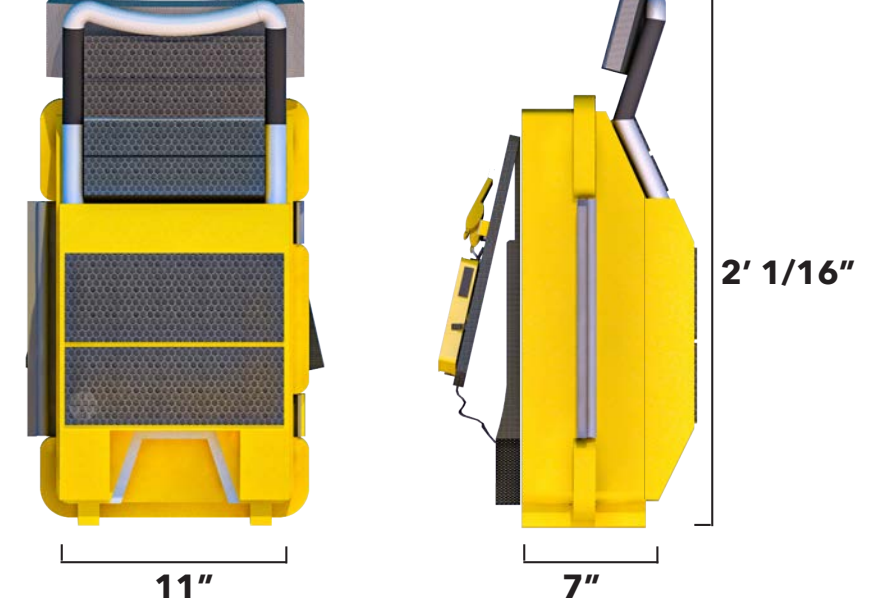
Approx 8 LBS

Resistance:

Chemical, Corrosion, Water Submersion, Shock

Target Approval Ratings:

IP67, STANAG 4280/AEPP-3D



Weight:

Approx 8 LBS

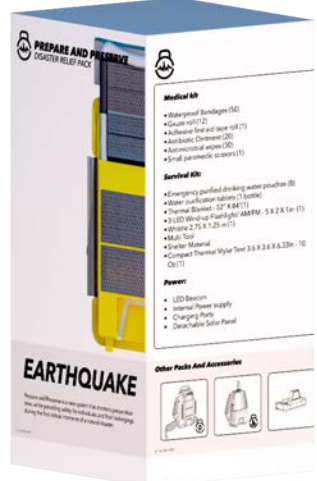
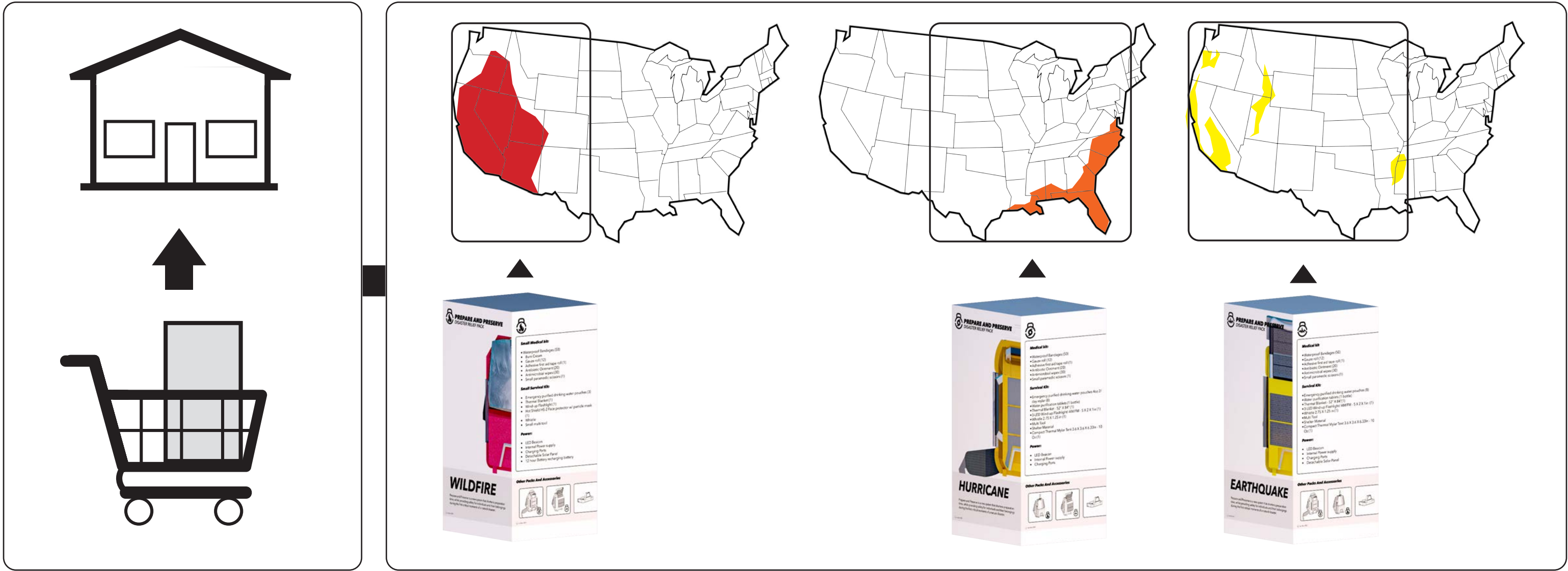
Resistance:

Chemical, Corrosion, Water, Shock, Impact

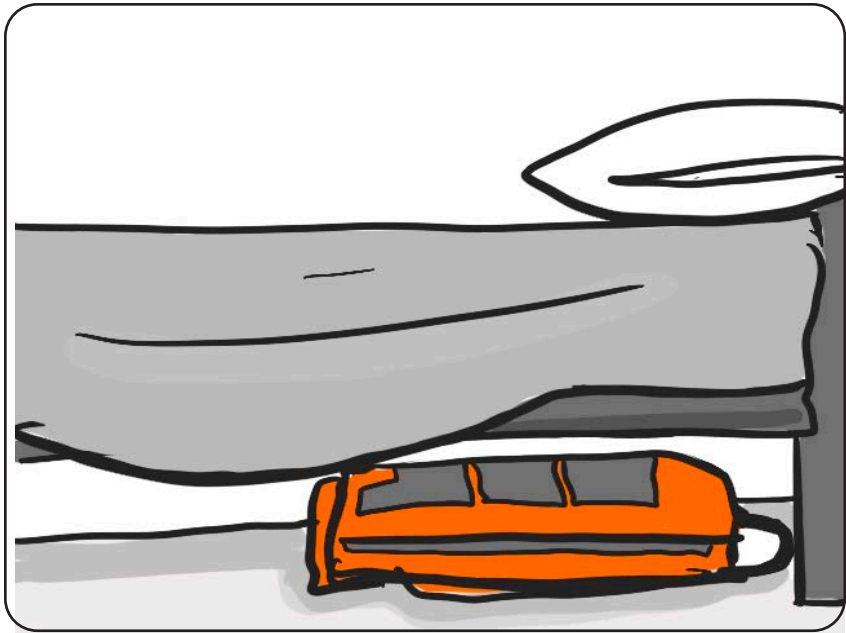
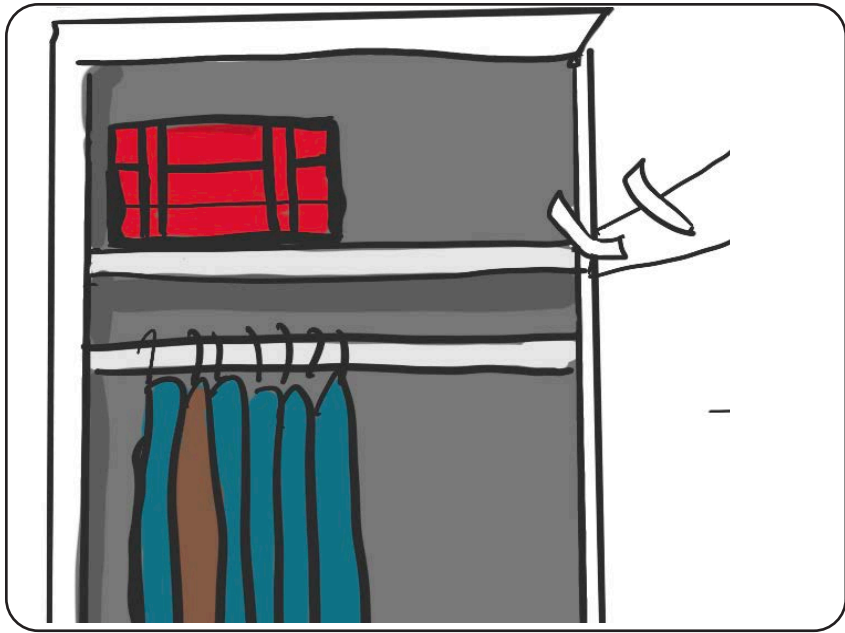
Target Approval Ratings:

IP67, STANAG 4280/AEPP-3D

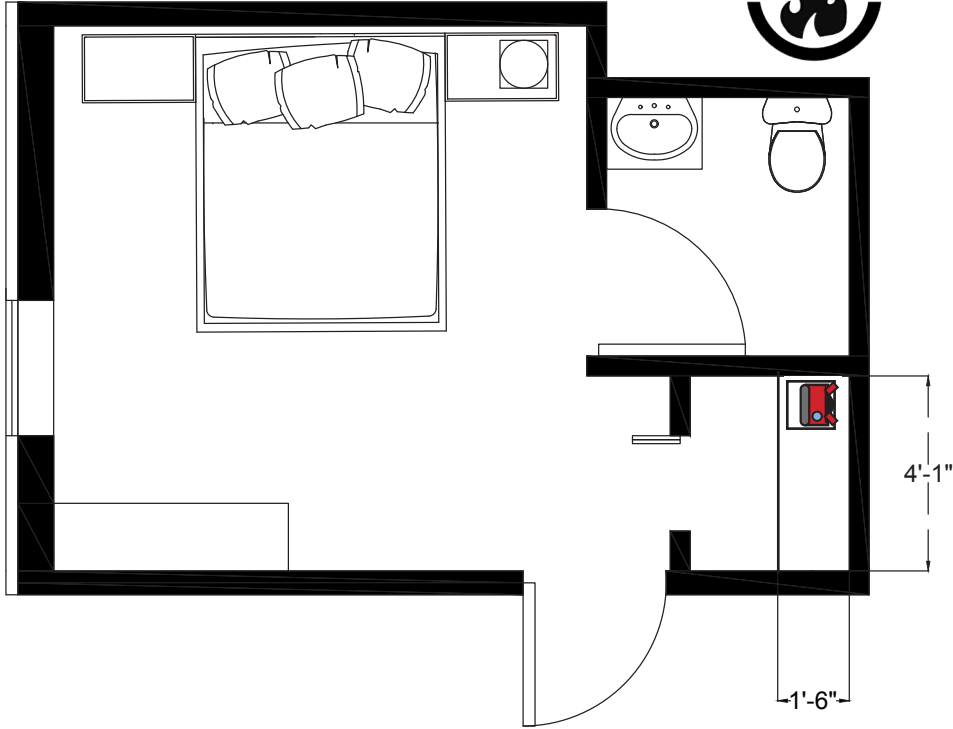
Marketing And Distribution



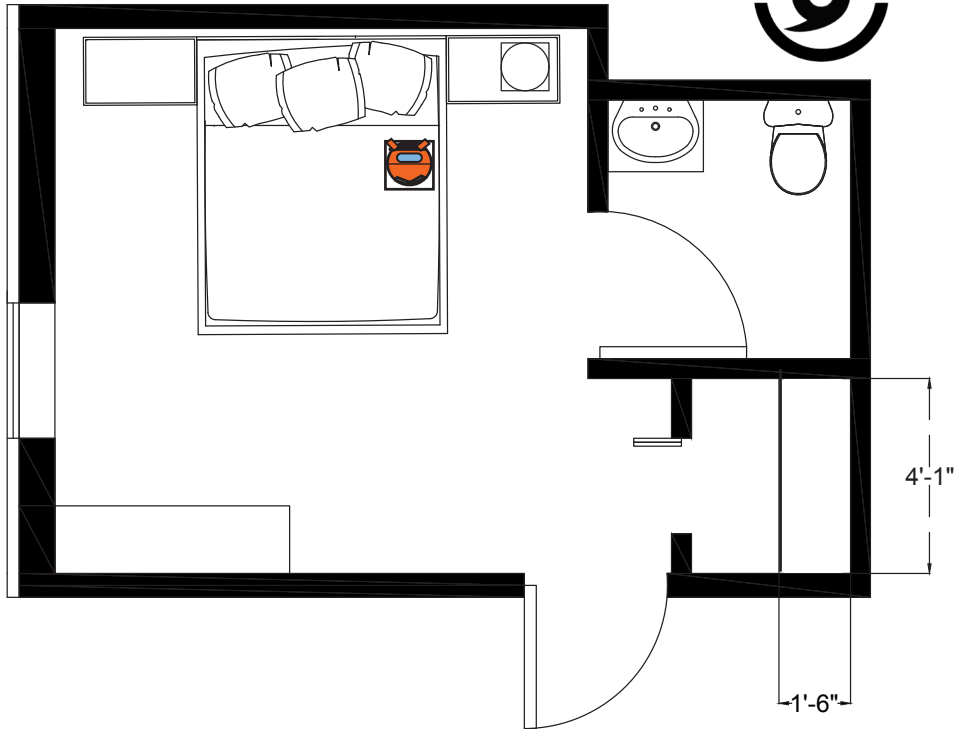
Potential Stand By Sites Within A Home



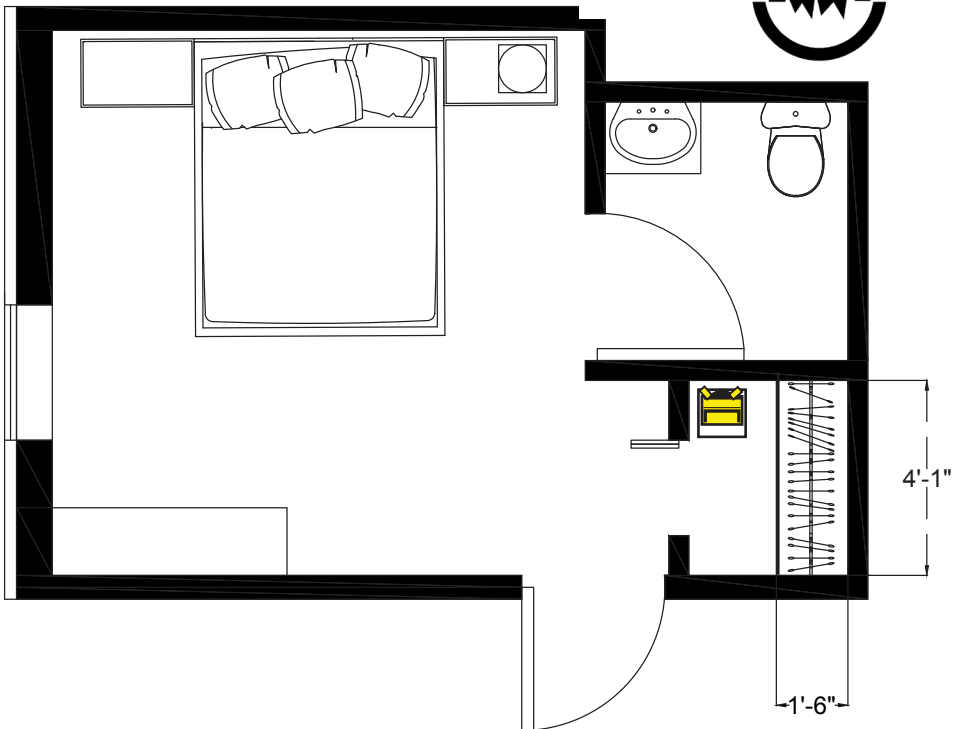
Example 1: Bedroom



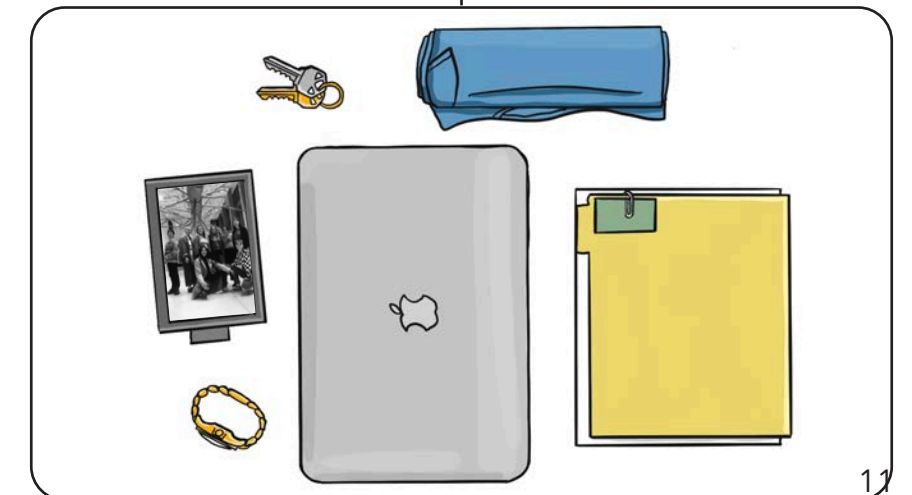
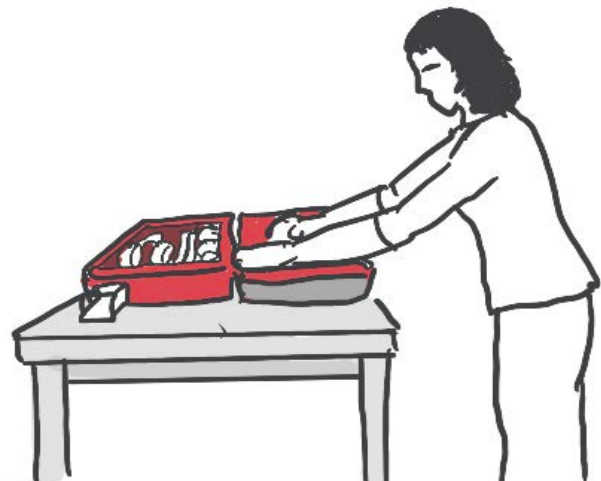
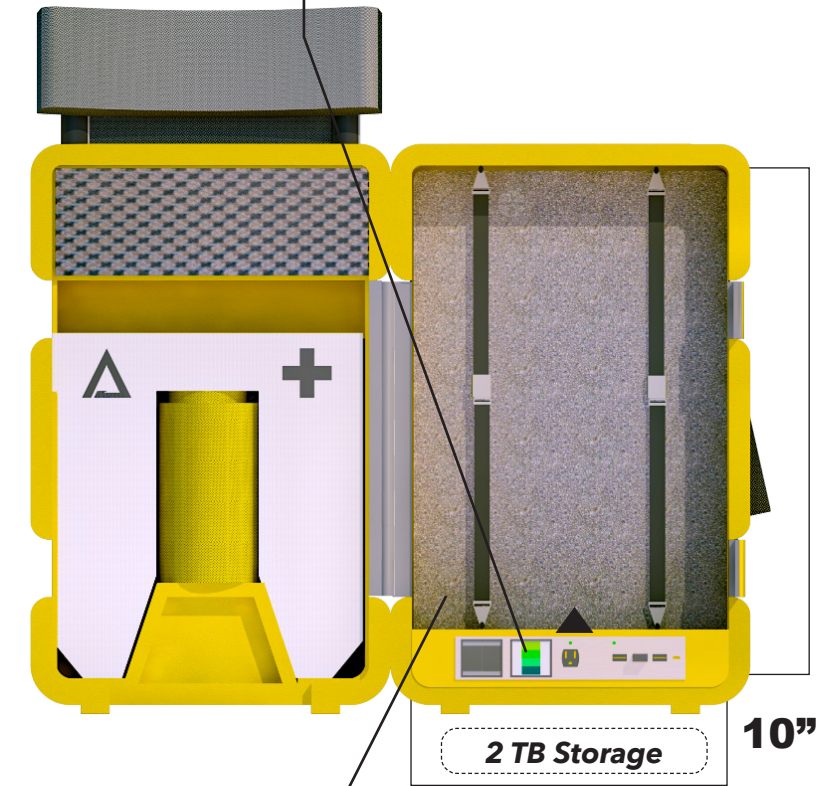
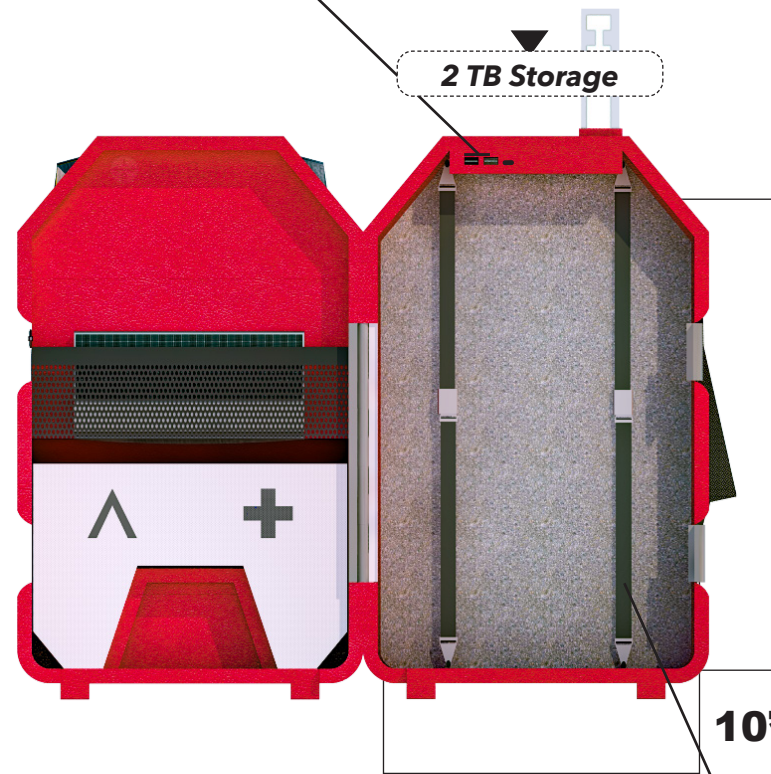
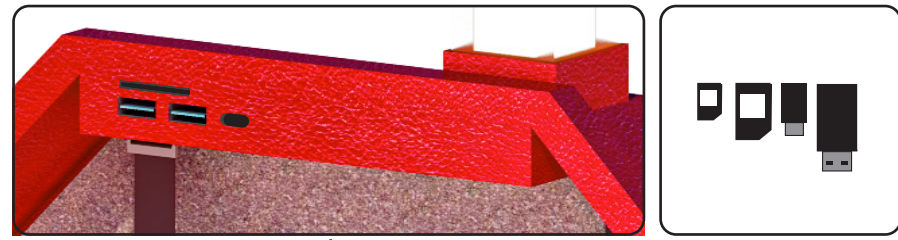
Example 2:



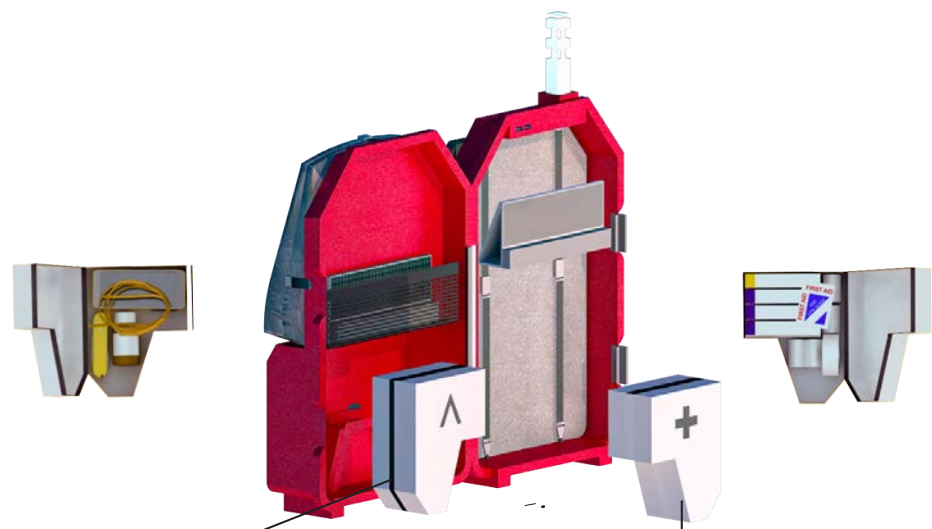
Example 3



Personal Storage: Physical/ Digital



Breakdown Of General Resources



Survival Kit:

- (1 Bottle) Water Purification Tablets
- (1) Thermal Blanket 52" X 84"
- (1) Wind-up Flashlight
- (1) Hot Shield HS-2 w/ particle mask
- (1) Emergency Whistle
- (1) Small multi tool
- (1) Folding Solar Charger

Medical kit:

- (50) Waterproof Bandages
- Burn Cream
- (12) Gauze roll
- (1) First aid tape roll
- (20) Antibiotic Ointment
- (30) Antimicrobial wipes
- (1) Paramedic scissors

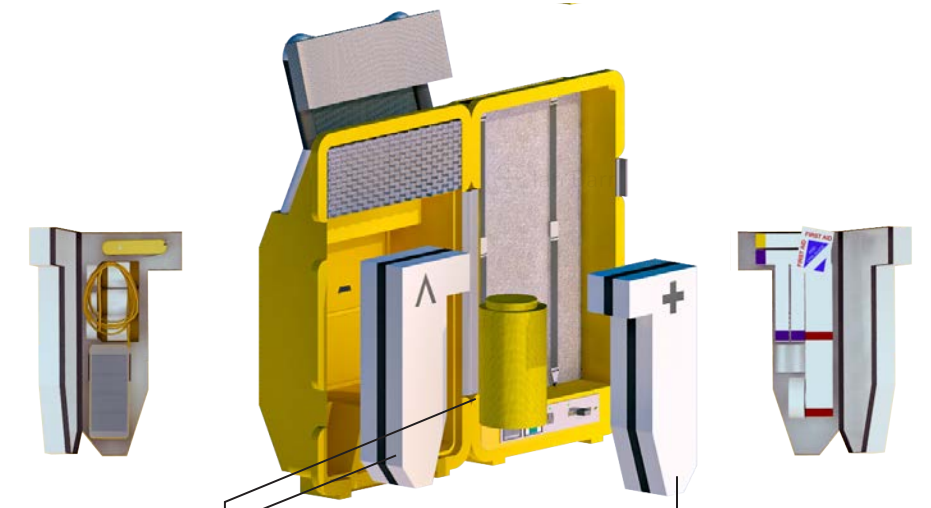


Survival Kit:

- (8) Emergency purified drinking water pouches 2/day
- (3 bottles) Water purification tablets
- (1) Thermal Blanket 52" X 84"
- (1) LED Wind-up flashlight/ AM/FM
- (1) Whistle
- (1) Multi Tool
- (1) Compact Thermal Mylar Tent 3.6 X 3.6 X 6.33In 10 Oz
- Integrated Solar Charger

Medical kit:

- (100) Waterproof Bandages
- Burn Cream
- (12) Gauze roll
- (1) First aid tape roll
- (20) Antibiotic Ointment
- (30) Antimicrobial wipes
- (1) Paramedic scissors



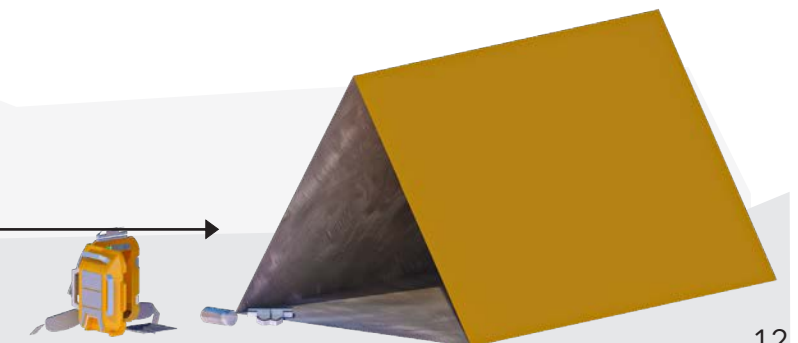
Survival Kit:

- (1) Emergency purified drinking water canister (on strap)
- (3 Bottles) Water purification tablets
- (1) Thermal Blanket 52" X 84"
- (1) LED flashlight (On straps)
- (1) Whistle (On Straps)
- (1) Multi Tool
- (1) Compact Thermal Mylar Tent 3.6 X 3.6 X 6.33In - 10 Oz
- Integrated Solar Charger

Medical kit:

- (100) Waterproof Bandages
- Burn Cream
- (12) Gauze roll
- (1) First aid tape roll
- (20) Antibiotic Ointment
- (30) Antimicrobial wipes
- (1) Paramedic scissors

Shelter





Disaster Specific Amenities: Wildfire



LED Beacon To Be Seen In Smoke



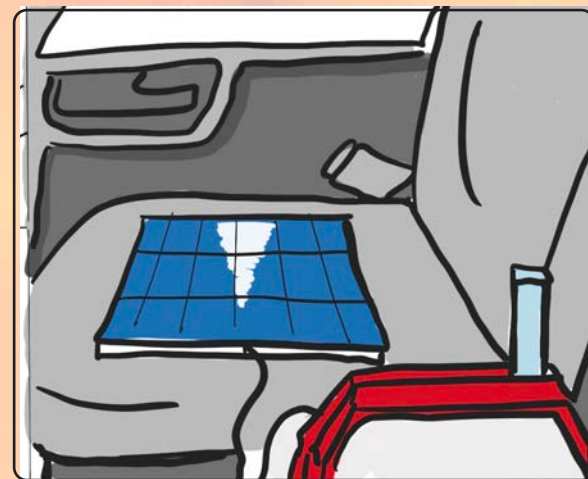
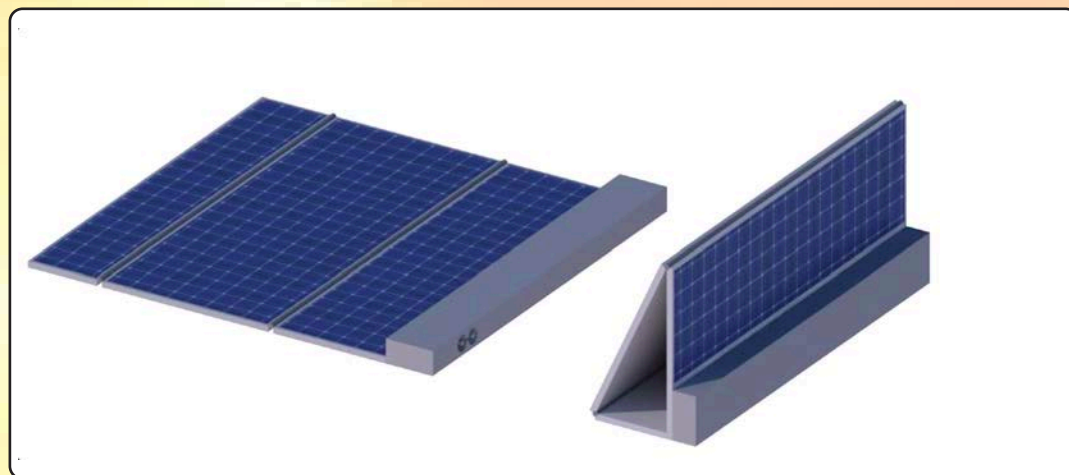
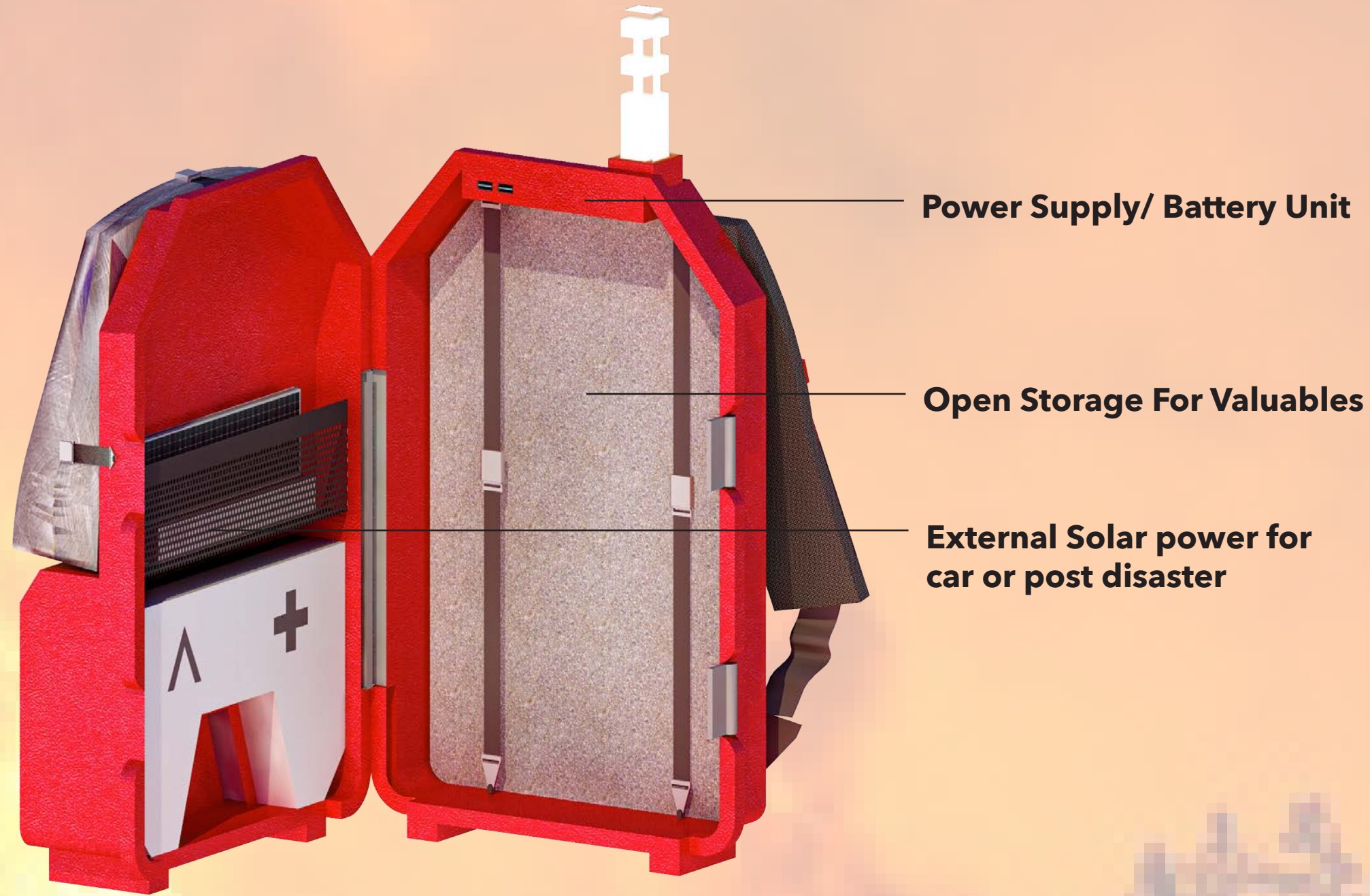
Fireproof Bag

Compact Size/ Light weight For Quick Grab And Run





Disaster Specific Amenities: Wildfire



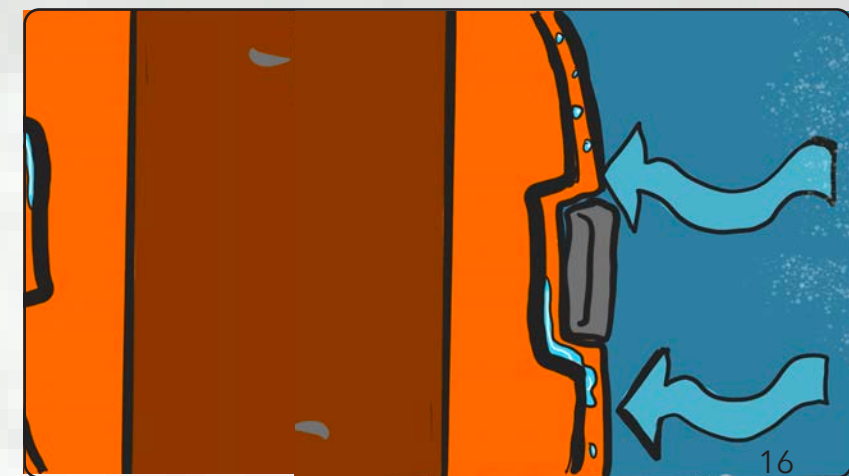
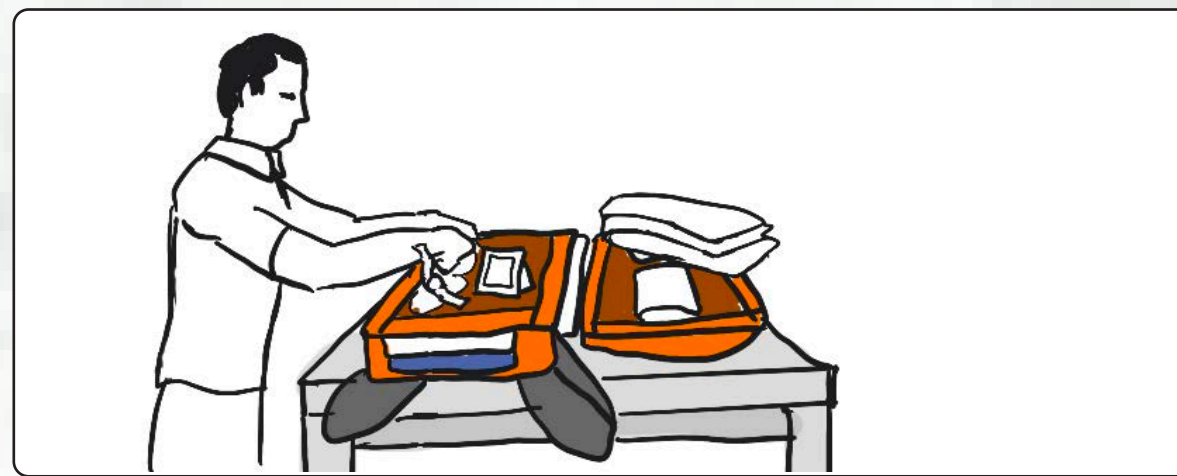


Disaster Specific Amenities: Hurricane



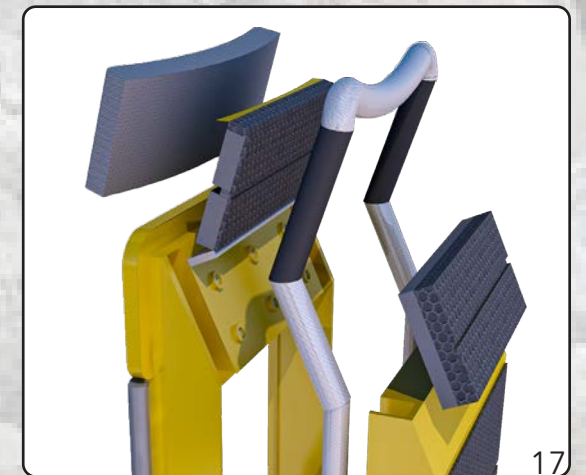
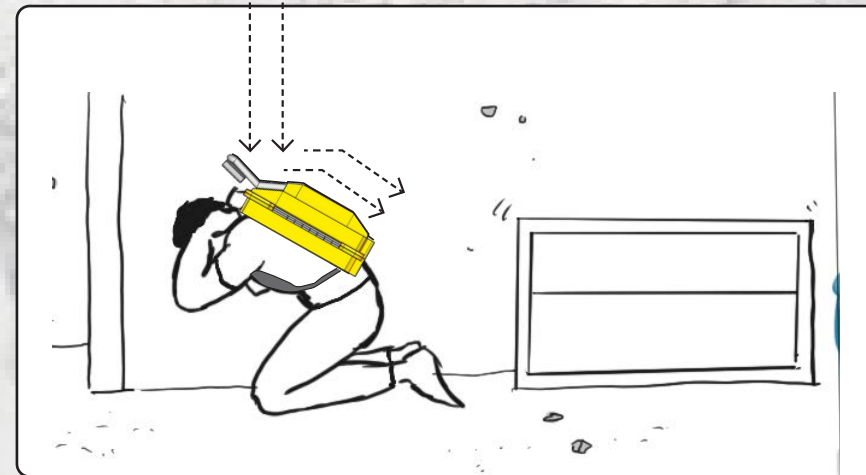
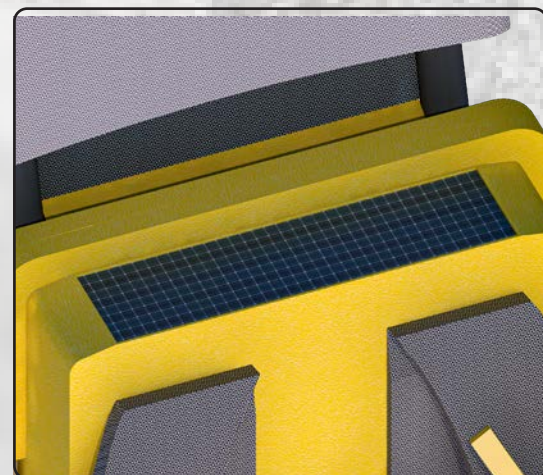


Disaster Specific Amenities: Hurricane





Disaster Specific Amenities: Earthquake





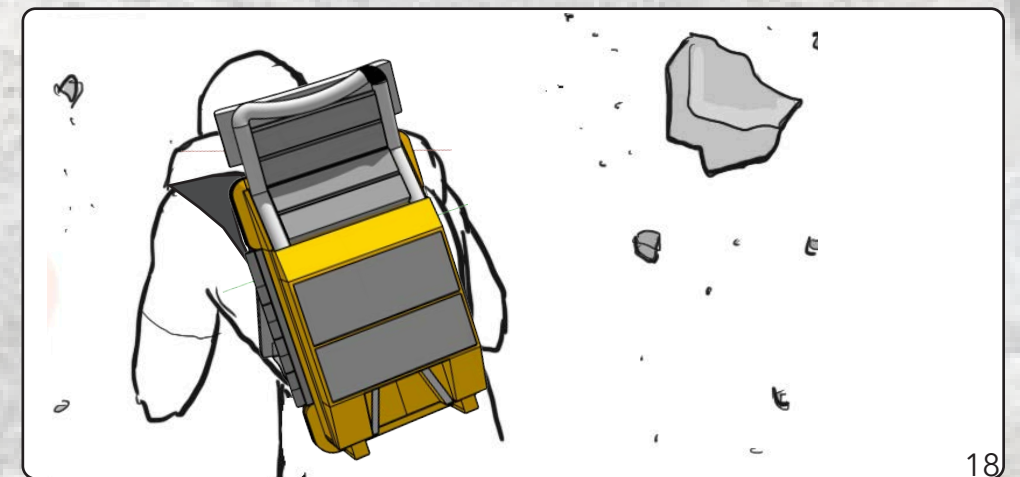
Disaster Specific Amenities: Earthquake



Shock Absorption

Open Storage For Valuables

Power Supply/ Battery Unit



Bibliography

1. "What to Do When Disaster Strikes | Everyday Health." EverydayHealth.Com, <https://www.everydayhealth.com/healthy-home/what-to-do-when-disaster-strikes.aspx>. Accessed 23 Oct. 2020.

This article helped me take a look at what immediate actions need to be taken when a disaster strikes. This ranges from earthquakes, tsunamis, hurricanes and more. Having this baseline disaster protocol established a grounding point from which to work from.

2. Timothy S. Killian, PhD, et al. "Stories after Disaster Survival: Preparing, Heeding Warnings, and Self-Reliance." *Journal of Emergency Management*, vol. 16, no. 2, 2, Mar. 2018, pp. 107-12. www.wmpllc.org, doi:10.5055/jem.2018.0359.

The purpose of the study was to examine the stories told by people personally impacted by disasters. The reports are semi-structured, qualitative interviews. This is important to my project because it helped me gauge what people intuitive responses might be.

3. Natural Environment Disaster Survival Experiences. <http://trauma.massey.ac.nz/issues/2007-2/prince.htm>. Accessed 13 Nov. 2020.

This article supplements the previous article in that it helped provide first person responses to disaster situations. I was able to look at the broad scope of how each situation is different for every person. It helped me break down the factors that play into a person's response.

4. "Phases of Disaster Recovery: Emergency Response for the Long Term - World." ReliefWeb, <https://reliefweb.int/report/world/phases-disaster-recovery-emergency-response-long-term>. Accessed 13 Nov. 2020.

This much like the first source helped me determine a baseline protocol that is issued when a disaster happens. This article focuses less on the specifics, but more on the general patterns that are seen before and after a disaster strikes.

5. "Natural Environment Disaster Survival Experiences: Narrative Research from Two Communities" <http://trauma.massey.ac.nz/issues/2007-2/prince.htm> Accessed 19 Nov. 2020.

This study does a deep analytic breakdown of how natural disaster victims decipher their experiences post disaster. It dives into the cognitive and psychological process that a person does to remember the situation. This was vital to my research because it explored the psychological and emotional distress a person may experience, which my design aims to remedy.

6. "SWNA." <https://theswna.com/projects/disaster-kit-life-clock>. Accessed 19 Nov. 2020.

7. "10 Hurricane Survivors And Their Stories Of Survival." Listverse, 11 June 2018, <https://listverse.com/2018/06/11/10-hurricane-survivors-and-their-stories-of-survival/>.



PREPARE AND PRESERVE
DISASTER RELIEF PACK

