

# UW Recycling Contamination

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INFO 200 | BE | Oscar Su

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# The Team

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## Team Members

**Daniel Bejar:** Second year intending to major in informatics. I'm from Portland, OR. Skills: project management, design, open to developing any skill. My responsibility is research and information gathering. This includes gathering relevant information and compiling data and sources to complete assignments.

**Melaya La Madrid:** I'm a first year student intending to major in Informatics. I'm from Issaquah, WA. I am responsible for communication and outreach. Communication involves reaching out to group members, updating project progress, and involvement with outside sources.

**Amanuel Tedla:** I'm a second year student and my intended major is Computer Science. I'm from Shoreline, WA. I am responsible for quality control of the project. This includes making sure the assignment is fully completed before submission with no spelling or grammatical errors.

**Hawi Samuel:** I am a first year student and my intended major is Informatics. I'm from Ethiopia. I was responsible for organization and making sure what was discussed during meetings was being implemented.

**Hudson Allen-** I am a first year student here at UW. My intended majors are Informatics and Real estate. I was born and raised in Seattle, and I am a third generation husky. I am the group facilitator. I ensure group members fulfill their responsibilities and we remain on task.

# Introduction

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The group of people we are going to serve is the UW Recycling team, including custodial services and Environmental Health & Safety. The problem area we are going to investigate and address is on-campus recycling contamination.

This problem should be addressed because when recycling gets contaminated, the recycling gets thrown away in the trash. If nothing is done then excess waste would be produced – material that could be recycled will instead be dumped. If nothing is done, possible excess waste charges and violation with waste management policies are at risk.

Solving this problem would create less waste being dumped and increase the amount of matter being recycled. More matter correctly recycled results in a greater profit from materials and less waste in the world. Recycled material is sold for money. Solving this problem would be beneficial in the long run by possibly reducing global warming with less waste material disposal.

## Problem Brief

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The problem we are researching is recycling contamination at UW residence halls. Recycling contamination is when un-recyclable materials are improperly disposed of into recycled waste. When recycling contains as much as 25% contaminated material, the whole load becomes waste and can no longer be recycled. UW is charged for excess waste and faces possible loss of partnership with waste management companies, resulting in systematic and logistical problems.

# Solutions Considered

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## Orientation Presentation

A common approach to this issue is an informational solution. With the leading cause of this issue being the lack of knowing what does and doesn't belong in the recycling bin. An advantage to this solution is it is educational. It is straightforward and lets the user know how they should recycle, reducing contamination by putting the wrong things in the bin. Another advantage is it's cost efficient, in the way that what is required is a slideshow presentation of some sort and a group of people affected by the problem to present to . While it tackles the root cause, a disadvantage to this solution is informative ones tend to be boring and noninteractive which will end up make it less impactful, students take little to none from the presentation and the issue persists. Another disadvantage might be information overload based on how we put the presentation together. In an attempt to give them the most information we might accidentally make it too much to retain so this is an aspect to keep in mind when designing the presentation. Overall this solution addresses the main problem and is a good one to keep in mind when approaching our final solution.

## Make Recycling Fun (Game)

In our innovative redesign of waste disposal bins, recycling takes on a dynamic and interactive form. The traditional recycling bin is transformed into a multifaceted platform with distinct compartments. The redesign introduces a gaming element, encouraging users to correctly sort their recyclables. Instead of boring traditional openings to allow waste to go in, the perimeter of the opening can imitate a basketball rim. This will incentivise users attempting to dispose of their waste in a form that they may enjoy. It can also give audio feedback that says "money" whenever something goes in the recycle. This gamified system that promotes responsible waste management can display real time points on screens to foster friendly competition.

## Giant Sign

Another solution we considered was a massive, semi-permanent recycling sign to be put in the waste chute room. A recurring problem that we observed from our research was that students often overlooked waste disposal guidance signs and/or signs were no longer posted due to wear and tear. The new and improved sign would be large enough that residents wouldn't miss it and more visually attractive so that the information would be more appealing to read. This might include more pictures, less and larger text, and an attractive focal point. This sign would also be more durable so that there's a lower chance of the helpful information being destroyed. Cons to this solution is it would only prevent improper trash sorting in the waste room. Though pizza boxes and cardboard packaging may be disposed of properly, waste in trash and recycling bags being thrown out may already be contaminated.

## Online Recycling Guide

The final solution we considered was putting qr codes on the trash cans or in the trash rooms that would take whoever scanned it to an online recycling guide. In this guide, a general overview of common items that should be recycled, trashed, or composted would be shown in order to inform the user of what garbage should go where. There would also be a search tab where the user could type in the item they are concerned about and from there, they would be told where that item should be thrown. Finally, we would implement a feedback mechanism where users would be able to suggest improvements or report any issues they might have with the recycling guide. That feedback would be reviewed by the staff behind the program and improve on it from there.

# Selected Solution

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## Interactive Educational Presentation

The solution we selected is an interactive educational presentation. Our solution to combating recycling contamination in UW residence halls and apartments involves educating students. We've found that improper waste sorting occurs due to lack of information about recycling. Put simply, students living in residence halls don't know how to recycle properly. In our solution, we are going to stop recycling contamination from happening by ensuring that students fully understand what it is, and how to not do it. An advantage of educating students is stopping recycling contamination at its most primary source, which is the improper knowledge inside a student's head. Signs and special lids are often overlooked and ignored, but by ensuring students directly know how to recycle properly, they can implement proper recycling into their daily lives. If a student knows how to recycle properly, then they would consciously have to practice improper waste disposal for recycling contamination to occur. If we eliminate the primary problem of lack of education for every student, then the problem of recycling contamination should be greatly reduced. Recycling is a life skill that students should practice everyday and apply into their lives long-term. By teaching students how to recycle now, they are better set for independent futures. However, constraints that should be considered are the varying abilities and dedication students might have for actually learning the material presented. With no clear monitoring, it may be challenging for students to practice self-accountability in applying the knowledge they are taught consistently. Another constraint might be finding a way to effectively implement our presentation and effectively distribute it to all students. With our idea of including this educational section in new student orientations, it would require a rearrangement of other events and it may be difficult to find space for this one.

## Description of Solution

We are going to create an interactive presentation that actively engages students and educates them on recycling in an effective and enjoyable way. This presentation is intended to be distributed to residents through student leaders, like RAs in residence halls. In the presentation, we will teach students what recycling contamination is, why it is bad, how to properly dispose of waste, and include a game at the end to test knowledge. There will be slides summarizing the most important recycling guidelines. There will also be multiple slides covering common items that can and cannot be recycled. The presentation will include less text and appealing pictures in order to not be visually overwhelming. This will also make the slides easily reviewable and easy to process. In order to make the presentation fun and appealing, we will include lots of visuals and minimize excessive text to retain attention. We will also look to directly connect to UW students by mentioning UW specific issues and things that students can relate to. This includes UW statistics, UW visuals, and common UW specific waste. We will also make the presentation interactive by including checkpoints to check student knowledge. The checkpoint will be trivia on the proper disposal of various waste items. This will be good practice for students to implement into their daily lives.

# Product Features

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## Primary Features

**Recycling Education Content:** The primary feature of our presentation teaching proper recycling sorting. Our recycling curriculum will be designed to empower students with the knowledge and skills to practice proper waste sorting in their daily lives. The presentation will teach the criteria that waste must meet to be recyclable and common non recyclable items that are improperly disposed of. A variety of real life examples and scenarios will be included in order to engage authentic learning.

**Effects of Recycling Contamination:** Another primary feature of our presentation is teaching the effects of recycling contamination. This feature is aimed at giving students a deeper level of understanding of how their actions directly affect systems and environments. With this, we hope to create an incentive for students to want to practice recycling properly.

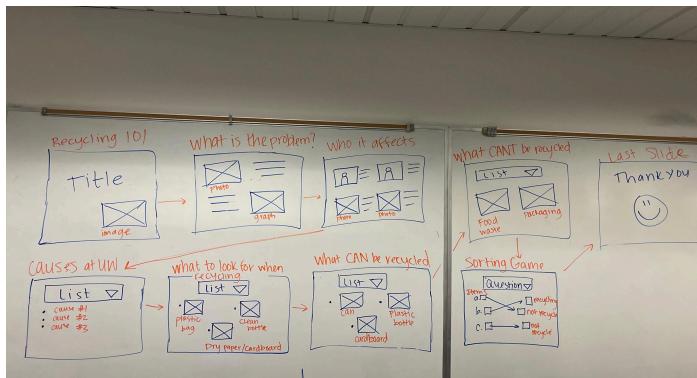
## Secondary Features

**Pictures:** A secondary feature we will incorporate into our presentation is visual imagery that helps the users better create their own image and understanding of not only the issue but in what ways they can assert themselves in what they can do to fix it.

**Quiz Slides:** Another feature we decided to put in are quiz slides. With any kind of presentation, it isn't just about making sure you can put out all the information possible. Making sure the user is understanding and having important takeaways is a big part of it too, and the way we will measure this is by incorporating quiz slides that lets us test the user and see what has been understood.

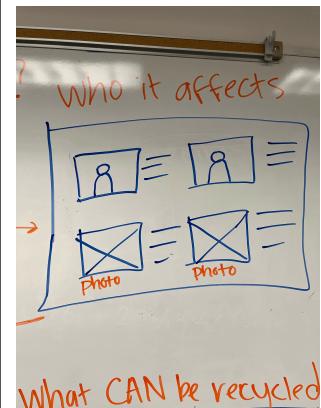
**UW Specific Items:** By adding in a slide of what you recycle and throw away but with UW specific items that users might come across, it helps them make connections to their specific situation, making their understanding stronger.

# Low Fidelity Wireframes

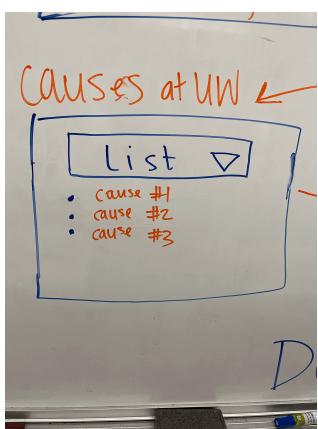


Final wireframes in full with arrows to demonstrate the flow of the presentation.

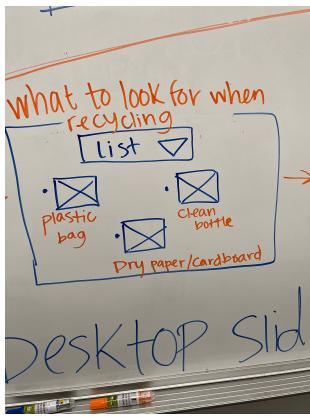
|  |  |
|--|--|
|  | This is just the title slide for our presentation so the users understand what they will be learning about in the presentation. The image will be a photo of students helping with recycling at uw   |
|  | In the first step in our presentation we want to describe recycling contamination, and how it is a problem. We will use graphs from UW Recycling and pictures to give statistics and help build ideas to help users visualize what is recycling contamination. |



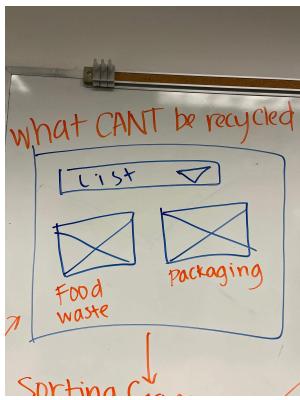
Now we want to show who it affects to further illustrate why uw students should care about recycling contamination. We will be using photos and user persona stories for visualization and for users to sympathize.



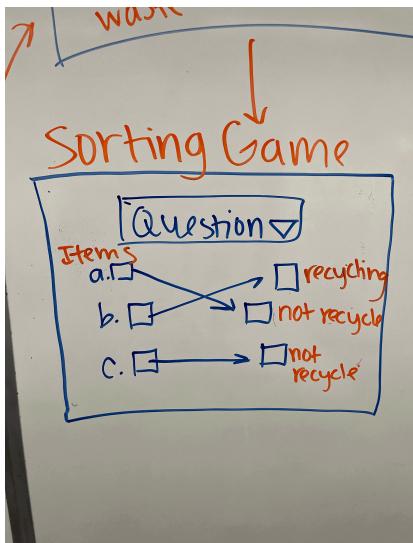
After establishing what the problem is, and who is being affected by it. We now will list the causes of the problem at uw. This list will factor in our prior user interviews, stakeholder interviews, surveys, and outside research conducted. The list will also include data and some visual representations like pie charts or graphs to back our claims.



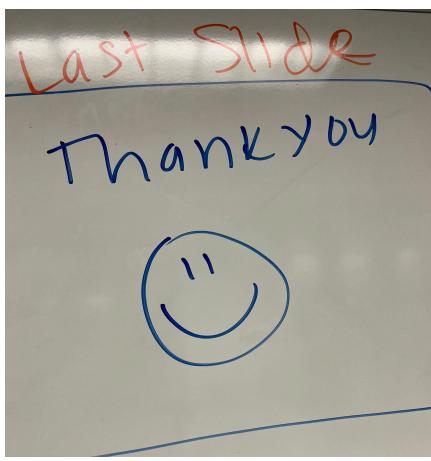
Here we want to clear up some misunderstood information about recycling here at UW that we found from our research. We will state what factors you need to consider when recycling like is the material clean? Is the material wet?, and is your recycling in a plastic bag?. This should help clear up these concepts that we have found people to struggle with at UW.



This slide will explain what can not be recycled with pictures of examples that we have found people struggle with from our surveys. We will include UW specific examples that occur frequently like a Pagliacci pizza box, or the brown to go boxes from dining halls. This should bring insight to common recycling questions asked by users.



Now that we know what to look for, we will test the users knowledge with a little sorting game. Users will volunteer to state whether the item is or is not recyclable and why. Incentives should be offered like UW merch or candy for users to engage with the activity more.



This will be our send off message. We will also include links for the UW disposable guide if people have more questions, the UW recycling page if people are interested in learning more about recycling, and the UW recycling instagram which is a good way to keep up to date on recycling news and guidelines at UW.

## Low-Fidelity Wireframing Stage

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Initially we had come up with a presentation style solution for this problem as the leading cause was being uninformed. Based on this initial solution, our low fidelity wireframes were an outline of our slides. Once we discussed this solution and got feedback, we were told our solution wasn't something users could come back to and was more of a one and done thing. With this we decided to change our solution into an app that would keep an informational aspect but make it more interactive as well. We made some revision to the original low-fidelity wireframes of the presentation to apply it on the app and get a better idea of how we wanted to structure the pages and built on those for our high-fidelity wireframes.

# Design Language / Style Guide

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## Font

The font we chose was Inter. We selected it because we believed it was professional and easy to read, making it so users with accessibility issues would be able to easily understand the text and use the app.

### Typeface

HELVETICA NEUE THIN

Abcde

HELVETICA NEUE LIGHT

Abcde

HELVETICA NEUE MEDIUM

Abcde

HELVETICA NEUE BOLD

Abcde

## Colors

The colors we chose were following a theme of green and white with black text. We selected these since green is most commonly associated with recycling and waste management, making the users connect the app with the garbage bins and other recycling content they might see on campus. We used white as a background in other sections of the app to make the black text standout and easy to read for the users.

### FINAL COLOR SCHEME



#4E4E4E



#77C697



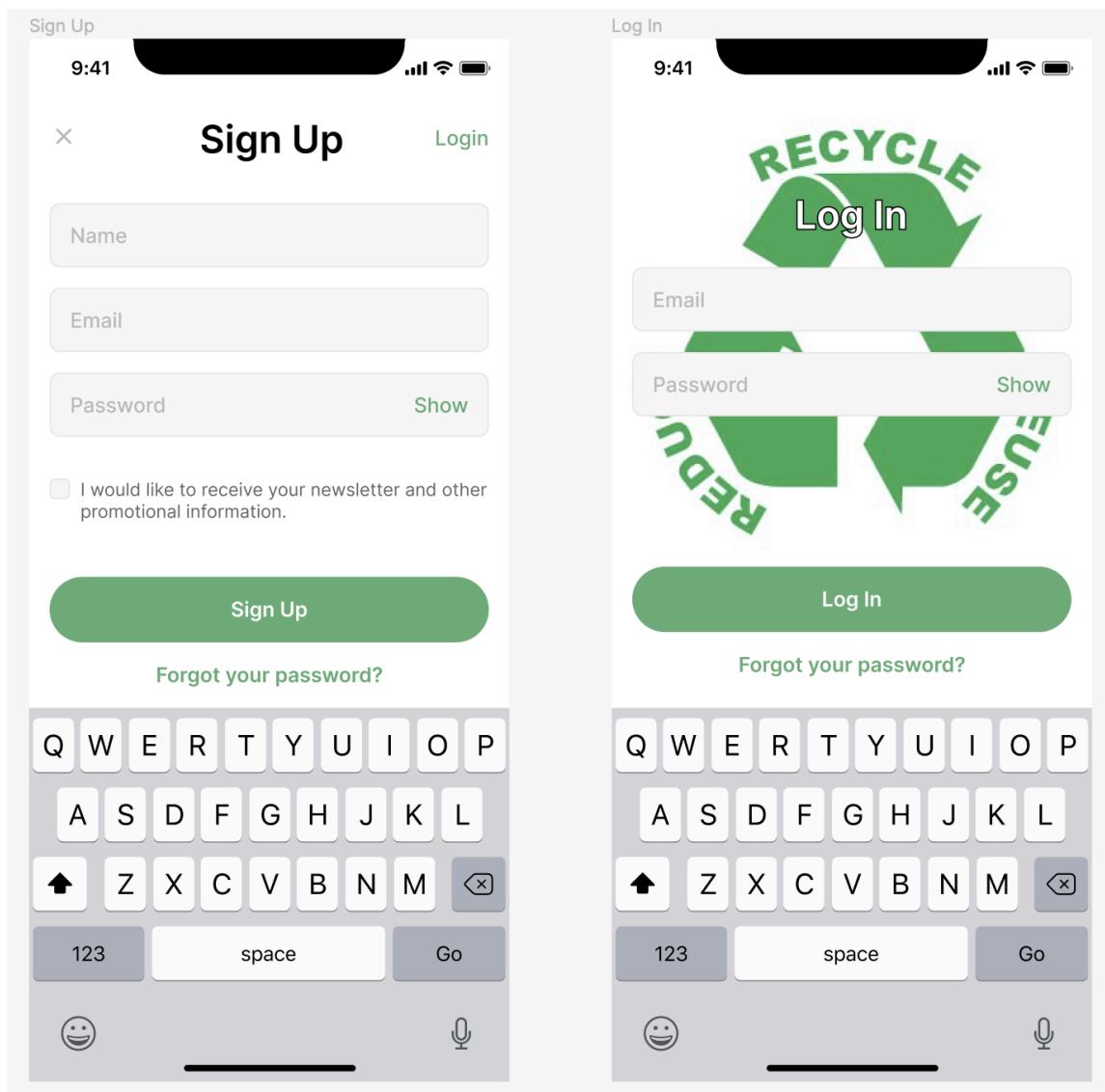
#FFFFFF

# High Fidelity Wireframes

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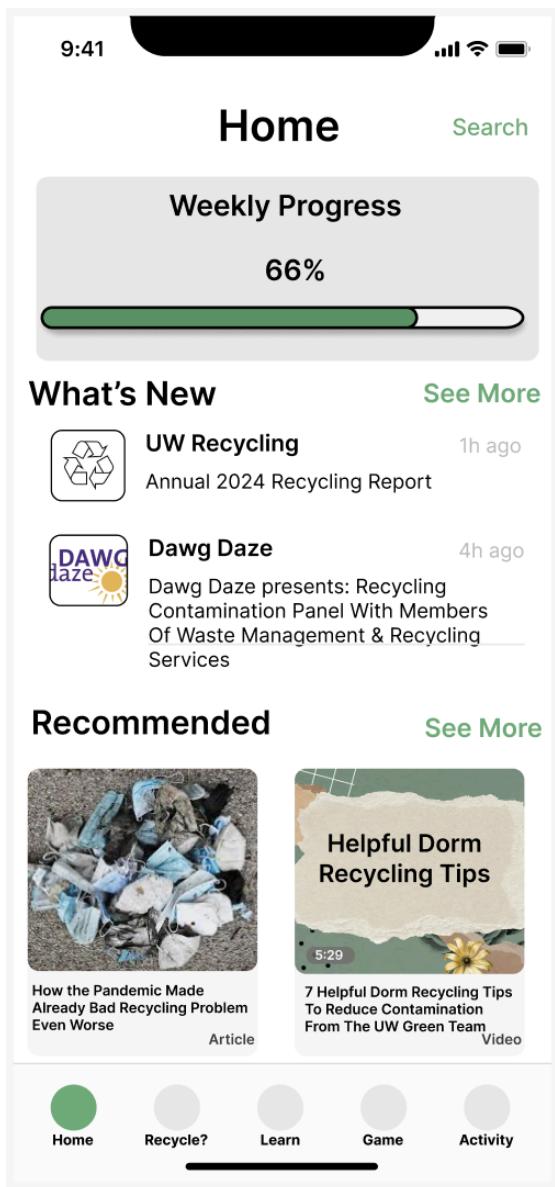
## Onboarding

Allows users to create an account to use the app or log in to an already existing account. The process is very simple, intuitive, and follows known sign-up conventions. All input boxes are labeled with signifiers to guide the user.



# Home

The home page is the main landing page for users when they encounter apps. The home page is the starting point of the app experience. Users first can see their progress bar regarding achievements for our game. Underneath is a section for the newest blog posts on recycling that users can catch up on. This is a way for users to stay up to date regarding recycling news. And below that would be a recommended section that we can promote certain things depending on circumstances. If we see an increase in recycling contamination we can push videos and articles regarding the issue with the recommended tab. We also have the green text on the Search and See More tabs. This green text acts as a signifier to users that an affordance of being able to click on the text is present.



## Recycle?

Users can click on the “Recycle?” tab at the bottom and will be taken to a search bar where they can type in the name of an item and see whether it should be recycled, composted, or trashed. Beneath the search bar, users will find a list of frequently searched items with those that are recyclable being indicated by a green star on the right side for quick identification. Users can also click on these items to instantly navigate to their respective pages, where disposal instructions will be provided along with an engaging fun fact about the item.

The image displays two screenshots of a mobile application interface. Both screenshots show a top navigation bar with a signal icon, battery level, and time (9:41). The left screenshot shows a list of items under the title "Items": Plastic Water Bottle, Cardboard Box, Glass Bottle, Paper Plates, Food Wrappers, and Paper Bags. Each item has a green star icon to its right. Below the list is a note: "★ Item can be Recycled". At the bottom are tabs for Home, Recycle? (highlighted with a green circle), Learn, Game, and Activity. The right screenshot shows a detailed view for "Plastic Water Bottle". It features two plastic water bottles. The text "Plastic Water Bottle ★" is displayed, followed by "Where to throw?: Recycling" and a "Fun Fact: It takes about 450 years just for one plastic bottle to break down in the ground!". A large green recycling symbol is centered below the text. At the bottom are tabs for Home, Recycle? (highlighted with a green circle), Learn, Game, and Activity.

# Learn

Page for users to access resources about recycling. Users can scroll through a variety of educational materials and choose which they would like to expand. This "Learn" database is always available for users to refer back to and is updated as needed.

The screenshots show the 'Learn' section of a mobile application. The top row displays two cards: 'Recycling Guidelines' and 'UW Recycling Process'. The bottom row displays two cards: 'UW Recycling Process' and 'Effects of Contamination'. Each card includes a video thumbnail, a brief description, and a 'Read More' button. The bottom of each screen shows a navigation bar with 'Home', 'Recycle?', 'Learn' (highlighted), 'Game', and 'Activity' buttons.

**Recycling Guidelines**

Watch on YouTube

- Empty, Clean, and Dry**  
Clean out recyclables and let them dry. No food or liquids in recycling.
- No Bags**  
Do not put plastic bags or plastic wrap in recycling, even if bundled. Keep materials...

**UW Recycling Process**

Watch on YouTube

This is a video of Recology's MRF in San Francisco. Their Seattle MRF operates in a similar way.

At the UW and in Seattle, most recyclables are put into the same recycling bin (something we call single-stream recycling). These items still need to be sorted before they can be processed, sold and...

**Effects of Contamination**

Watch on YouTube

These workers are fixing a broken machine at the MRF. What caused this issue?

Answer: People put plastic bags in the

**City of Seattle's Recycling List:**  
<https://www.seattle.gov/utilities/your-services/collection-and-disposal/where-does-it-go/a-z>

- Empty, Clean, and Dry**  
Clean out recyclables and let them dry. No food or liquids in recycling.
- No Bags**  
Do not put plastic bags or plastic wrap in recycling, even if bundled. Keep materials...
- 5 Types of Recyclables**
  - Paper - office, newspaper, magazines
  - Cardboard - paperboard, boxes
  - Plastic - bottles, containers, tubs
  - Glass - bottles, jars
  - Metal - aluminum, tin, scraps

**UW Recycling Process**

Watch on YouTube

This is a video of Recology's MRF in San Francisco. Their Seattle MRF operates in a similar way.

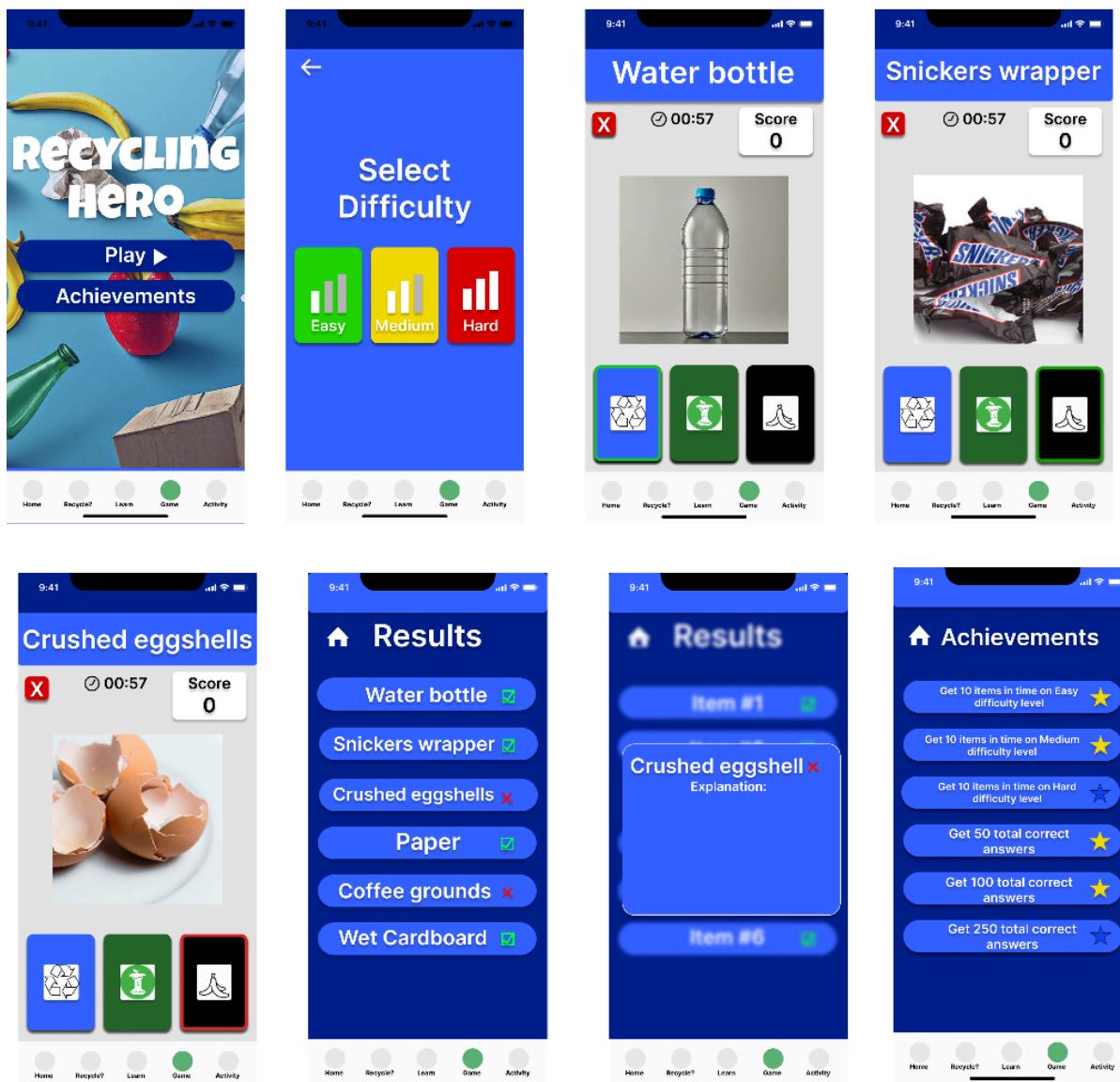
At the UW and in Seattle, most recyclables are put into the same recycling bin (something we call single-stream recycling). These items still need to be sorted before they can be processed, sold and converted into new material.

After the recycling is collected from campus, the material is taken to a Materials Recovery Facility (MRF). There, both people and machines sort out recycling into types of glass, metal, plastics, and paper. The sorted materials are then sold to plants and mills to be turned into new materials.

A diagram illustrating the recycling process. It shows a person holding a recycling bin, an arrow pointing down to a truck, and icons representing various recyclable materials (paper, plastic, metal, glass).

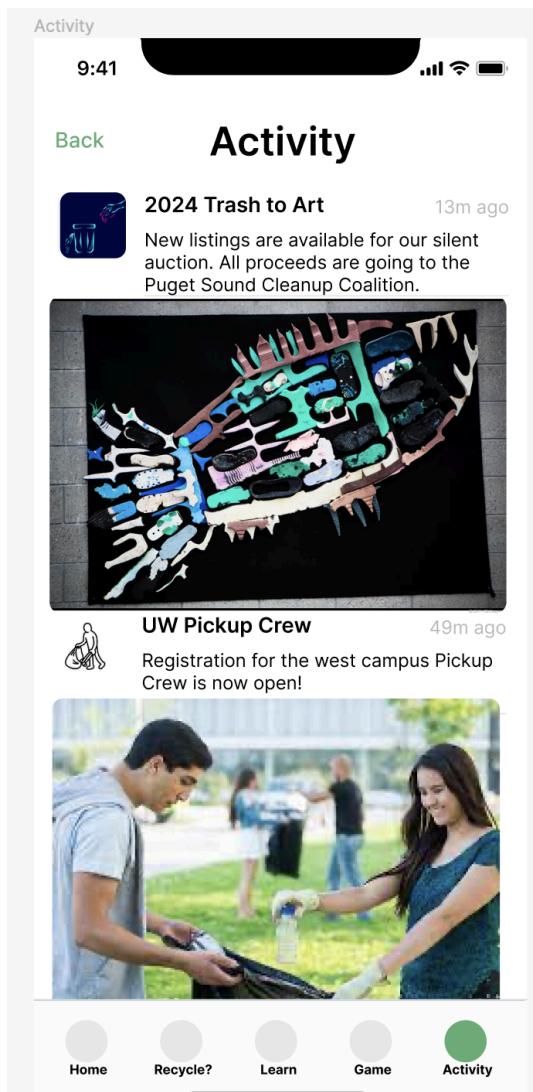
## Game

Users can click the "Game" tab at the bottom and will be taken to a game feature where they can play a game of different difficulties where they are given an image and name of a waste item and select whether it is considered recycle, compost, or trash. The goal of the game is to answer correctly and select where the given item should go, correct answers add to a users score while incorrect answers don't. At the end of the game, the users' results are shown and they are able to see all their correct and incorrect answers. By clicking on the item in the results, users can get an explanation of the correct answer. Ultimately, the game is designed to teach users about recycling by informing them on incorrect guesses. The game offers different levels of difficulty which change the items that are presented, as difficulty increases so does the ambiguity of the item.



## Activity

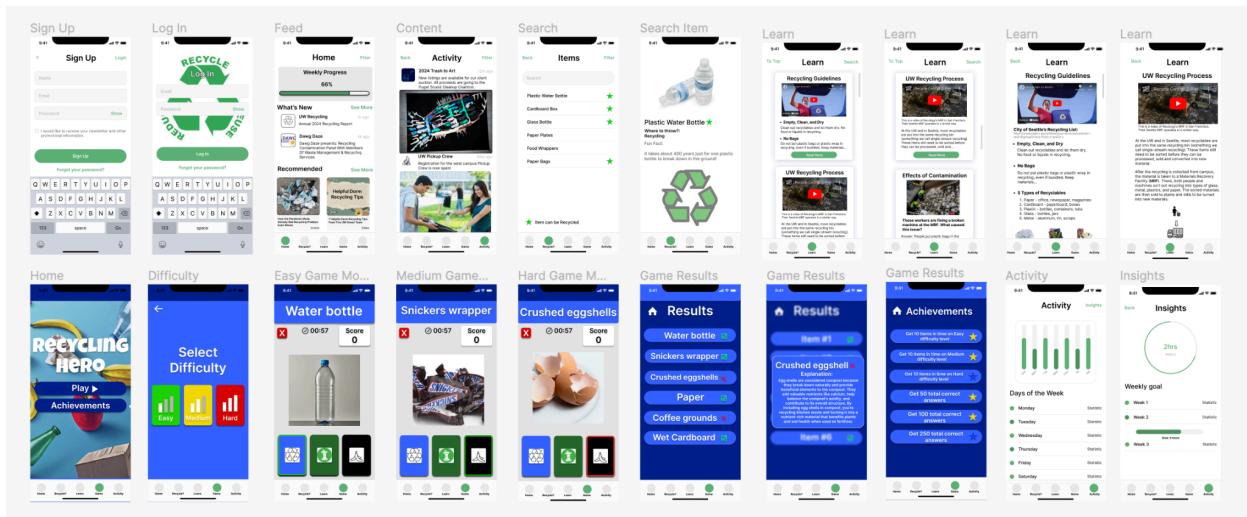
On the “Activity” tab we can see the latest activity on the app. With this tab users can scroll through posts on the timeline that is arranged chronologically. This would help keep users up to date on recycling guidelines, community outreach events for recycling, and overall news on recycling. The timeline format would be familiar to users and would be an efficient way to display information without the need for extensive searches or sifting through unrelated information. We also have a back button on the top left to bring you back to the home page or the user can use the tabs on the bottom to navigate through the app.



# Interactive Prototype

We used Figma to make our interactive prototype.

<https://www.figma.com/proto/n4S1iHrLqpRPCh7wESVvgx/Project-Final-Prototype?type=design&node-id=124-2588&t=SZ5Uv5b2DeH5w1Sw-1&scaling=min-zoom&page-id=124%3A2587&mode=design>



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[https://docs.google.com/forms/d/e/1FAIpQLSdmfVrk0dR9I1KRfd7yqFtahQa626VOHAxpPh\\_ZhkGWYrzTCA/viewform](https://docs.google.com/forms/d/e/1FAIpQLSdmfVrk0dR9I1KRfd7yqFtahQa626VOHAxpPh_ZhkGWYrzTCA/viewform)

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<https://www.seattle.gov/utilities/your-services/collection-and-disposal/where-does-it-go#/a-z>