Eat your greens

Degree Project for Bachelor of Fine Arts in Design

Elin Wahlqvist

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Eat your greens

An attempt at reducing postharvest waste at consumer level so that people eat their food not waste it.

Degree Project for Bachelor of Fine Arts in Design

Main field of study Industrial Design

From Lund University School of Industrial Design, Department of Design Sciences

Acknowledgments

I would like to thank my classmates for the constant feedback and support. Taking a break, having some coffee with you guys helped me refocus. I want to thank my brother for his guidance and advice on all the technical aspects, and his patience when explaining them to me. I want to thank Sandra for helping me get through the dips. I want to thank Charlotte for her honest helpful feedback.

Abstract

Why do people, to such a large extent, waste fruits and vegetables? In design, it's essential to develop systems and ways to help people help themselves make more sustainable choices. Interviews, surveys, and past research show that to reduce food waste, planning and storage are essential, as well as knowledge of fruits and vegetables. In a more globalized world, fewer people have this knowledge. The focus of this project is to bridge the knowledge gap entertainingly. So we eat our greens, not waste them.

Contents

SUSTAINABLE DEVELOPMENT GOALS

The SDGs were a starting point in figuring out what to do as a bachelor project.

What can I do to improve the society we live in?
What can I do to help reach the SDG? It was very overwhelming, so I kept sane by looking at more minor problems I could easier grasp.

Therefore I looked at something like consumption and food waste in Western society. These are still massive problems, but nevertheless something I have a relationship with and is easier to try to find some solutions to.

"If food waste were a country, it would be the third country in greenhouse gas emissions"- [1]

I kept looking into consumer waste specifically since this is the area in western countries where most waste is generated- [2]

Motivation

Swedish people are viewed as sustainable citizens by eating more vegetarian food, taking public transport, and recycling. But Swedish people consume clothes, electric appliances, and food in excess.

Håkan Witren, UN secretary in Sweden, said

"If everyone would live as Swedes do, it would require 4.2 globes" [3]

Some things we can stop consuming like clothes that can be borrowed, thrifted, and mended. Electronic appliances can be leased or borrowed. However, food is essential for human survival and health. To eat a more enviromentally sustainable diet, it's necessary to focus on a vegetarian or vegan diet with local seasonal foods [3]. This means understanding and appreciating vegetables and fruits. After finding statistics on food waste, I was shocked; this led me to want to work to reduce this waste. I looked into SDG.12.3. and chose to focus on post-production loss at the consumer level.
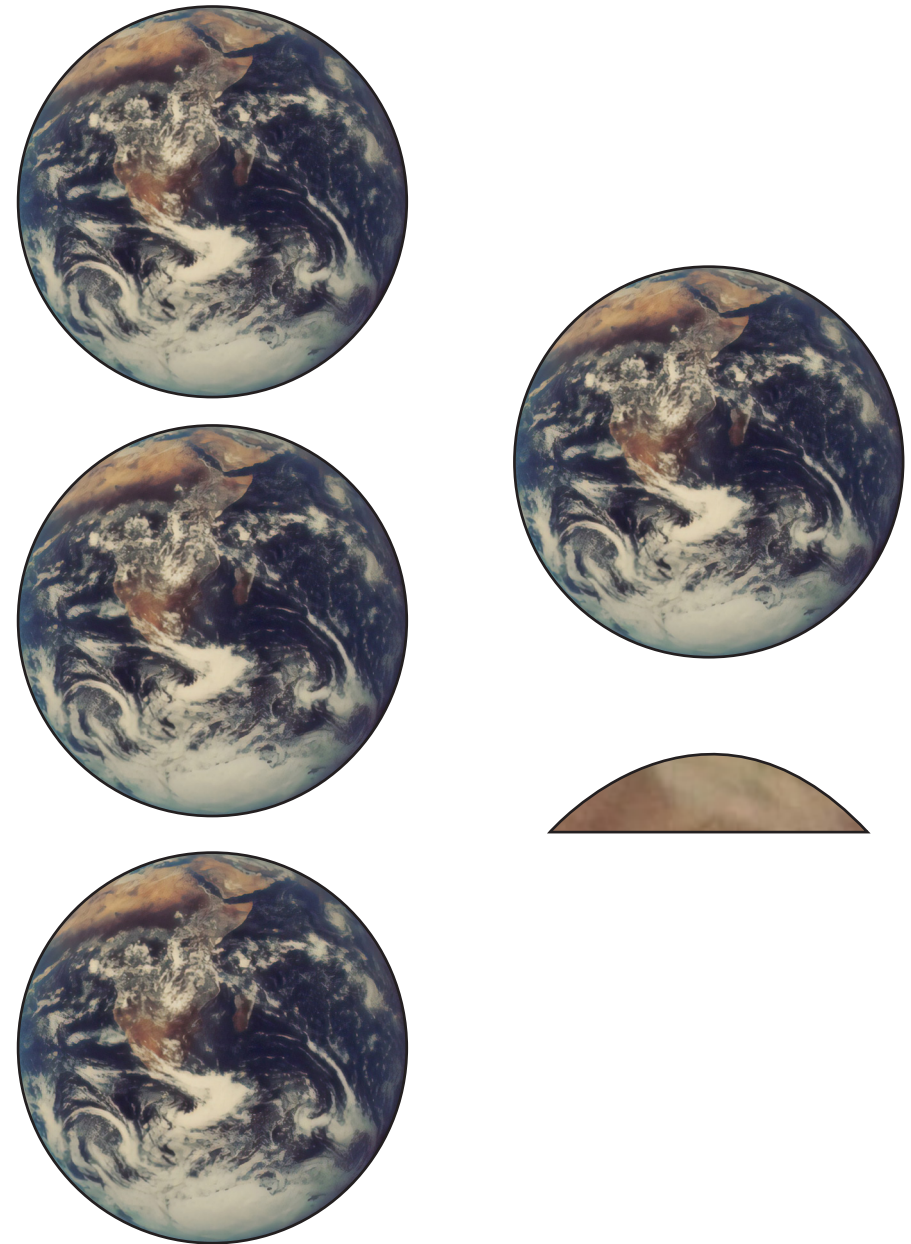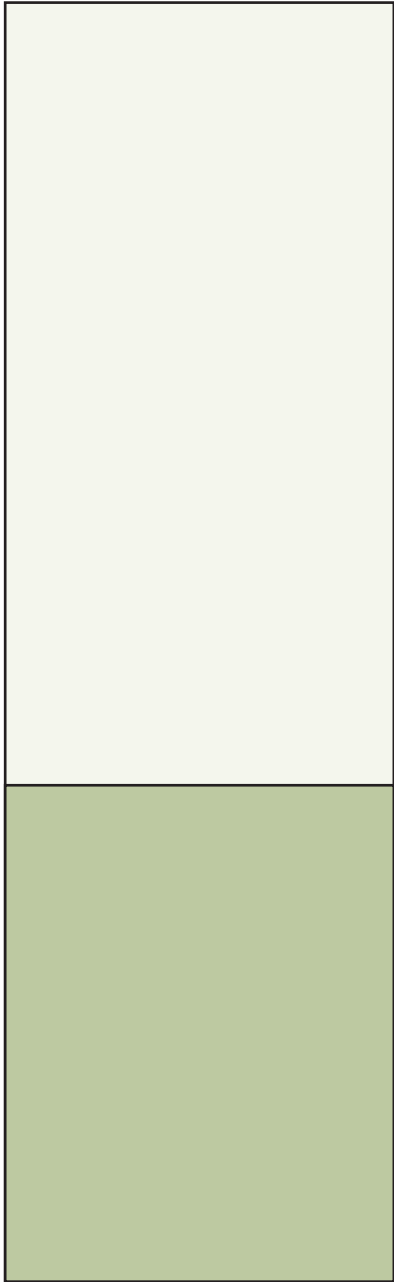
Picture 1: by NewYork Library

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

SDG 12.3:

By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.[4]

Food waste emissions are 4 times more than the travel industry- TooGoodToGo[5]

"The most wasted food is fruit and vegetables."- [7] Livsmedelsverket

29% of fresh fruit and vegetables purchased by households in the EU is wasted [6]

"In Sweden 71 % of the total waste occurs in the households"- TooGood-toGo [5]

Brief

Reduce post harvest loss of fruits and vegetables at a consumer level

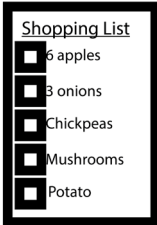The research is divided into several sections to give a deeper understanding of the problem in the various aspects
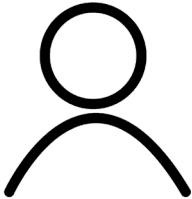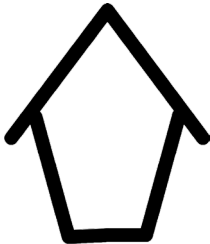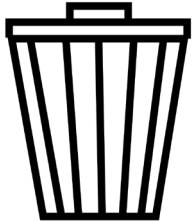
Consumer

Fruits and Vegetables

Shopping List
- ☐ 6 apples
- ☐ 3 onions
- ☐ Chickpeas
- ☐ Mushrooms
- ☐ Potato

Planning

Shopping

Home Storage

Throwing away

Consumer

Why do we eat fruits and vegetables?

Fruits and vegetables are staples in a vegetarian and vegan diet. This makes them an essential part of a sustainable diet. Something that is essential for the welfare of the earth. The consumption of fruit and vegetables is also important for health reasons. They improve cardiovascular health, lower high blood pressure, and lower cancer risk. [8,9,10]

The risk of cardiovascular disease is reduced by 4 % for each additional portion of fruit and vegetables, excluding potatoes and starchy root vegetables. The recommended intake is 500g, around half vegetables and half fruits. The best is leafy green vegetables. [9,10].

Consumer waste

In Sweden, consumers stand for most of the post-harvest food waste 71 % [5], which is why my project focuses on reducing consumer waste.

Young parents 18-29 waste the most food, likely due to their stressful lifestyle [5,11].

The most wasted food is perishable goods, including fruits and vegetables.
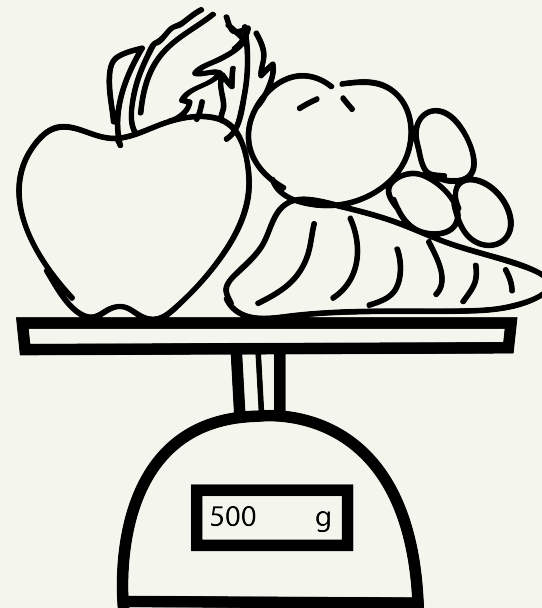
Why people don't eat fruits and vegetables

The taste and flavor of fruits and vegetables are the top reasons people buy fruits[12]. Taste is also one of the main reasons people throw away food.

It's very common for young children not to like the taste of vegetables, yet vital that they are consumed. Eating habits are formed in childhood, and flavors and preferences are determined by what the individual ate as a kid. This will then translate into what the kid buys and eats as an adult.

However, one study mentions using spices to improve the consumption of vegetables, something that applies to the necessary transition to more plant-based diets [16]. Using spices to make vegetables taste better might get individuals to consume more vegetables instead of throwing them away.

Picture 2: by Marion Botella

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Interviews: asking people on the street

Interviews were held in Sweden and English, with various agegroups, mostly 18-30, both group and individual. See interview questions in Appendix A.

The main questions in this section are why people throw away fruits and vegetables and why people buy fruits and vegetables.

Why do you think people throw away fruits and vegetables?

"Probably because they bought too much and **aren't able to eat it all**, I try to really save the fruit unless it really goes bad."

"Because they go bad most people don't keep it only for 7 days."

"I buy fruit and vegetables. I eat it up. It's easy for me because I live alone, so I only buy what I eat."

What information would you consider important to reduce fruit and vegetable waste?

"What I do is I buy something. I think I'm gonna use then I don't use it, and I look at it, and I'm like umm I don't know whether it's good or bad, and because I'm squeamish I'm like I don't want to eat anything that's bad. So more information on how to notice something has gone bad or good. For example, you have vegetables that are hard that you can just cut the bad part out, and it's fine to eat, then you have the ones with a lot of liquid that you aren't supposed to eat if it gone bad because it has too much liquid in it. When can you eat something that's maybe not top-notch but still doable?"

"The only way to reduce waste is to learn how to store them"

Do you know how to store fruit and vegetables?

"Confident, I'd say like a six out of ten like I know how to store them, I'd say, but I don't have the means right now, and I'm not at that stage of my life where I want to spend a lot of money on proper containers, but I am aware of it, and in the future when I'm on my own I would do it."

"Sometimes I search the information on the internet."

"I just throw them all in the fridge."

Reflection

People don't generally know how to store F&V

People store F&V too long

People are squeamish over changes in F&V.

Vitamin content and taste affected the choice of F&V.

Storage is more difficult in some living situations

"I try and buy seasonally and locally but have a hard time storing things the correct way due to my small living space."

"I buy fruits and vegetables to be healthy like avocado for healthy fats and oranges for vitamin C."

" Consumers have specific expectations of the texture and texture defects often result in the rejection of fresh produce." [12]

What if our expectations lead to more food waste because we think a ripe fruit is spoiled?

Picture 3: by Jaqueline brandwayn

I wanted to see consumers' apprehension on visual aspects of fruit and vegetables when eating. I used some information and pictures from the website:https://www.eatortoss.com/

Picture 4: byEat or Toss.com

Picture 5: byEat or Toss.com

Picture 6 byEat or Toss.com

Picture 7: byEat or Toss.com

Would you eat these?
Survey and interviews held, 30 participants

The Goal of the Interview:

- Awareness of edible F&V

- Storage behavior

- Eating behavior

- To see how aware people are of when fruits and vegetables are safe to eat or not.

Participants are people in the IKDC building as well as acquaintances online. The Interview includes questions, then shows pictures of fruits and vegetables with either natural damage or inedible unsafe damage.(See Appendix B)

While viewing the pictures of fruits and vegetables, participants were asked if they would eat them or not.

Quickly asked questions are used to replicate quicker thinking and how people make food-related decisions.

When looking at the responses, I found that people were skeptical; in almost every fruit option that was unsafe to eat, someone would eat it. Some people said they would not eat it in the scenarios that were safe to eat.

My theory is that people who are not accustomed to particular fruit like avocados and other tropical fruit in Sweden are less sure about whether it's safe or not to eat. But as Sweden becomes more globalized, more types of food and different cultures of people will exist within Sweden. How do we teach people to store and eat their fruits and vegetables correctly?

Mango, when ripe, is relatively soft, yet some people eat it at its hard stage—making it less sweet and less flavorful. It will not taste as good, and since taste makes people throw away food, it's a shame to see people eat fruit and vegetables incorrectly.

How do we make decisions?

Over 200 food related choices are made by an individual each day,[13]
How do we make all these decisions?

Behavioral Economics: how to change peoples behavior

System 1 vs. System 2

Picture 8: by Andrew Hutchings
Picture 9: by no revisions

Systems 1 and 2 are how our mind works when making decisions.

The organization WRAP.org explains system 1 as the auto setting on camera where we don't know what's happening, but it works automatically. [11] This doesn't require as much energy; therefore is used the majority of the time.

System 2 is the analytical thinking when we make a larger decision; this way of thinking requires more energy. This way is how we learn things. [11]

Reciprocity

Picture 10: by Charles Delvuvio

Reciprocity is returning the favor. People feel the need to give something back when people have done something for them. Many shops offer complimentary tea or coffee. People are more likely to buy something when they are offered complimentary tea or coffee.

Anchoring

FRESH ALL WEEK

Picture 11: by Etienne Girardet

Anchoring uses the first piece of information to explain the following scenario. The prices of t-shirts illustrate this concept. When you first go into an expensive store and see a t-shirt for 3000 sek, it seems cheap when compared to another store selling a t-shirt for 7500 sek. In this example, people assume the vegetables are fresh all week because the text says so and people anchor to this.

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We make over 200 food-related decisions every day [13]. We use system 1 since it requires less effort; however, we are more prone to implicit biases.

To change people's behavior, I must be aware of how people make decisions. Creating a product where system 1 is in focus would support the way people make decisions.

To teach people, System 2 can be used, which might make people learn something so well they don't need to think about it anymore, so then it becomes a habit and we have moved from system 2 to system 1.
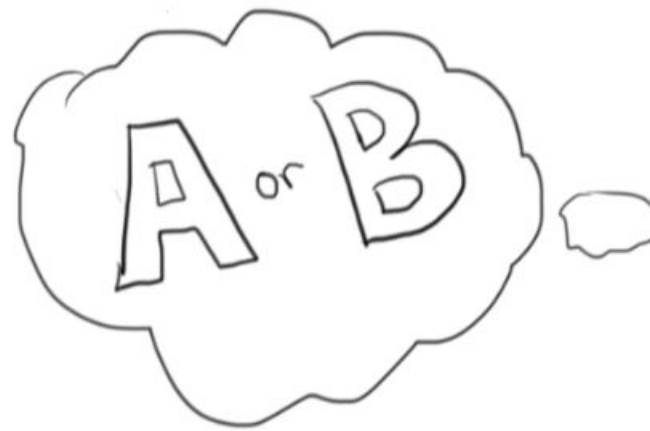
Food waste as a bad habit

Looking at the negative food waste behaviors as bad habits. I looked to addictive behaviors such as smoking and systems to change those behaviors. One method found was "psychologists Carlo DiClemente, Ph.D., and James O. Prochaska, Ph.D., identified five stages of change, which became a cornerstone of a Transtheoretical Model of Change. These stages include:

- Contemplation

- Preparation

- Action

- Maintenance

In the contemplation stage, people would respond to education in the subject. The preparation stage is seeking a plan of action. Action and maintenance actively change their behavior.

Important ingredients of change

- Behavior change requires a willingness to change. Proper incentives to change are necessary.

- Social support helps support change.

- Rewarding good behavior.

- Good to put the unhealthy behavior in a context, both self context :what type of person you see yourself as and how the negative behaviors don't align with the desired version of yourself.

- How does that negative behavior affect other people or the environment?[14]

Target group

- Makes their own shopping choices
- Trying to be a good adult
- Councious of the enviroment
- Is not aware what to do to be more enviromentally friendly
- Digital savy
- Always carrying a phone
- Google as personal advisor

18-29-year-olds without kids

18-29-year-olds are the target group since they start learning how to be an adult. They buy food for themselves, eat their food, and have responsibility for their consumption and eating habits. They are eager to learn how to do things the right way.

"It is hard to know what choices help the enviro-ment"[5]

Picture 12: Eliot Reyna

Fruit and Vegetables

Fruit and vegetables are a source of minerals, fibers, and vitamins. They are an essential part of our diet. We have discussed why fruits and vegetables are necessary to consume.

But why do vegetables and fruits go bad? Perishability, storage, and consumption are important. This section will focus on perishability with a bit of storage.
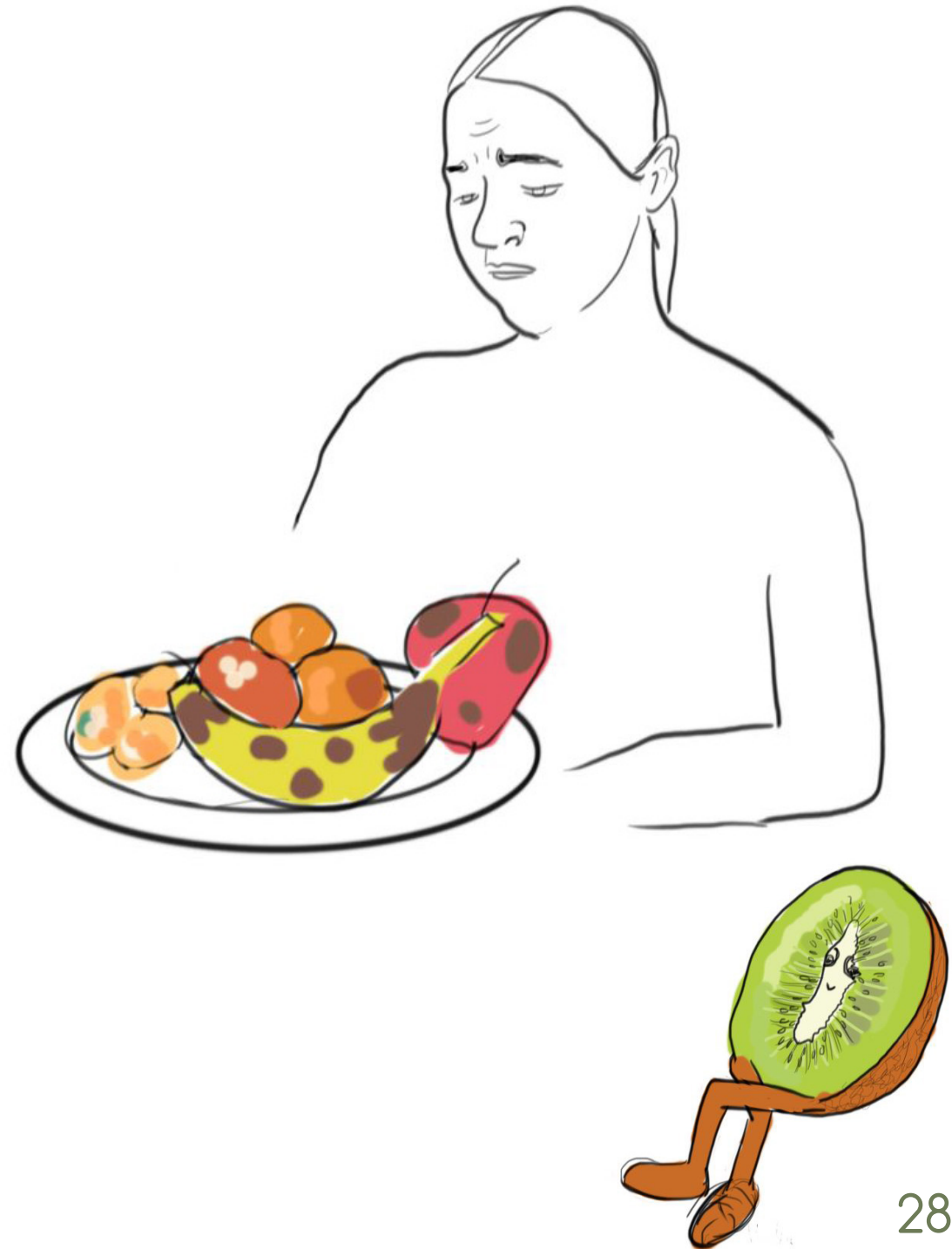
Fruit and vegetable perishability

To understand why users throw away fruits and vegetables, I need to know why fruits and vegetables go bad. Therefore it is essential to understand their perishability.

Picture 13: byNancy-Hughes
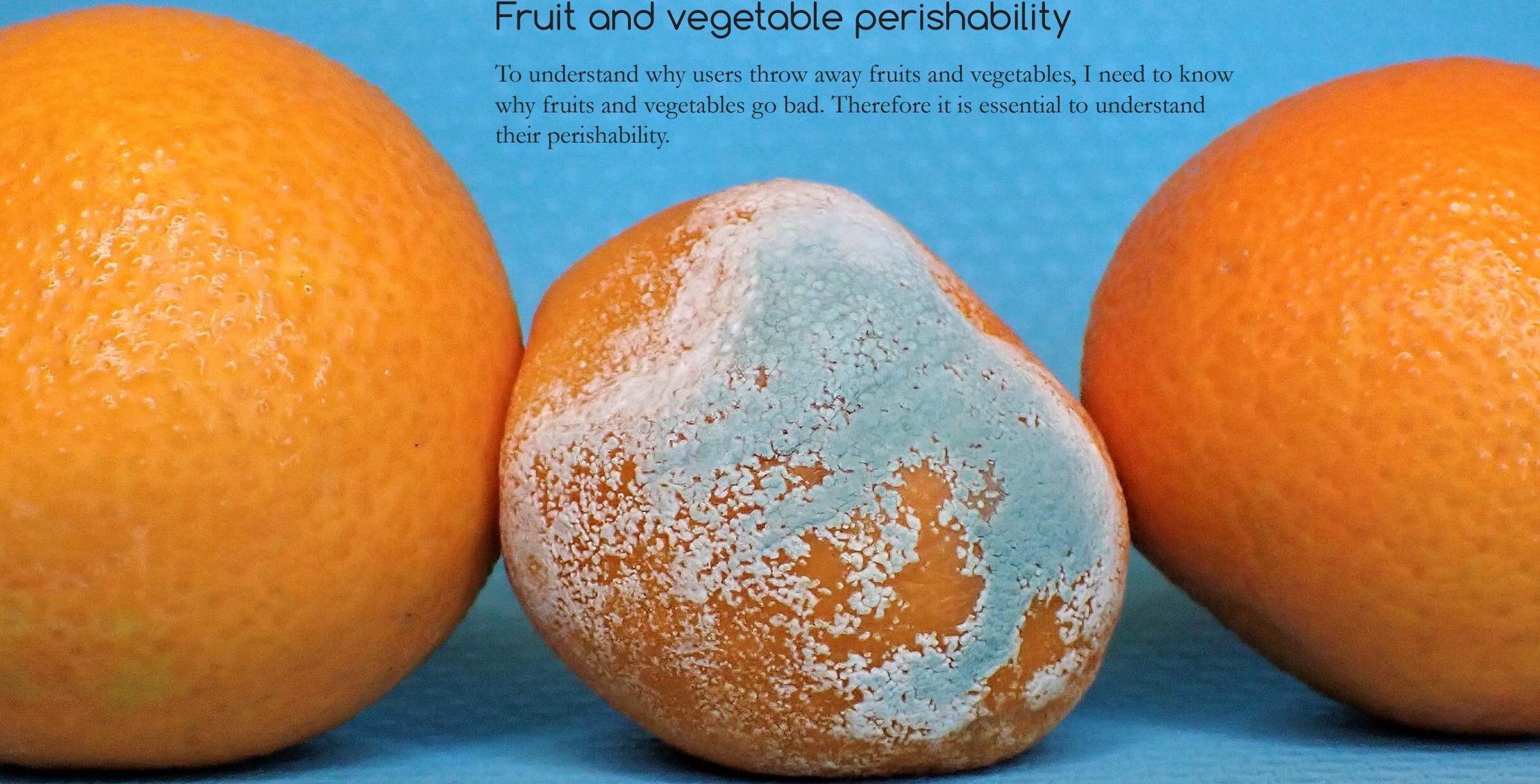
Fruits and Vegetables Breathe

Vegetables and fruits breathe in oxygen and out carbon dioxide. Oxygen depletion can lead to the rotting of fruit and vegetables. But it can also be used to preserve fruits and vegetables by preventing ripening resulting in longer storability. [15]

The perishability of fruits and vegetables is caused partly by their high water content. "All fruits and vegetables are vulnerable to dehydration, mechanical injury, environmental stress and pathological breakdown due to high moisture content, rich in nutrients and active metabolisms" [17]

People generally separate fruits and vegetables into two groups to facilitate understanding of their perishability; non-climacteric and climacteric.

Respiration levels, exposure to ethylene gas, chilling injury, and bruising affect the storability of fruits and vegetables. The higher the respiration, the lower the storability. Respiration rate is the rate at which water leaves the fruit or vegetable. Loss of water causes shriveling, wilting, flaccid appearance, and soft texture. This loss of water is why many vegetables have increased storability when stored in water, for example, asparagus.

Ethylene gas is a gas that many fruits and vegetables emit as they are ripening; however, some fruits and vegetables are sensitive to this gas, which may cause uneven ripening or yellowing, such as in broccoli and cucumber.[15]

Storability is the number of days it lasts when stored.

Most fruits and vegetables are stored in the fridge; however, for some fruits and vegetables, this causes chilling injury affecting the storability by ripening unevenly, not ripening at all, or leading to bacteria growth. A bruised fruit or vegetable creates a breeding ground for bacteria and yeast at the injured site. Many handling bruises can change the appearance and storability of fruits and vegetables. The softer fruit and vegetable, the more susceptible to bruising. Bruising occurs in all stages of post-harvest handling. [18]

The perishability of fruits and vegetables causes the producers to focus on variants that have great storability rather than great flavor.[12] It is essential to buy in season and buy locally for the best storability and flavor. This is a crucial aspect for consumers to understand.

Climacteric fruit

- Climacteric fruit is picked when unripe and ripens after its been picked.

- A ripe fruit is more sensitive to bruising and damage therefore picking it when its unripe makes it more durable

- Some ripe fruits and vegetables only last for some days so we can let the fruit ripen at home and eat it at optimal ripeness

- Increased ethylene production when ripening

- More sensitive to spoilage by mold yeast and bacteria

- Continue to develop flavor and become sweeter by turning starch into sugar

- Example: Plums, kiwi, cantaloupe, pears are examples of climacteric fruit.

[17][15][12]

Bruise like a peach

Non Climacteric fruit

- Non Climacteric fruits do not ripen after picked

- Since ripe fruit has shorter storability they generally have less storability since they need to be picked close to ripeness.

- They often require more packaging to protect the ripe fruit. Cucumbers plastic protects from oxygen and water loss.

- Strawberries, raspberries, blueberries generally are in a box or plastic container.

- Need to be picked closer to full maturity

- Respiration rate decreases over time

- Cherries, grapes, raspberries, cucumbers, watermelon are examples of non climacteric fruit.

[17][15][12]

Don't pick me, Im not ripe yet

Storing

Every fruit and vegetable has specific temperatures, humidity levels and light level etc, where storability is best. This means that some storage options aren't possible, and compromises are necessary. This compromised condition may lead to lower storability in fruits and vegetables. [12][15][18]

However, the best storage is no storage, and we should aim to buy fruits and vegetables to eat them, not to store them.

The longer something is stored, the worse the flavor and nutritional value.[18]

When storing, it's important to consider ethylene sensitivity and placement next to possible ethylene releasers. To store properly, one must see what they have and regularly check their fruit and vegetables.

For example, when one grape is rotting, it's essential to remove it from the others so that they don't also rot.

Some fruits and vegetables can be stored in the fridge but only for a short time.

Most fruit and vegetable, when cut, should always be stored in the fridge.

Generally, tropical fruits are more prone to chilling injuries; therefore should not be stored in the fridge.

Tomatoes can be stored in the fridge however should only be kept there for a limited time for optimal taste.

Storage life is longer than flavor life; it's essential to eat them at their prime for fruit and vegetables to taste the best and be healthiest. The flavor and nutritional value of fruits and vegetables decline before storage life.

The development of packaging has helped extend the shelf life of fruits and vegetables. By protecting them from bruising, water loss, and oxygen.

Packaging existing today

"Packaging has four primary functions containment, protection, convenience and communication." [15] Today there are a lot of packaging technologies. There is a nano coating on fruits and vegetables that protects them from oxygen and water loss while changing color of the coating to indicate ripeness the change in the ph when its ripe. [17]

Some packaging like on cucumber is essential for storability since the product would have extremely low storability if not for the packaging. If fruits and vegetables were to be made for taste rather than storability packaging becomes all the more important.

Packaging is considered a waste of material in a lot of contexts. It's weighing how well it increases shelf life vs. material wasted. Theoretically if the material protecting the fruit was somehow returned to the store it might reduce the environmental impact of packaging..

"Packaging should be considered an ingredient"[15]

Packaging is also a way to preselect the number of fruits and vegetables which might make people buy more than they eat inevitably wasting it.[19]

Picture 18: by Charles Deluvio taken from unsplash

Planning

Proper planning and correct storage are essential for limiting food waste-Livsmedelsverket [7]

Good planning behavior

The organization WRAP highlights some good planning behavior. [11]

- Inventory of food
- Meal plan based on scraps
- Planning to eat leftovers
- Writing shopping list
- Bringing food with you
- Prepping healthy snacks
- Finish what you have before buying more
- Have essentials at home

Barriers to good planning

Most people don't have the intention of having poor planning, but because of their lifestyle and daily stress, planning doesn't become a priority. WRAP organization study found that during covid, people wasted less food because they had to plan out their meals and purchases using what they had at home to a more significant degree. This waste increased, however, when lockdown ceased.

How often people plan

People plan their meals differently; some write meal plans every week, some twice a week, some daily. When it comes to buying fruit and vegetables, the frequency of purchases also varied significantly from individual to individual; however, the more a person consumed, the more often they would buy—people who liked fruits and vegetables also impulse purchased at a higher frequency.

Planning systems

A lot of planning solutions exist. ICA, Willys, coop and more supermarket chains have their own planning app that can create shopping lists. Ica and coop also have recipes so that meal planning can be done through their apps.

WiLLY:S

- Can make shopping list
- Not automatically named shopping list
- Automatically divides parts of food
- List can be shared

ICA

- Bank ID log in
- Automatic name on shopping list
- Recipes can be added then ingredients automatically added
- Easy meal planning

coop

- Automatic shopping list name
- Whole recipe entered
- Added recipes found in shopping list
- Automatic removal

Shopping

We make over 200 food-related choices every day. Without time to analyze all grocery store decisions in the store, we take the first one we see. We choose the fruits and vegetables we always have, not thinking about the implications.

Frequency

People tend to shop for food once a week; however, some in the first interview mentioned shopping for fruits and vegetables several times a week, whereas others who didn't like fruits and vegetables bought them once a month or less.

For people who don't often eat fruits and vegetables, Livsmedelsverket recommends having frozen ones at home so they don't have to worry about storage life and can add them to a meal.

Supermarket Perspective

In supermarkets and farmers' markets, fruits and vegetables are displayed to sell rather than be stored correctly.[12] This leads to a shorter storability. However, achieving an optimal storage condition for fruits and vegetables would be complex and impossible. The displays are focused on selling. Impulse buys are what people consider to be a source of food waste.

Sale prices and easy-to-grab pre-packaged goods propel impulse buys.

To reduce fruit and vegetable waste in a store, a rapid turnover rate of produce is needed. This might support the idea of impulse buys. Instead, consumers should eat their impulse buys and see it as an inevitable and even good behavior.[12]

Negative Behaviors

Overbuying is not, however, good behavior. Overbuying can be caused by going to the store hungry and then basing your consumption on your current hunger level. Therefore consumption increases drastically. Making sure that people have a snack before buying food or when they aren't as hungry may be a solution.

Pre-packaged

- Making it difficult to buy a small number of items, people buy more than they need and end up wasting.

16⁹⁵
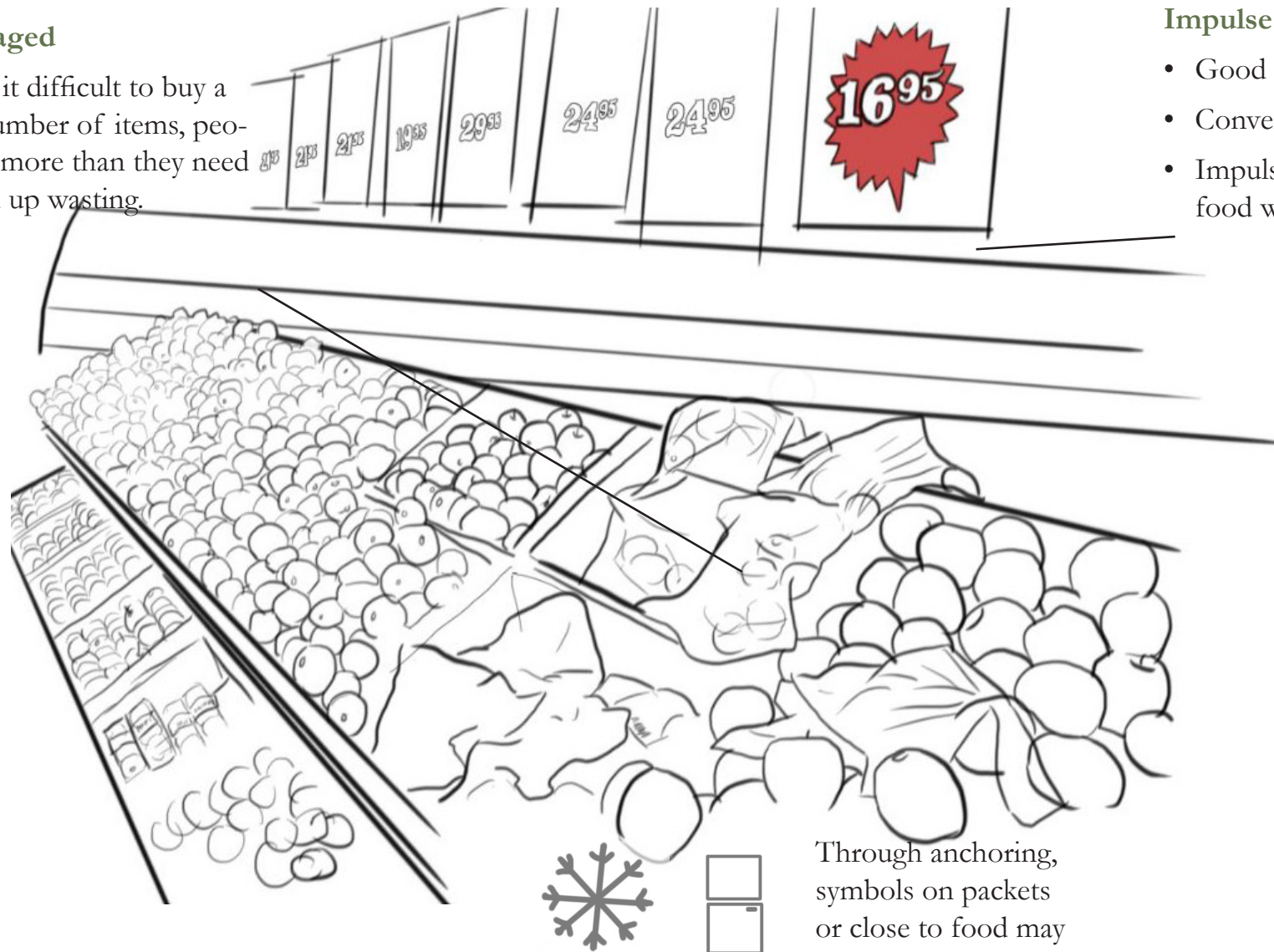
Impulse buys

- Good prices,
- Convenient packaging
- Impulse buys lead to higher food waste.

Through anchoring, symbols on packets or close to food may help the customer make good storing choices.

Plan,
Based on storability

Consumers should be aware of the storage life of different fruits and vegetables to plan what they buy and when. As well as how long they can store it safely and correctly.

Picture 19: by Veronika Koroleva

Home

"Home storage may be the most hazardous stage in the food production and delivery system."[15, p322]

After having bought food, as people return home, several things occur.

- Food storage at home

- Behavior around taking food with you

Storage systems

"It is difficult, if not impossible, to prepare foods so a careless or ignorant consumer cannot compromise safety" [15]. Most people in Sweden have access to a fridge, a freezer and some cabinets to store fruits and vegetables in.

"I throw them all in the fridge."

The most common way to store fruits and vegetables is to put them all in the fridge, which is not a bad idea if they aren't kept there for too long.

The fridge has storage departments for vegetables and fruits however are rarely used correctly.

People struggle with the visibility of their fruits and vegetables. They put a fruit or vegetable in the fridge or cabinet, and if it's not that visible, they forget they have it.

Some fridges indicate the expiration date of fruits and vegetables. However, this makes it a class question, those that can afford the expensive fridge have access to it. It also makes the fridge a quickly replaced object since newer, better AI quickly develops in an intelligent fridge, making it necessary to replace the refrigerator often to keep up with the development.

Picture20 by Christina Rumpf

Waste

In Sweden, people waste 1200kr of food/person/month[5]. A lot of effort, land, transport, and money goes into producing and transporting the fruit or vegetable to the consumer just for it to be thrown away.

Food waste is wasting edible elements of food that either was edible before it perished or is edible. Things like apple seeds are not considered edible and therefore are not food waste. However, some add this type of food waste into inedible food waste that is unavoidable for consumption.

Behaviors like throwing away the stem of broccoli or throwing away the peel of potatoes increase avoidable waste and waste of edible and healthy parts of the vegetables.

Market Analysis

Looking into organizations that try to reduce food waste.

Food waste is a big problem that requires several efforts to be successful. Here are some of the efforts;

WRAP.org

-One of the largest campaigns against food waste "Lovefood hate waste"

- UK based but spread around the world.

- Reports food waste behaviors

A-Z of food storage is part of their campaigns making sure that people store food correctly. Focusing on nudges and changing peoples attitude.

foodsavinglund | Meddelande | 👤✓

235 inlägg   466 följare   136 följer

Food Saving Lund
Ideell organisation
🌱 Reduce Food Waste 🌿🌳🌍
📍 Based in Lund, Skåne County
💡 Save Food. Potluck. Repeat 🍹🥑🥦
♻️ Sharing is caring 🤝🥕🍆🥔🥗🍲
📧 DM for ideas & partnerships 💬🙏🌐
youtu.be/PxIshpscpUE
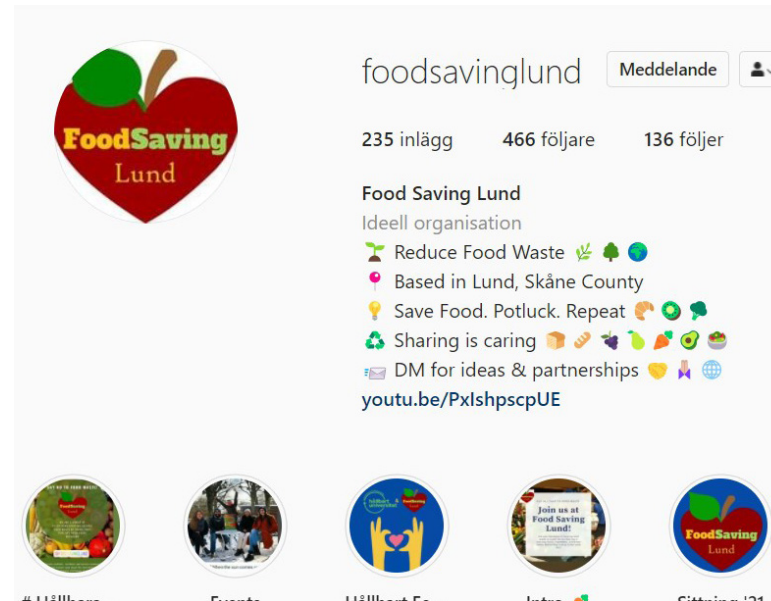
Food Saving Lund

- Volunteer driven organization to spread food waste awareness and pick up left over food and give out to its members.

- Spreads awareness through social media platforms

During interview with them they said

"I think a lot of people throw away fully edible parts such as broccoli stems or peels of different fruits and vegetables."
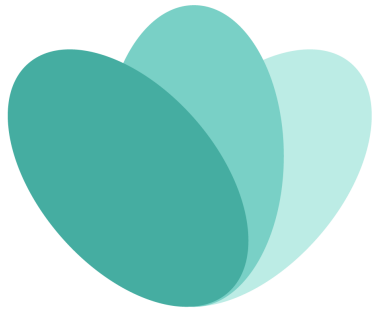
Too Good To Go

Too Good To Go

- Prevents resturant waste

- Spreads awareness through app and social media platforms

- Reports food waste and behaviors leading to it, MatsvinnRapport 2021

Livsmedelsverket

Most governments have their own organization or part of organization to limit food waste.

- Information

- Reporting behavior
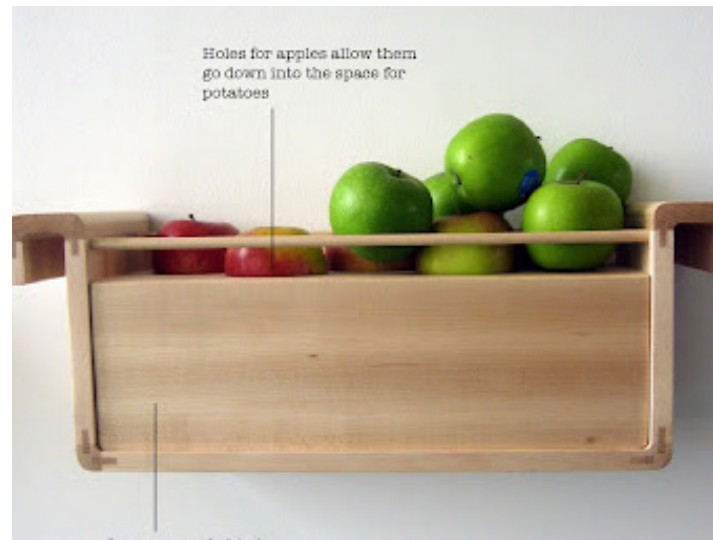
Save food from the fridge is a product range from Ji-hyun David that theorizes that showing our fruits and vegetables will go back to appretiating them. It does however only have space for 4 types of fruits and vegetables and sees the fridge as a negative storing space.

Ideation

Initial Ideas

Initial ideas were based on incentivizing three behaviors. Possible ideas to incentivize these included;

- Campaigns

- Storage solutions preventing bruising

- Storage solution as reminder to eat a fruit or vegetable

- Way to make fruits and vegetables visible in the freezer

- Information on when to eat fruits

- Planning systems

Picture 21 byMockup Graphics

1

Inventoring fruit and vegetable eating what you have at home

2

Knowing if something is good or bad smelling, looking and touching

Picture 22: by Darrien Staton

3

Storing fruit and vegetables correctly

Incentivising eating what you have at home

Behavior 1

figure 4

figure 3
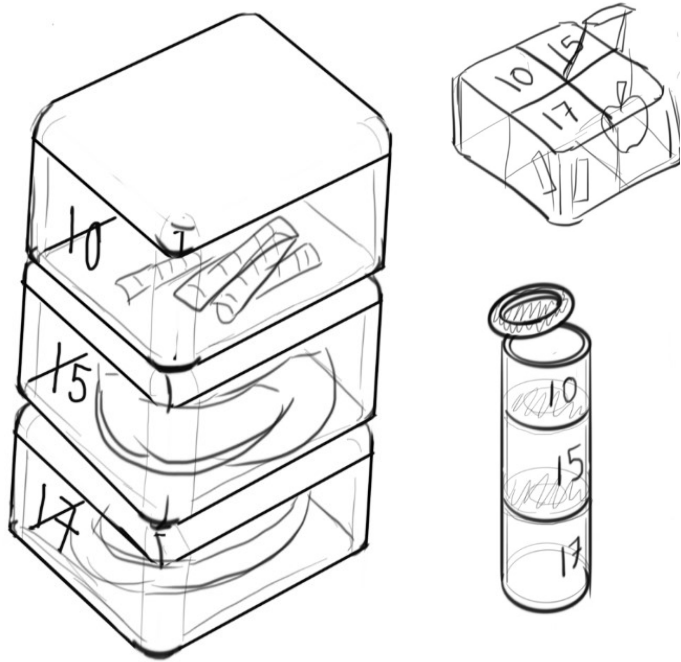
Inspiration: water bottles that have time on side.

What if lunch boxes had times on them and somehow fit together. Eating the fruit not wasting it means taking it with you therefore a way to bring it with you is explored.

- You could do the same thing with a lot of lunchboxes.

- Easier to just bring the fruit

+ Good for family outings
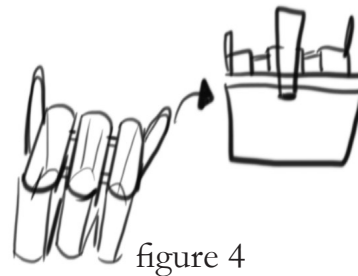
Figure 3 *built for a queen* is a more symbolic way of protecting fruits during travel with cushioning to prevent hitting sharp edges

- Not applicable to all fruits

Figure 4 is a shopping bag with several built in sections so that you buy less but organized

- There is not that much of a market for it many similar things exist
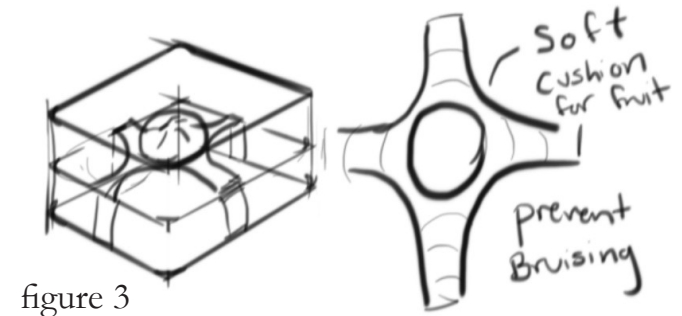
Reflection

I thought creating products that make it easy to bring things with you was necessary but a lot of storage containers already exist and for people to buy new containers just to have fruits and vegetables in is unecessary. I wanted to develop something that would be different.

Ways to incentivise behavior

Way to inform user

Picture 22: by Miguel a ...ution

Informing the user about their negative behaviors as well as educating them on the extent of the food waste and ways to prevent foodwaste in their household.

Behavior 1-3

-Very broad

Supermarket interventions
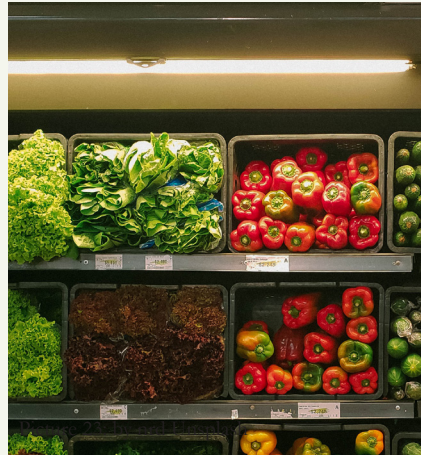
Preventing people from over-buying fruits and vegetables. logos or signs to help people understand how to properly store fruits and vegetables

Behavior 1-3

-People already have a lot of impressions from supermarket and might not be open to more

Fruit Subscription

Picture 24: bySara Scarp...

A subscription to a fruit and vegetable place. Could make sure the produce is seasonal, local and ecological. Could provide manual on how to take care of fruit and vegetable.

Behavior 3-storing correctly

- Exclusive makes information not accesible to all and requires a certain class.

Food sharing

Picture 25: by Elaine Casap

When buying too much food a platform to share food. A communal garden or a network of people or place to put food you no longer desire.

Behavior 1-Eating what you have.

-Requires maintanence and trust in other people. Might be scared about hygiene.
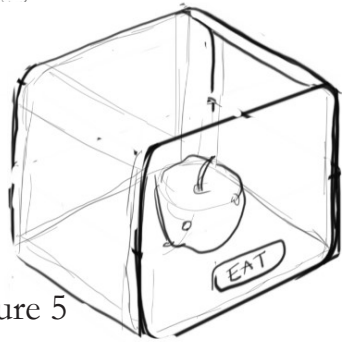
Figure 5

Figure 6

Figure 5 and 6 show examples of smart boxes that would indicate if the fruit or vegetable is safe to eat. Figure 5 shows a box where if someone is unsure they would place the produce in the box and get a response. Figure 6 shows storage option where it indicates the ripeness.

Fruit Subscription

Fruit subscription is not continued to develop since fruit and vegetable consumption is consumed in the correct amount majority by the higher class. I'm scared that making a fruit subscription service would create an even wider gap between the classes.

Food sharing

Food sharing, there is a lot of sevices that already gear towards this aswell as the hygienic aspect.

49

Way to inform- Campaign

Comparing eating vegetables to taking vitamin supplements that people rarely forget.

Focusing on how to get people to eat the fruit they buy, how do we place higher value on fruit.

How do I get people to eat the fruit they buy?

Supermarket interventions
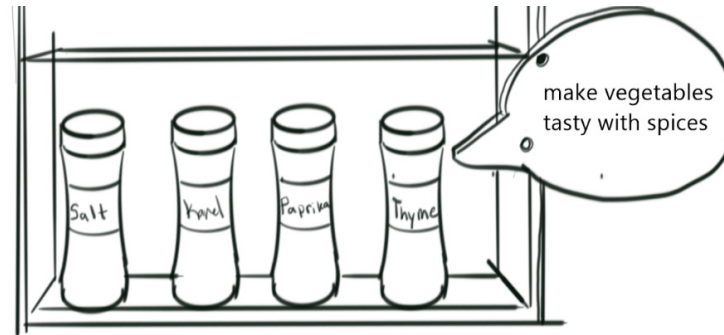
Figure 7

Figure 8

Incentivizing behavior 3- Storing correctly.

Figure 7 shows how a simplified version of how the produce should be stored. This simplified version should be near where it is bought.

- May be lost with too much other information

- A too simplified version may offer incorrect information

Incentivizing behavior 1- Eating what you have at home

Figure 8 shows a possible supermarket intervention that would be placed close to the spices reminding customers that spices and herbs are a way to improve the flavor of vegetables.

- Does not target the root of the problem (storage and planning)

51
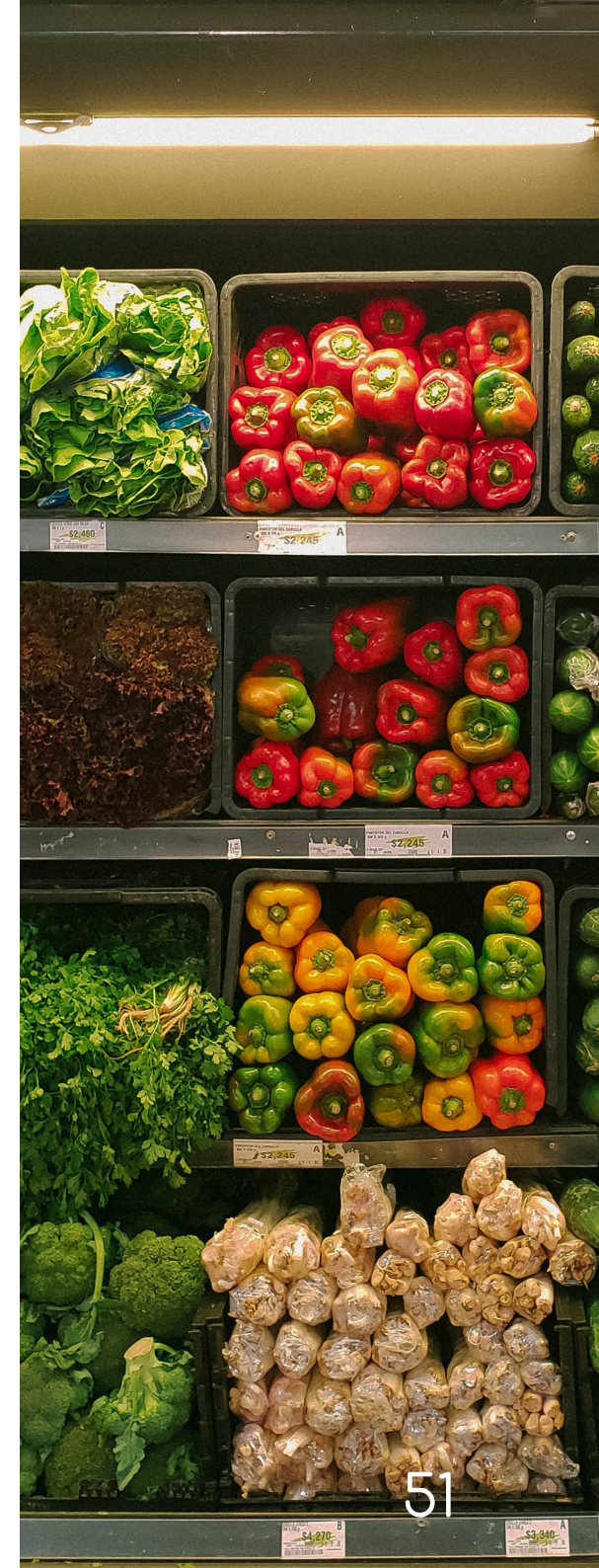
How can I teach people to store and eat fruit and vegetables correctly

In the age of information how do I educate people?

Book

- A lot of information
- Kept in one place
- Hard to find specific information
- Easier with google search

App

- Organize information
- Able to give notifications
- Track eating and wasting behaviors
- Give positive feedback to promote change in behavior
- Available on your phone
- Does not waste resources for print

Synthesis
Creating the App

Since I know nothing about creating an App or designing the layout I spent some time analyzing different apps seeing what I liked about them. I researched UX design and tested using Figma to understand the basics
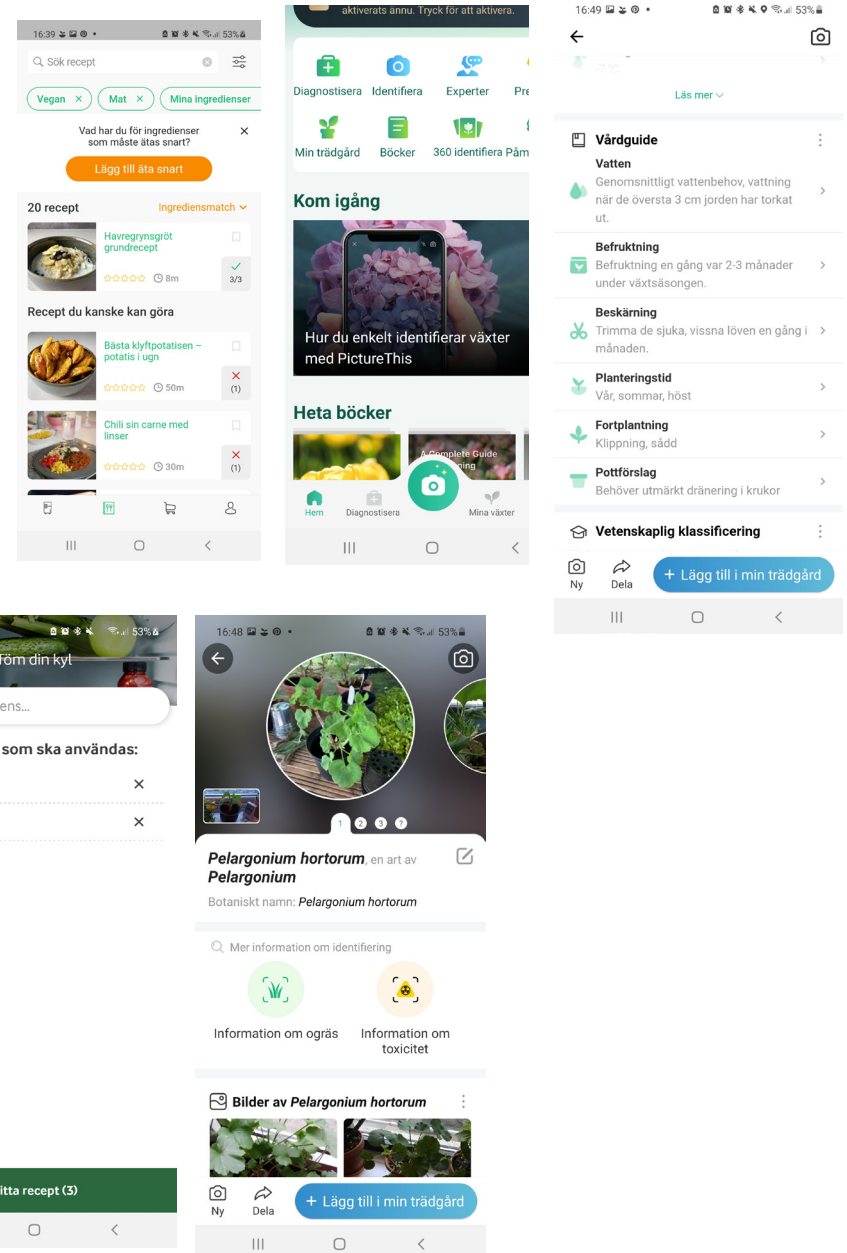
App inspiration
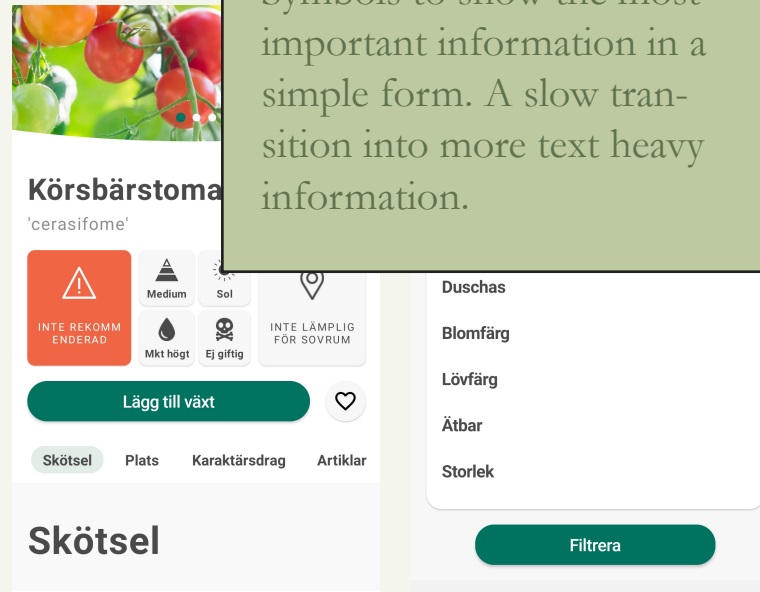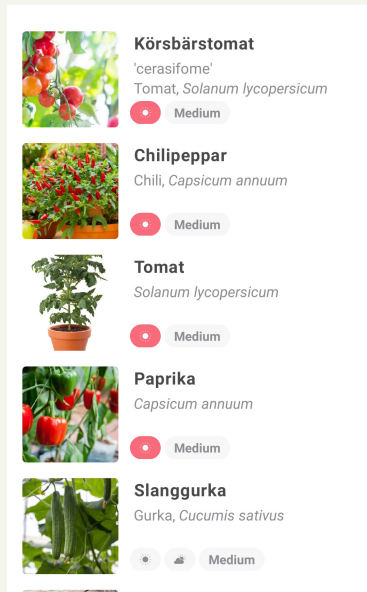
Symbols to show the most important information in a simple form. A slow transition into more text heavy information.
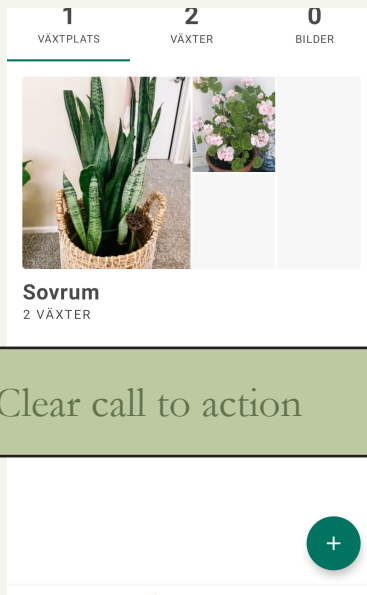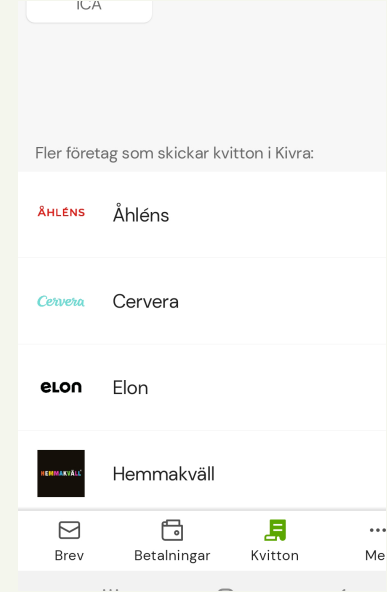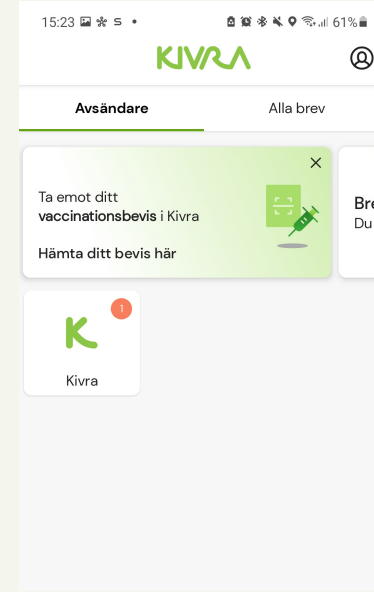
Clear call to action
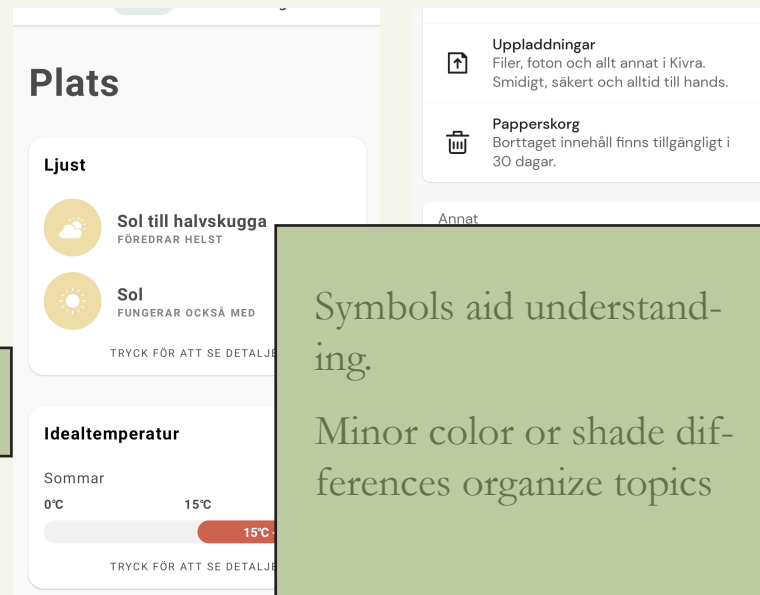
Symbols aid understanding.

Minor color or shade differences organize topics
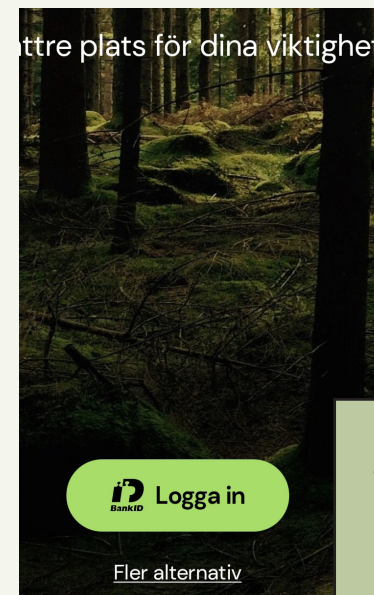
Transition into app

Calm entering
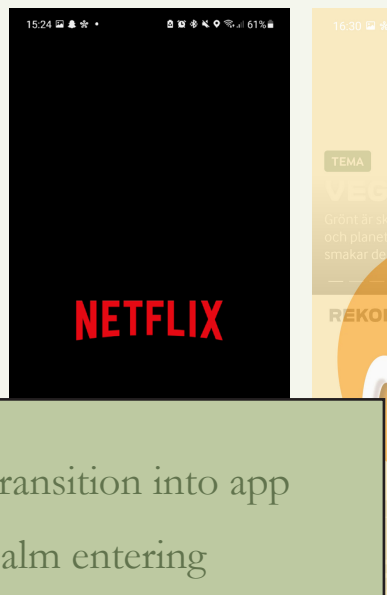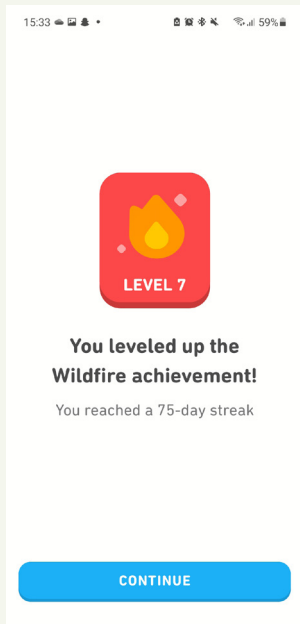
Achievements to continue motivating to learn

3D buttons to seem pressable

Behavior statistics

Reflection

Graphic design is a way to organize information to make people understand

Animations are important.

Gamification helps create interest and facilitate learning.

I have to start seeing graphic organization everywhere.

Small shadows help the organization.

Transitioning the user into information instead of showing all data at once.

Too much on one page is overwhelming.
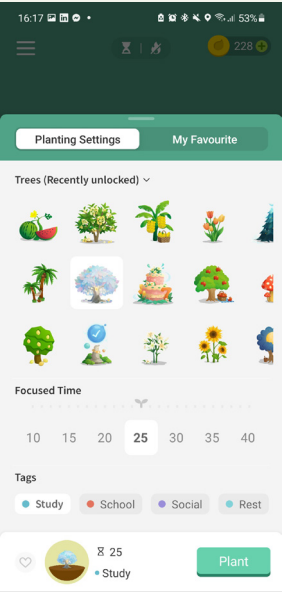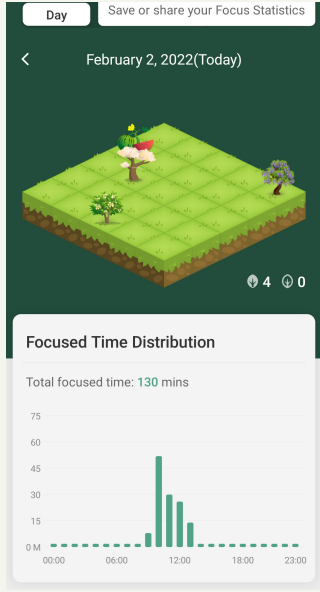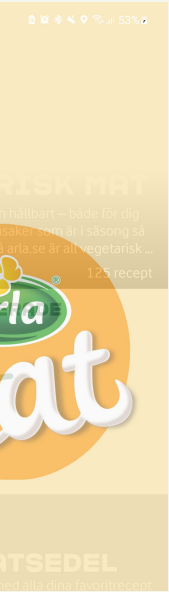
Content

When creating an app, it was necessary to outline the desired outcome, focusing mainly on the actions in the app.

- Storage information of fruits and vegetables

- Ability to add fruits, keeping track of when you should eat fruits and vegetables before they go bad.

- AI tells you if your fruit is good or bad from visual inspection.

- Motivational graphics, reminding to eat fruits and vegetables.
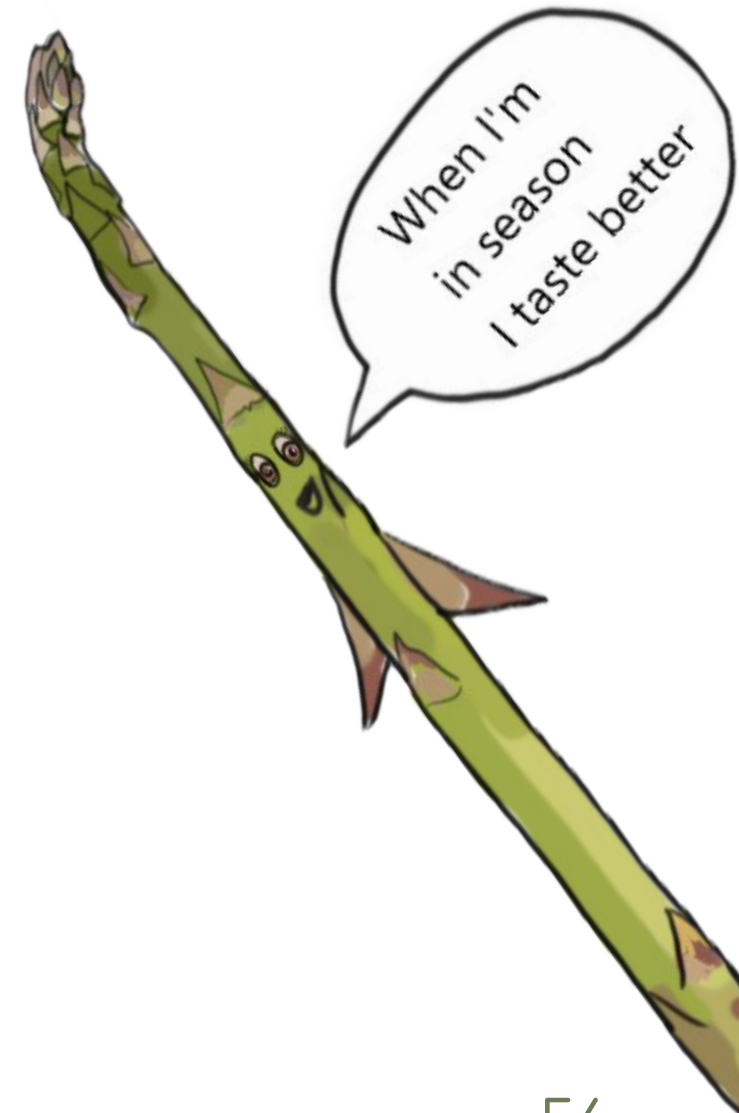
Figma course

Consistency is key

Contrast

When creating wireframes start in grayscale and a basic font.

Main pages to include in app

- Animation page #1
- Logo #2
- Login Screen #3
- **Home page #4**
- **Fruit /vegetable page#5**
- **Profile#6**
- Medals #7
- Adding fruit#8
- Removing fruit#9

Problems to tackle:

Fruit problem identified possible user actions

- Scan fruit(camera)
- Look it up(eat or not) section with information
- Look it up on google
- Throw it away

Add fruit

- Picture of reciept
- Manually add
- Picture of fruits and vegetables
- Linked to Willys, Coop or Ica and automatically enters what you buy

What fruit to ADD?

Due to the size of this project, I decided to add fruits and vegetables in season in April and standard purchases.

Onion, Carrot, Potato, Leek, Red beets, Asparagus, Lemon, Rhubarb, Kiwi, Tomato, Apple, Peach, Banana.

Research on these fruits and vegetables focuses on;

- Storage
- Flavor
- How to eat
- What it goes well with
- Vitamin content.
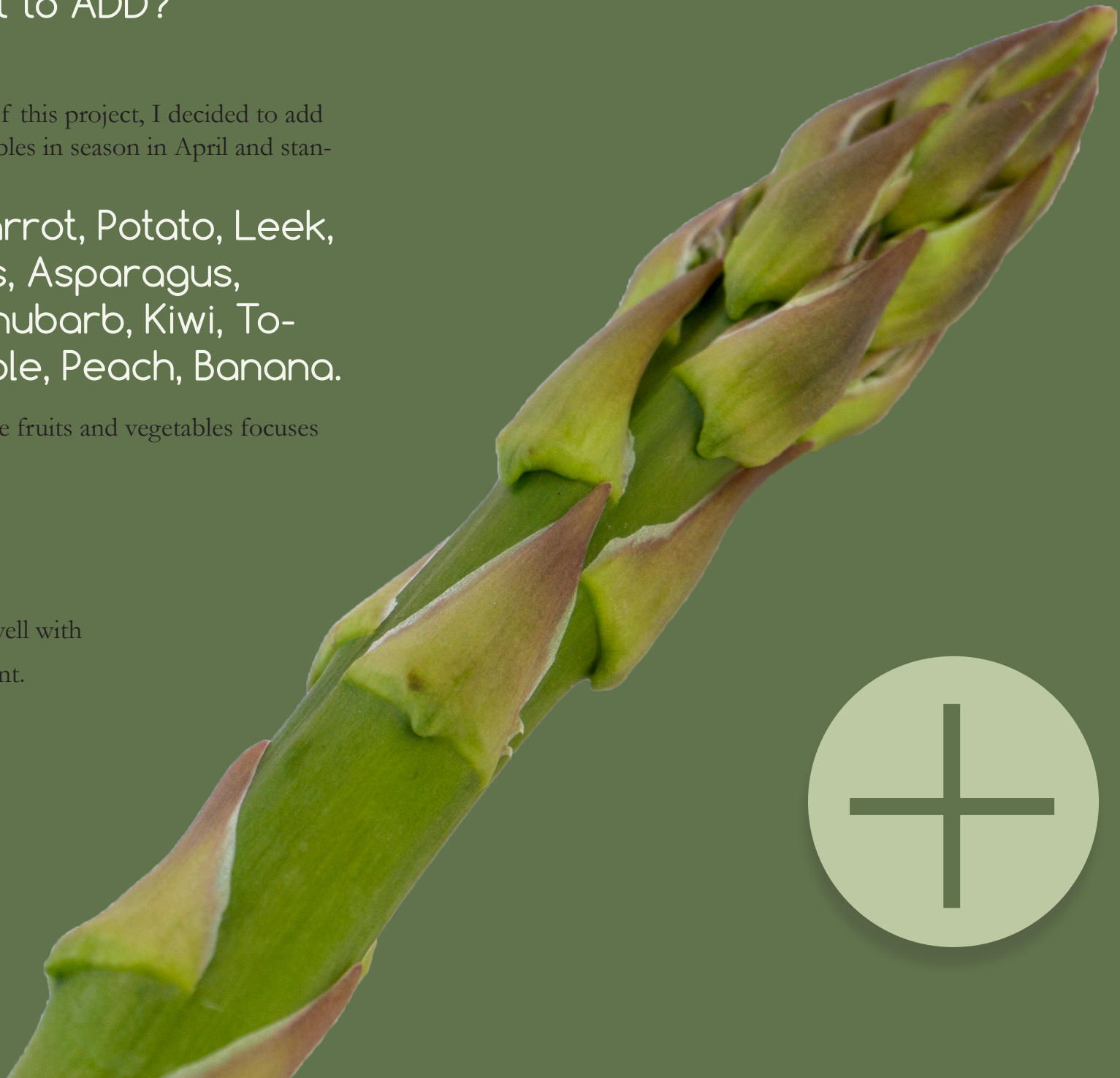
Add Fruit

In the app, to tell if your fruit or vegetable will go bad, it is good to add it; it will also keep track of how often you buy the fruit and how long it takes to eat it. Users can add fruit in different ways.

Criteria	Pic	Receipt	Store	Manual
Complex	7	5	3	10
Legal	10	10	3	10
Speed	9	9.5	10	2
Accuracy	6	8.5	10	9.5
	32	**33**	26	31.5

Pic
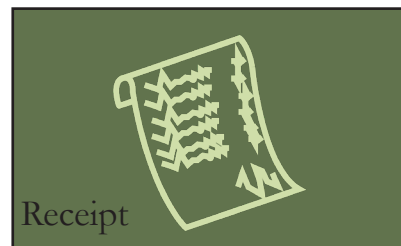
Taking picture of F&V bought using AI to detect what was bought

Receipt

Taking picture of receipt using AI to detect what was bought

Store

Automatically connected to store account.

Manual

Manually adding what you bought via the app

Pros
• Quick
• One step inventory

Con
• Relies on good lighting and camera for AI

Pros
• Price included
• One step inventory

Con
• Need receipt with you
• Hard to know how much fruit is in kg

Pros
• Price included
• Easiest for consumer

Con
• Tied to one store and Sweden
• Doesn't promote local food market

Pros
• Forced to think about your purchases

Con
• Exhausting
• Time consuming

Wireframing

I am starting in paper to get an overall feeling for size and readability, asking users for input on paper versions.

I focused on the main three pages Profile, Home, and F&V page.
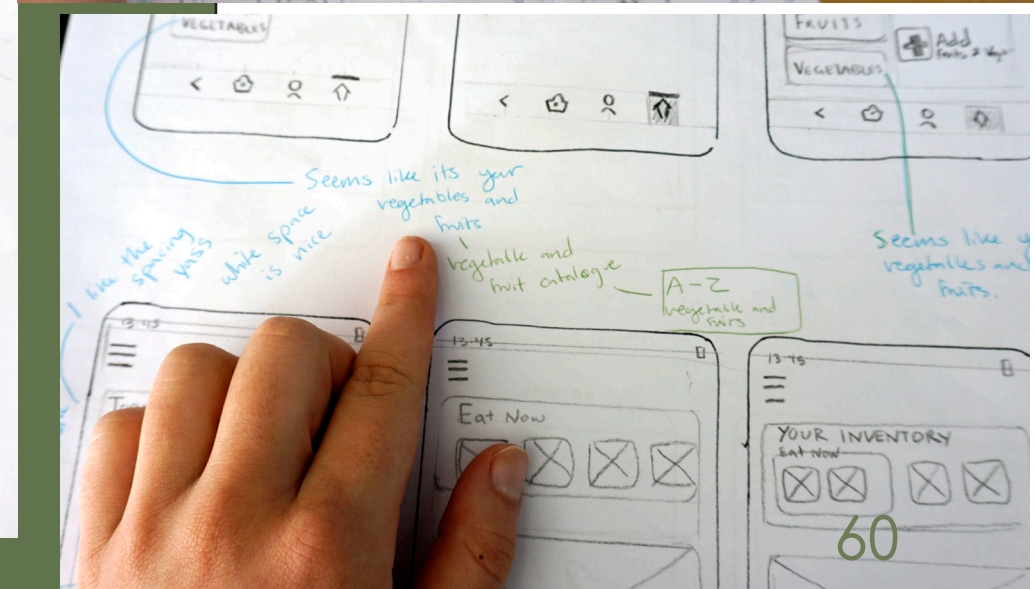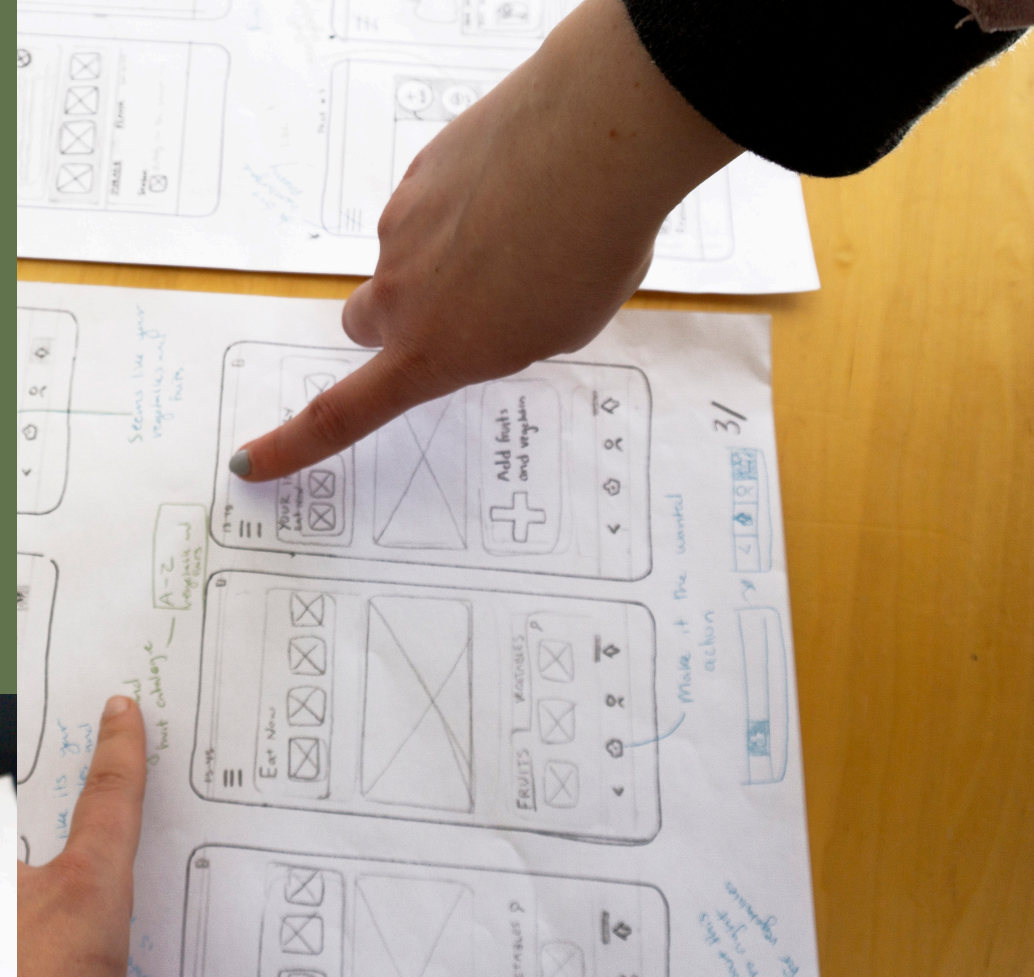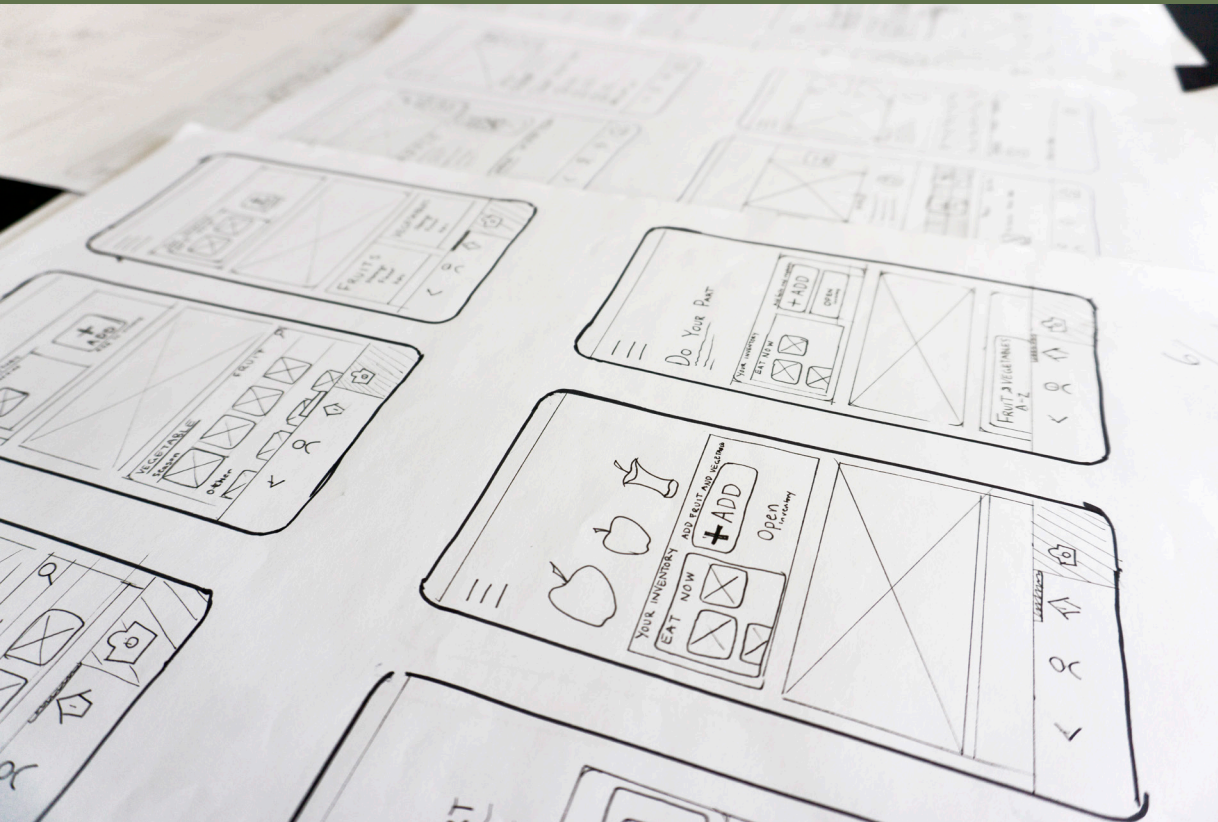
Wireframing
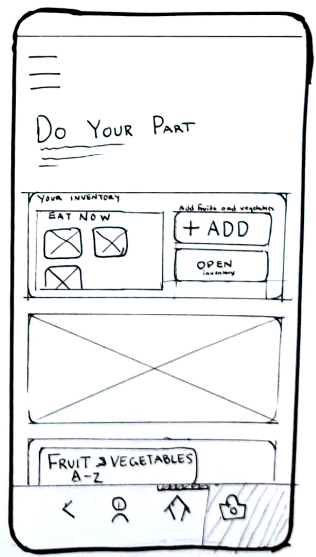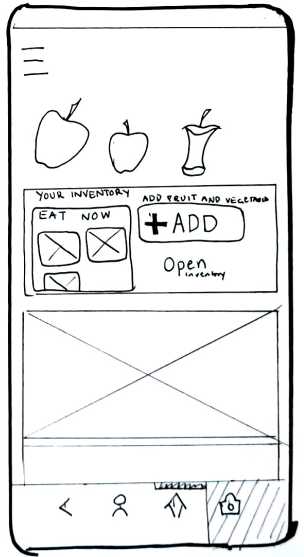
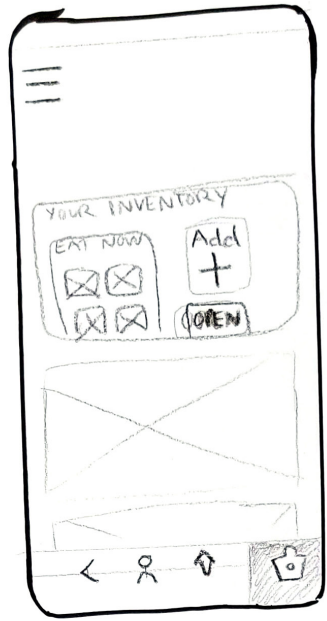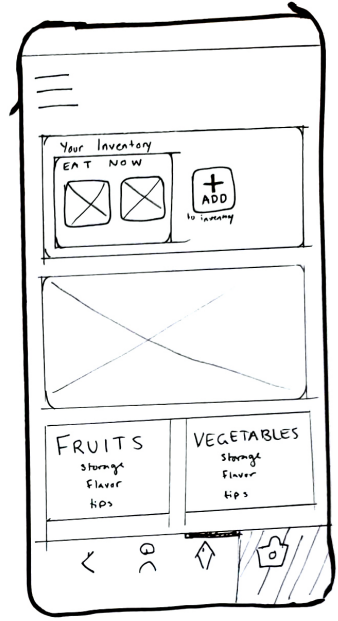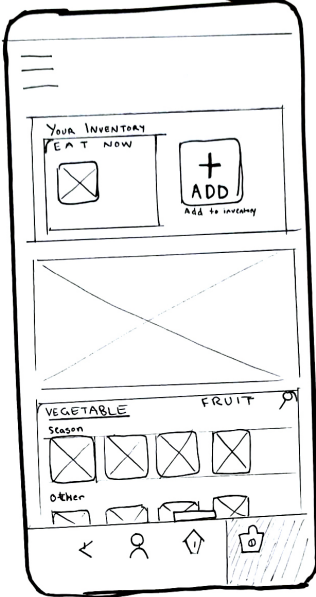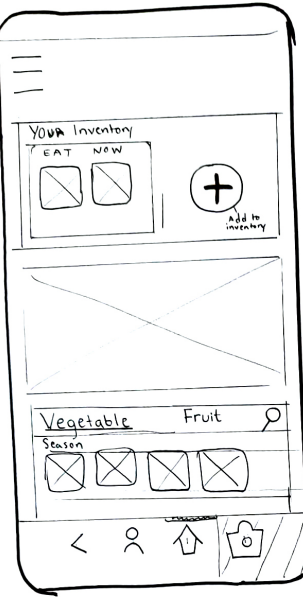I was working in Figma to do rapid testable prototypes.
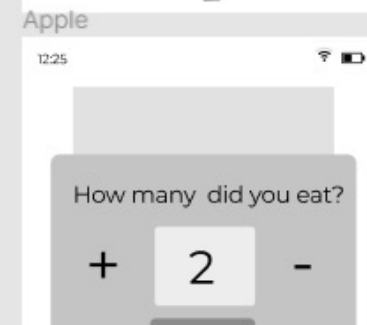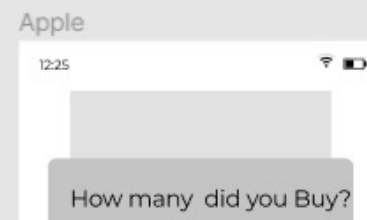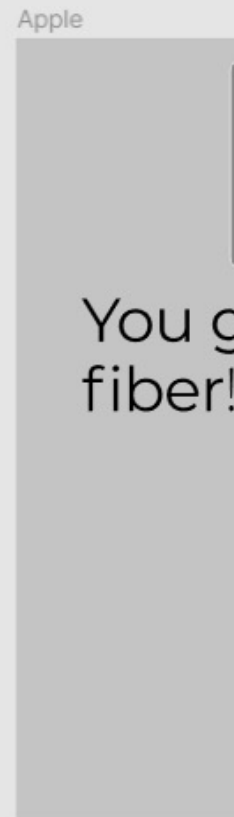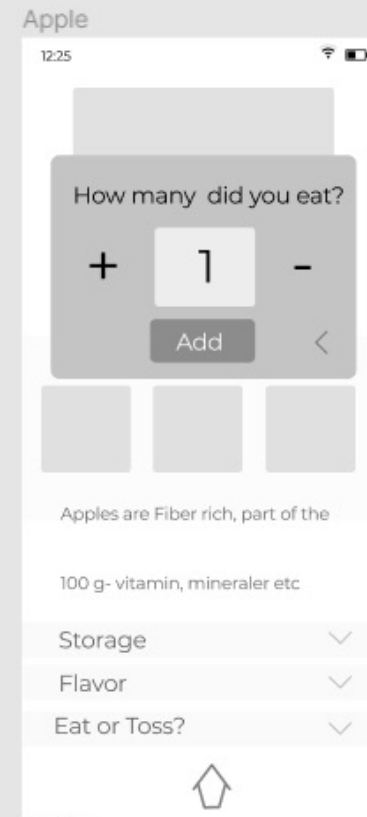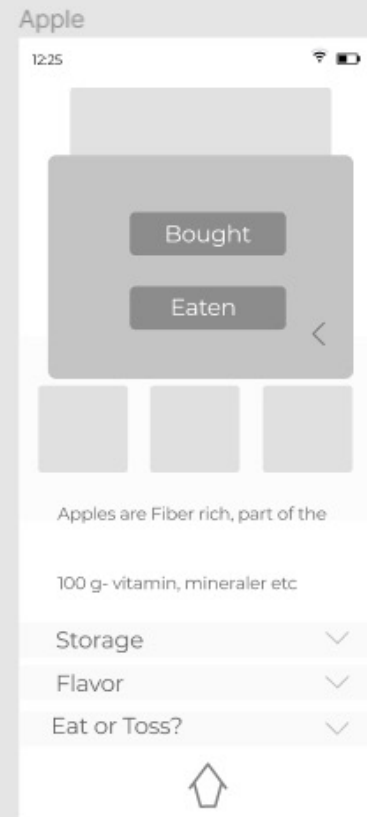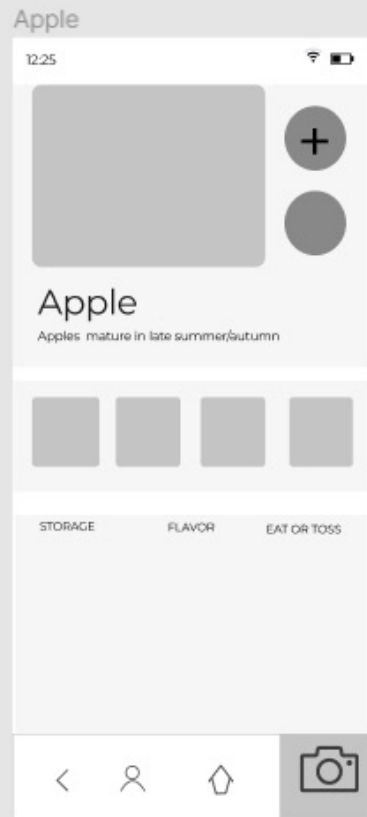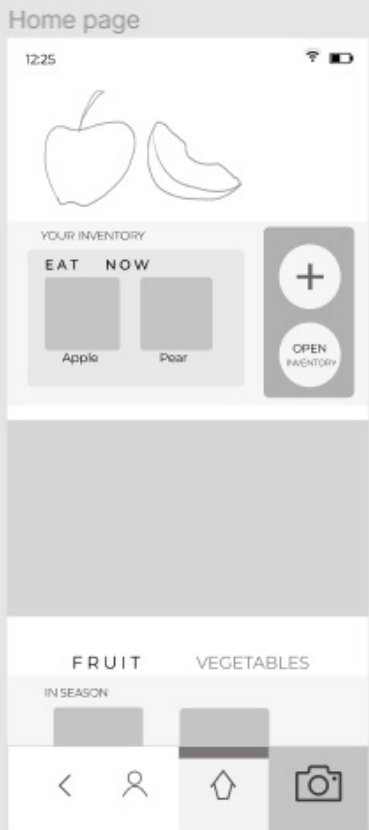
Home

Primary functions

1. Look at your fruits inventory eat now

2. See if your fruits are good or bad (scan)

3. Add fruits manually or with receipt

Secondary

4. Tips and tricks for food saving
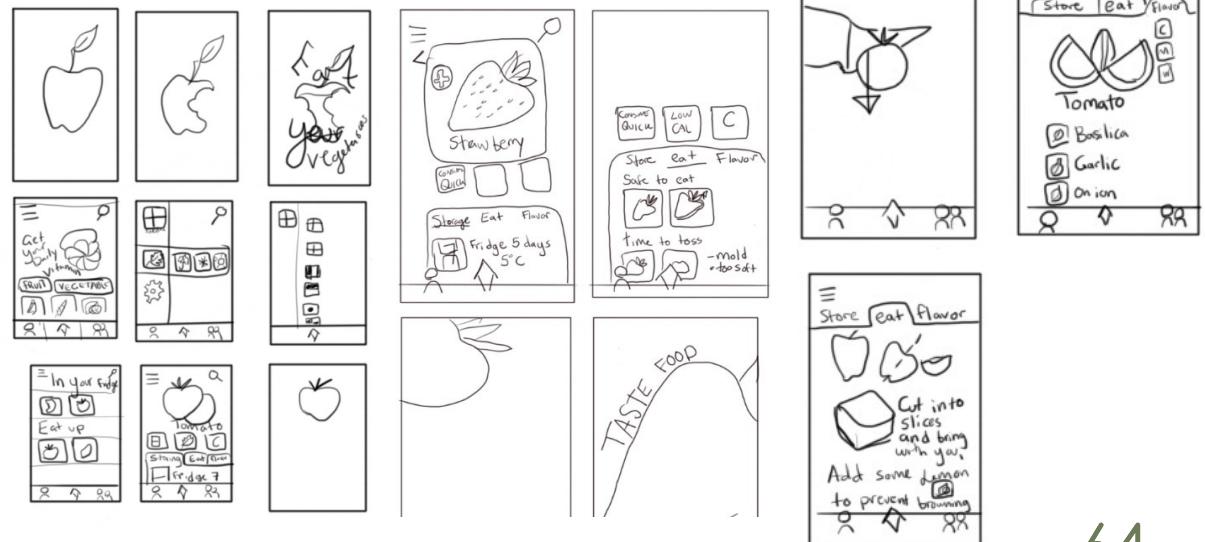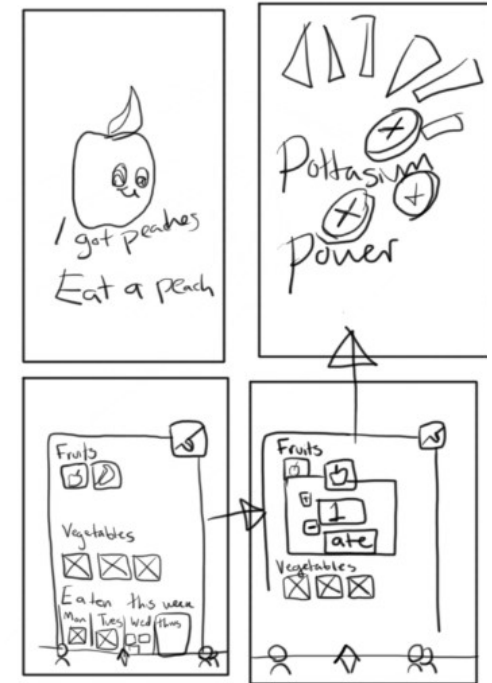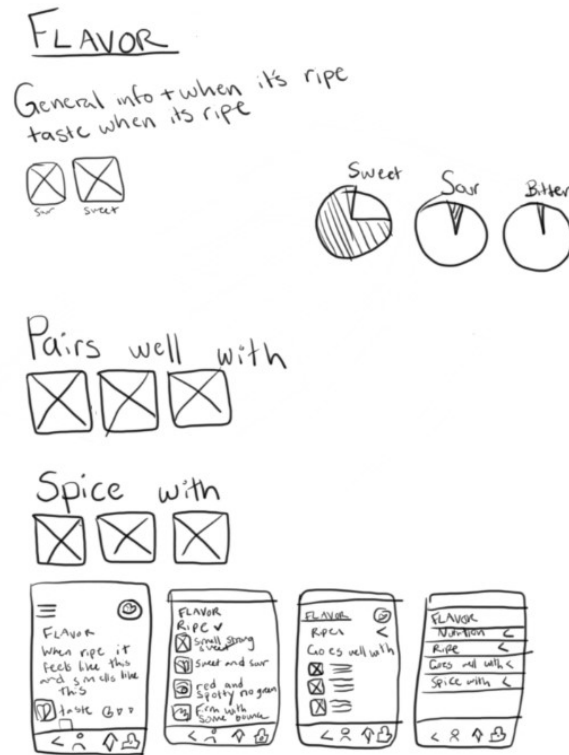
5. See fruits and vegetables
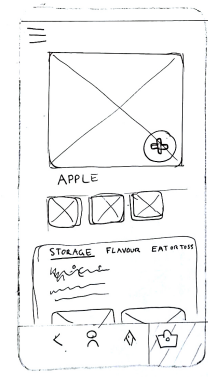
6. Calm welcome

63
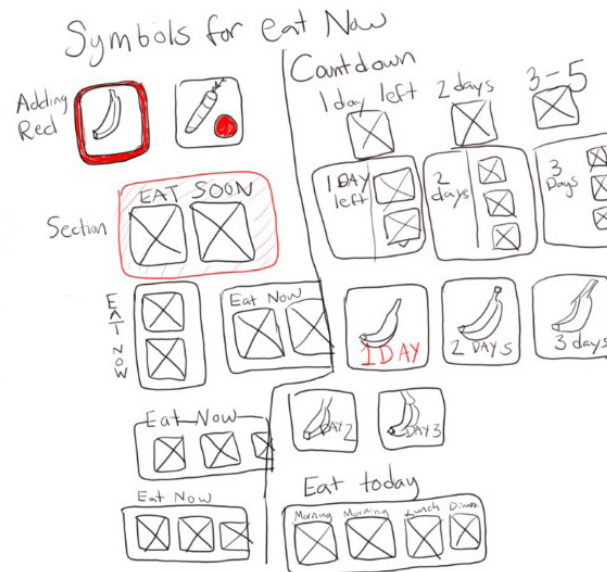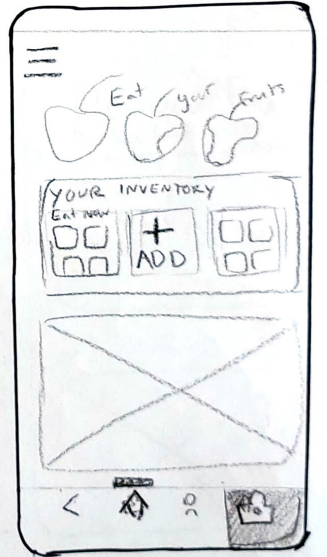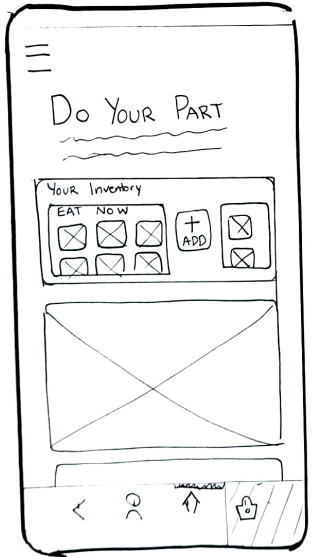
Fruit and vegetable

Primary functions

1. How things are stored

2. Eat or toss

3. Add and remove by eating

Secondary

4. Nutritional content, "you got fiber"

5. Tips on how to eat, flavor profile and healthy ways to eat.

APPLE

STORAGE   FLAVOR   EAT OR TOSS

ADD

ADD

APPLE

STORAGE   EAT OR TOSS   FLAVOR

STORAGE   EAT OR TOSS   FLAVOR

ADD

APPLE

STORAGE   EAT OR TOSS   FLAVOR

Bring with you

Apple

STORAGE   FLAVOR   Eat or toss

Buying in season makes food taste better
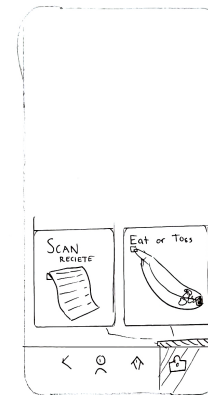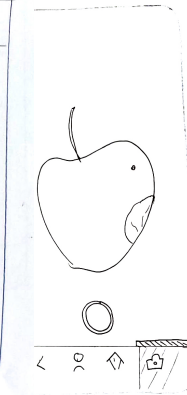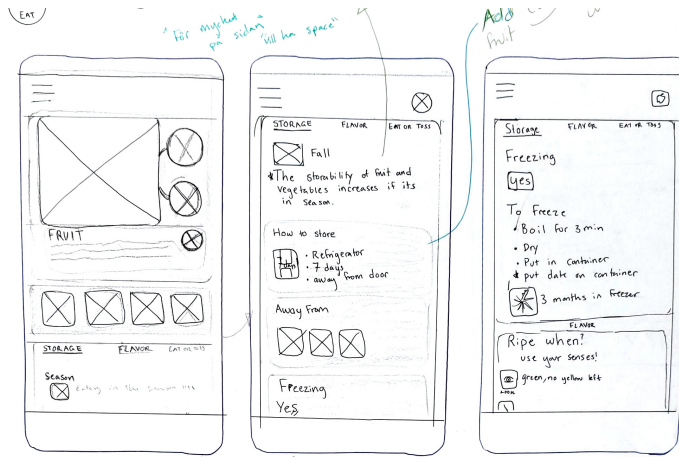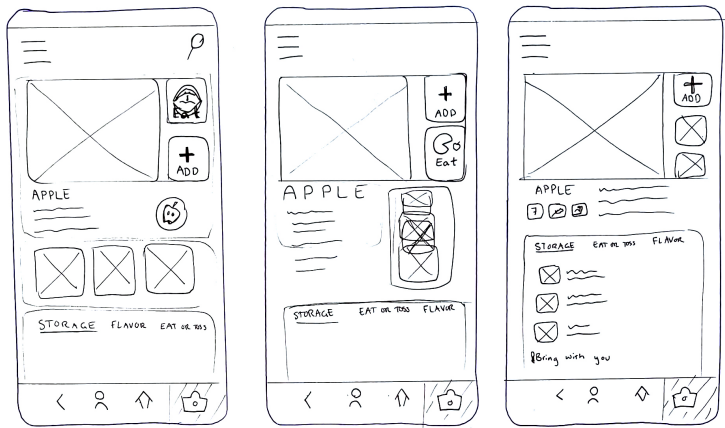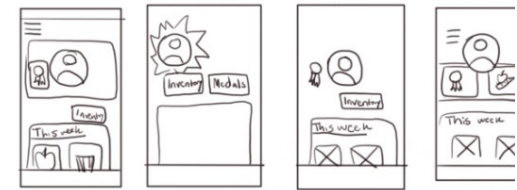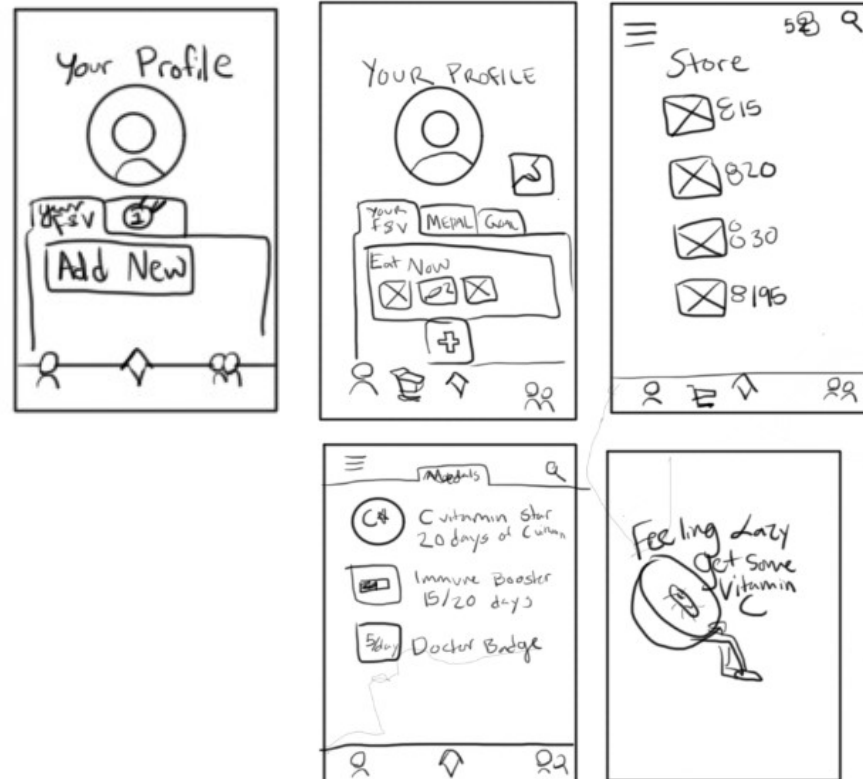
How to store

4/5

Eat   ADD

APPLE

Storage   flavor   Eat or Toss

In season tastes better

4/5

ADD

FRUIT

STORAGE   FLAVOR   EAT or Toss

How to store

FRUIT

STORAGE   FLAVOR   Eat or Toss

Season

Fall

The storability of fruit and vegetables increases if its in season.

How to store
- Refrigerator
- 7 days
- away from door

Away From

Freezing
Yes

STORAGE   FLAVOR   EAT or TOSS

Freezing
Yes

To Freeze
Boil for 3 min
- Dry
- Put in Container
- put date on container
- 3 months in Freezer

FLAVOR

Ripe when?
use your senses!
green/no yellow left

SCAN RECIETE

Eat or Toss

SCAN

EAT or TOSS

PAGE #7

FRUIT

STORAGE   FLAVOR   EAT OR TOSS

Season all year
Reasons to buy in Season

ADD

EAT

PAGE #6

YOUR INVENTORY

EAT NOW

ADD

OPEN

another symbol for eat

Buttons round?
consistent
Icons

Radiuses create layout of APP

VEGETABLES   FRUIT

Season

Buying fruit and vegetable in season tasted better is cheaper and good for environment

Other

APPLE

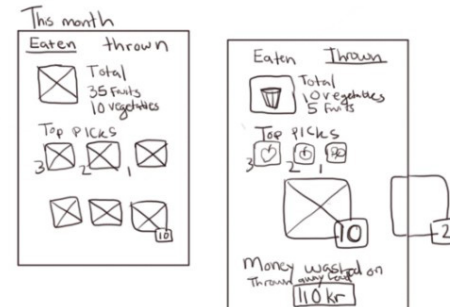STORAGE   FLAVOUR   EAT or Toss

SCAN RECIEPTE

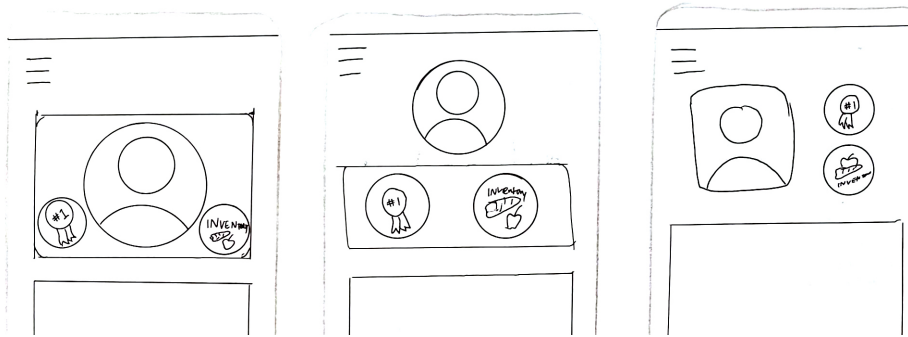EAT or Toss

7/

Profile
Primary functions

1. Track eating behaviors

2. Go to inventory

3. Medals
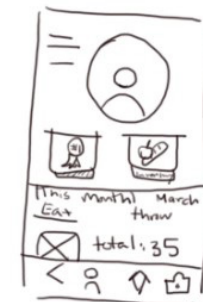
When working on the profile page, I kept in mind the primary goals. These helped me focus on the function of the app. I was breaking the goals down, working on them one at a time to understand how to achieve that function.
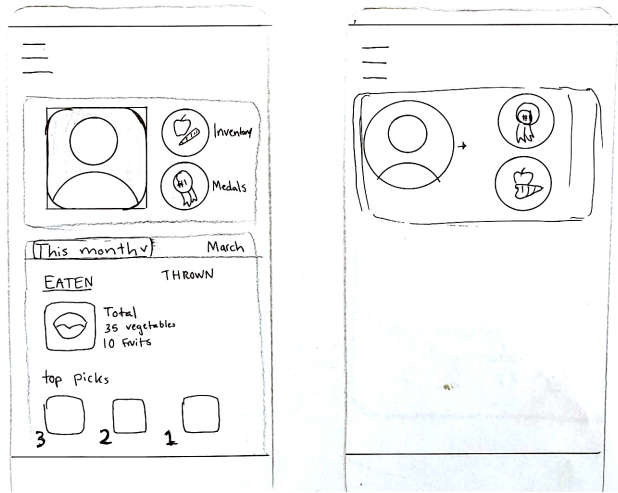
Color

Respectful

calm

nature

playful

When deciding on a color scheme, I needed something that made people feel calm and reminded them of nature, but that wouldn't clash with the colors of the vegetables and fruits.

Green, brown
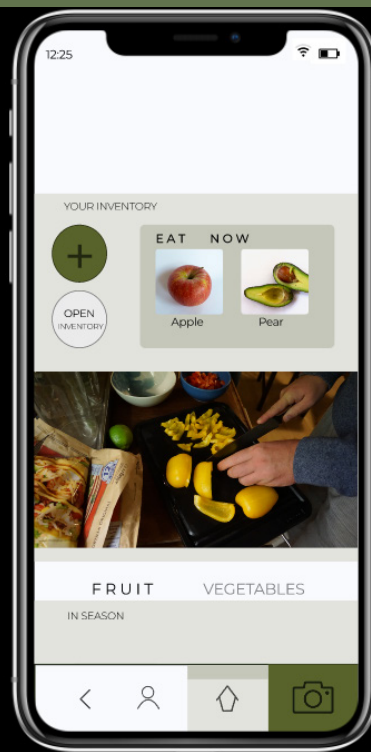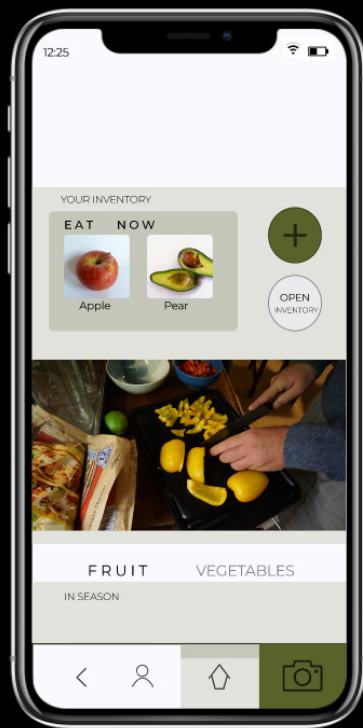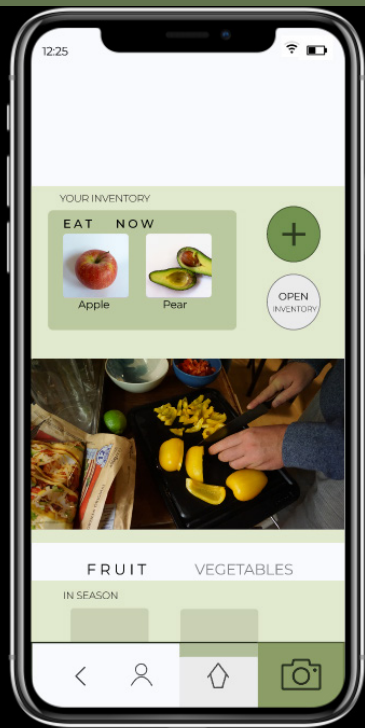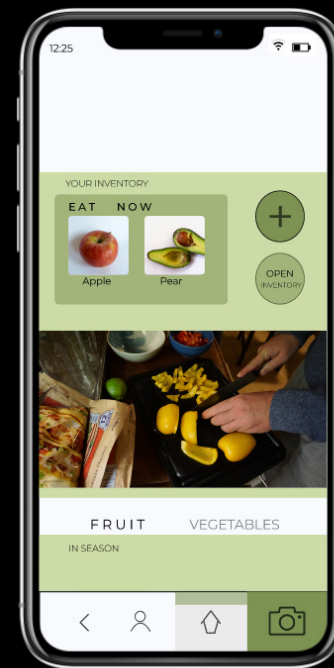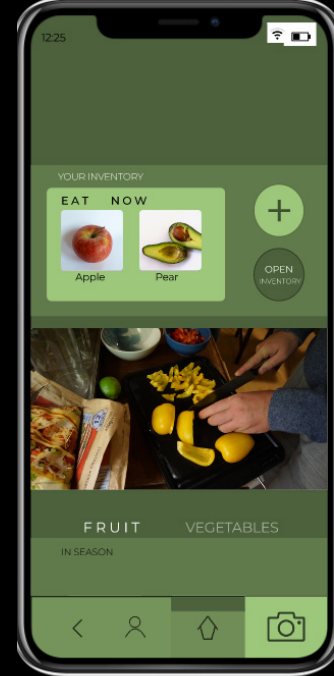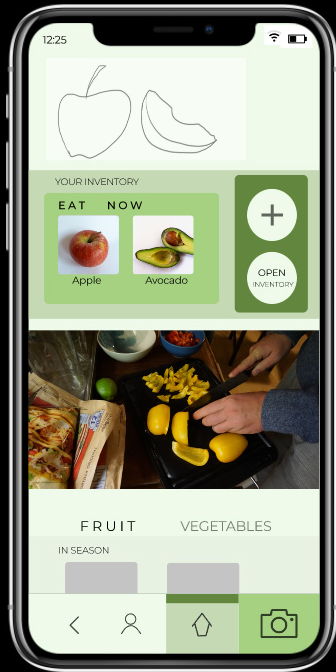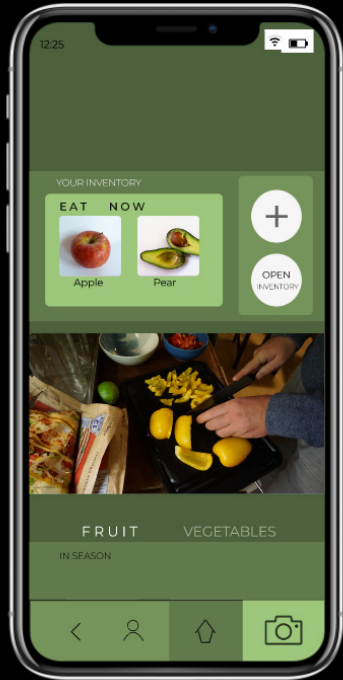
To properly test out the possible color schemes I applied them to the home page

I was leaning more towards green.

ColorScheme

Creating a monochromatic color scheme I decided was best for my limited graphic design knowledge since it is considered the easier color scheme to master.

R:88
G:109
B:70

R:163
G:181
B:123

R:167
G:182
B:141

R:167
G:182
B:141

R:218
G:225
B:194

R:228
G:231
B:222

R:235
G:235
B:235

R:255
G:255
B:255

R:0
G:0
B:0

Screen 1 — Welcome:

Welcome,
Let's Reduce Waste Together

EAT NOW

Apple   Banana

Inventory

FRUIT   VEGETABLES

April   Sweden

Return   Profile   Home   Camera

Screen 2 — Inventory:

Inventory

EAT NOW

3   EAT   THROW

2   EAT   THROW

Fridge ‹

3   1   4   2

Room Temperature ‹

Return   Profile   Home   Camera

Screen 3:

Scan

Manual

Return   Profile   Home   Camera

Font

I chose a font that would be legible since there may be sections with a lot of text. For buttons and pressable parts of the text, all caps were used.

Open sans

ALL CAPS FOR BUTTONS AND AS EMPHASIS POINTS

Chosen because of how common it is and therefore people have an easy time reading and understanding it.

Icon

I wanted the functions to be understandable in different ways, visually and in writing. Therefore creating icons to represent things was vital. These were made in illustrator to quickly get a vector pathway and be able to change color and background color.
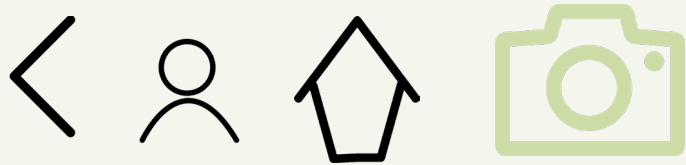
After creating my own icons, I realized it was challenging to make them in the same style, so when icons were next to each other, like in the footer, I chose to use icons from Iconset to have a more coherent form language.

Version 1

Version 2
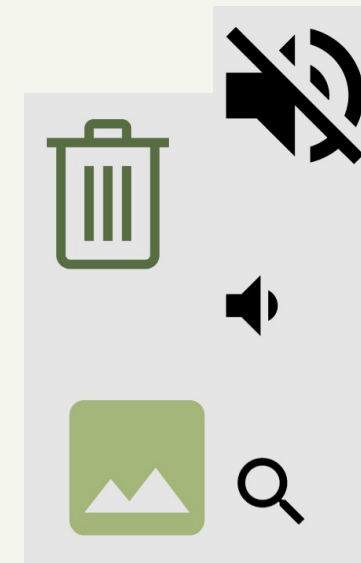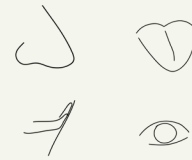
Logo

Eat
your
greens

Eat
your
greens

Eat
your
greens

EAT
YOUR
GREENS

EY
GREENS

EY
greens

EY
greens

EY
greens

EY
greens

EY
greens

EY
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greens

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EY
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greens

EY
greens
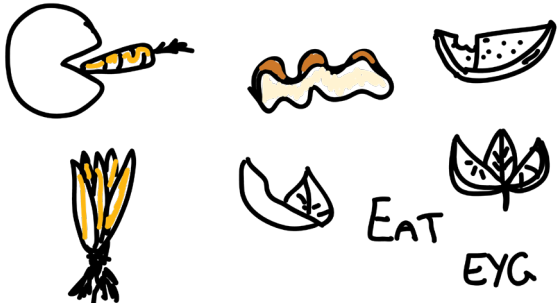
EY
greens
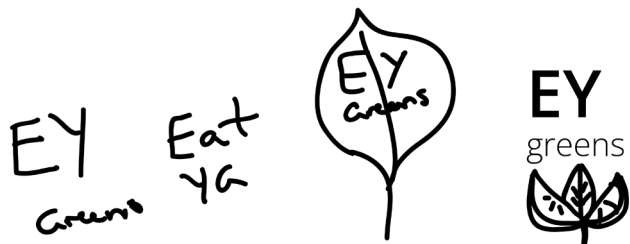
EYgreens is a catchy way to eat your greens: EY! Greens. An abstraction of a cut-up apple reminds the app's purpose: to eat fruits and vegetables not throw them away. A cut-up apple is an apple that is about to be eaten. The colors are from the color scheme.

How do I make the app interesting?

Heirarchy, consistency

Footer
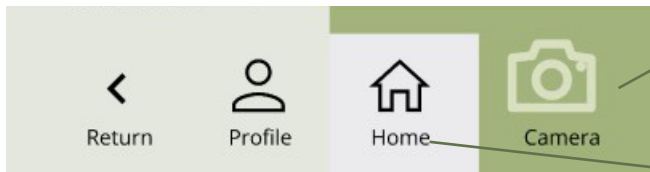
The camera is always in focus to show its importance

Selected section different shade as well as the line above

Divider

Font weight and size to show what section is selected.
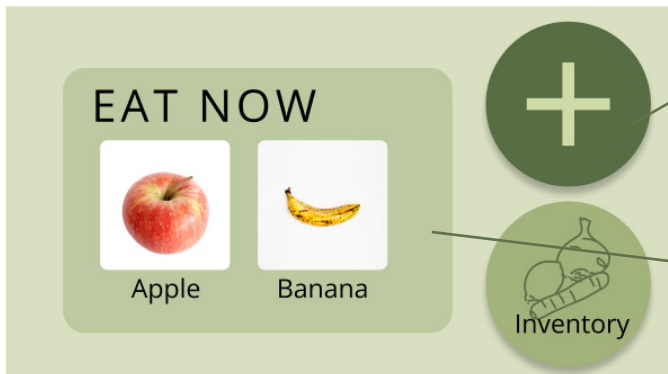
Adding fruit as the main focus to incentivize people to do the action

Similar tones in the boxes help to organize the information. Eat now is an important aspect, therefore making it more visually important.

Action   Icon

The circles with drop shadows indicate action. The squares indicate icons.

IN SEASON Sweden

Onion   Carrot   Potato

Red Beets   Cucumber   Asparagus

IN SEASON

Kiwi   Peach   Lemon

Feeling Lazy?
Eat some kiwi loaded
with vitamin c

OTHER
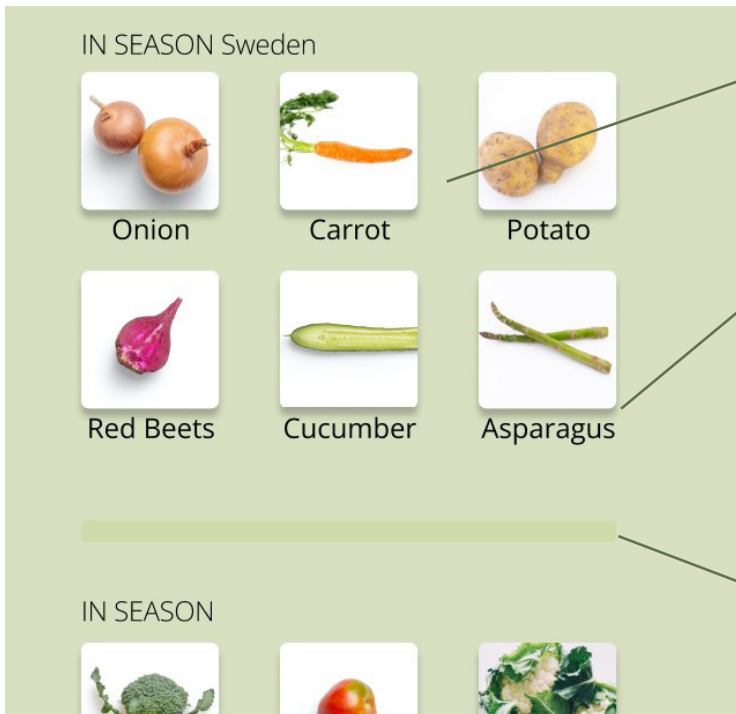
Auto layout between fruits and vegetables=31 ppt

Drop shadow suggests the possibility of pressing.

Drop shadow

X   0   Blur   4
Y   4   Spread   0
000000   25%

Show behind transparent areas

Image   100%

Stroke

Effects

Drop shadow

Export

Green lines separate information. Short lines separate sections of similar information. At the same time, full-length lines separate sections of different information.
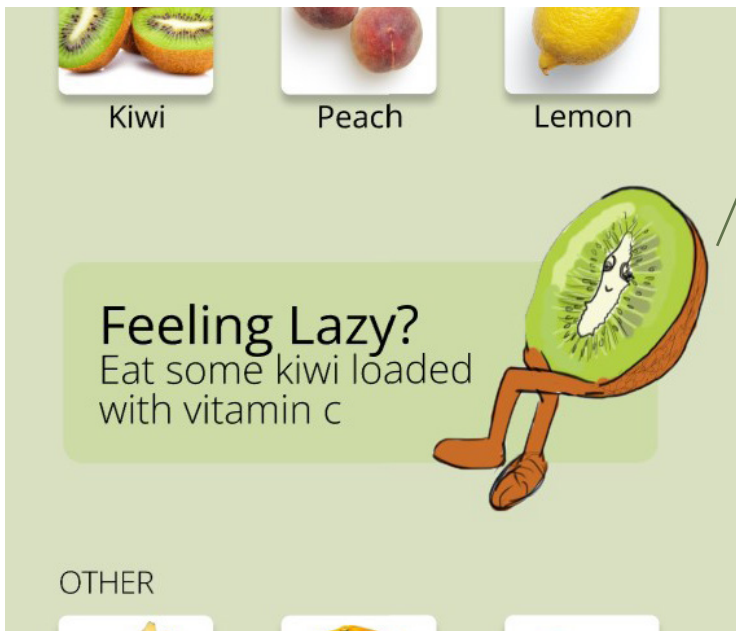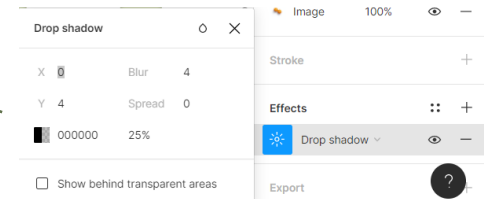
To add interest, fruit and vegetable characters with information are a break in between objects.

77

Testing out different layouts for the pages.
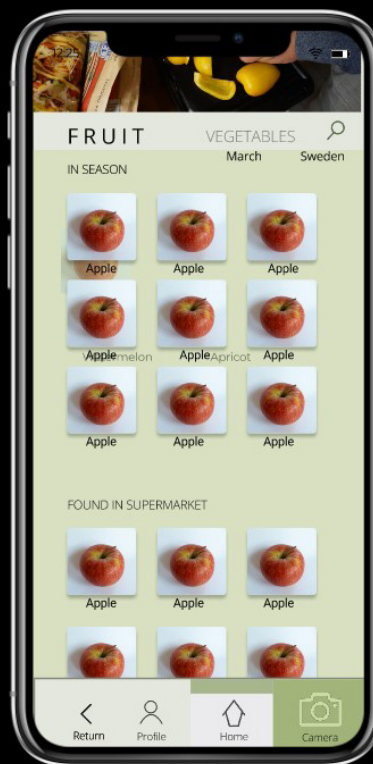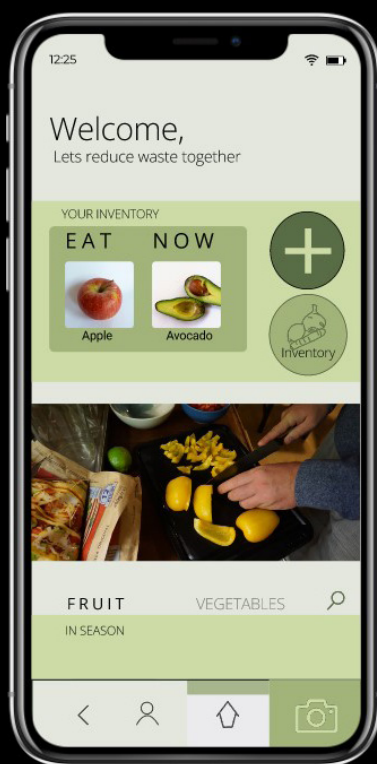
Using Figma app version on phone to test out prototype in real time.

Final Model
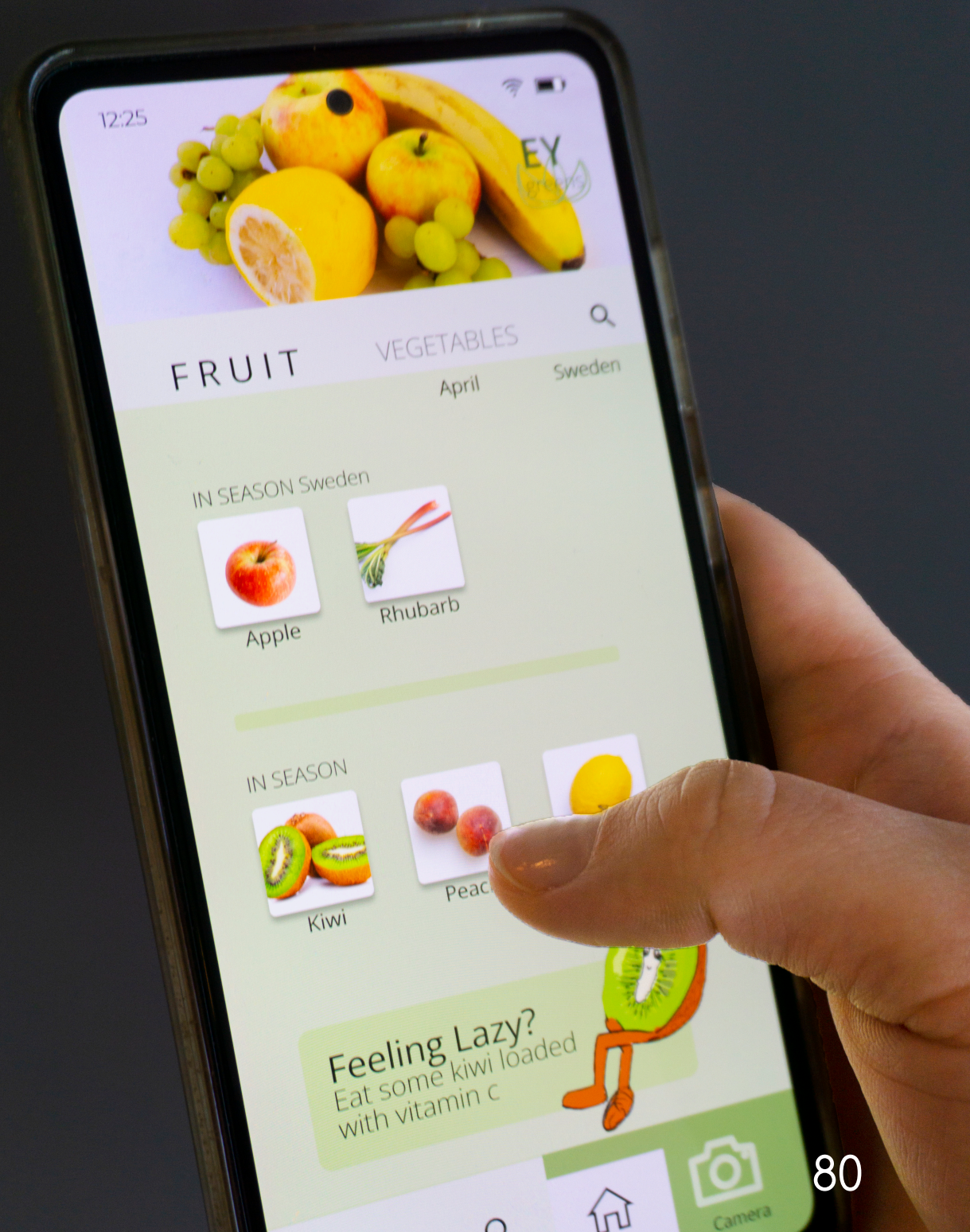
EY greens

Version 1.0

Walking through
the actions

Calm entering

Transition into app

The logo appears when you open the app, which transitions into the logo with the text "Eat your greens, don't waste them" to show the app's message. Then you transition to the home page; here, you see the most crucial information—first, a welcome with the personal goal of the user, using the app. Then the fruits and vegetables they need to eat now.

Eat or toss?

Check if vegetables and fruits are okay to eat

Not sure if you can eat your fruits and vegetables?

Quickly scan your fruits and vegetables to see if you can eat them

onion sprouting

EAT
Remove the sprouted part and eat the rest
The sprouting changes the flavour and texture but its still safe to eat

Prevention
Make sure your onions are stored in a dark cool, dry enviroment.
Light and moisture make it sprout.

Go to onion
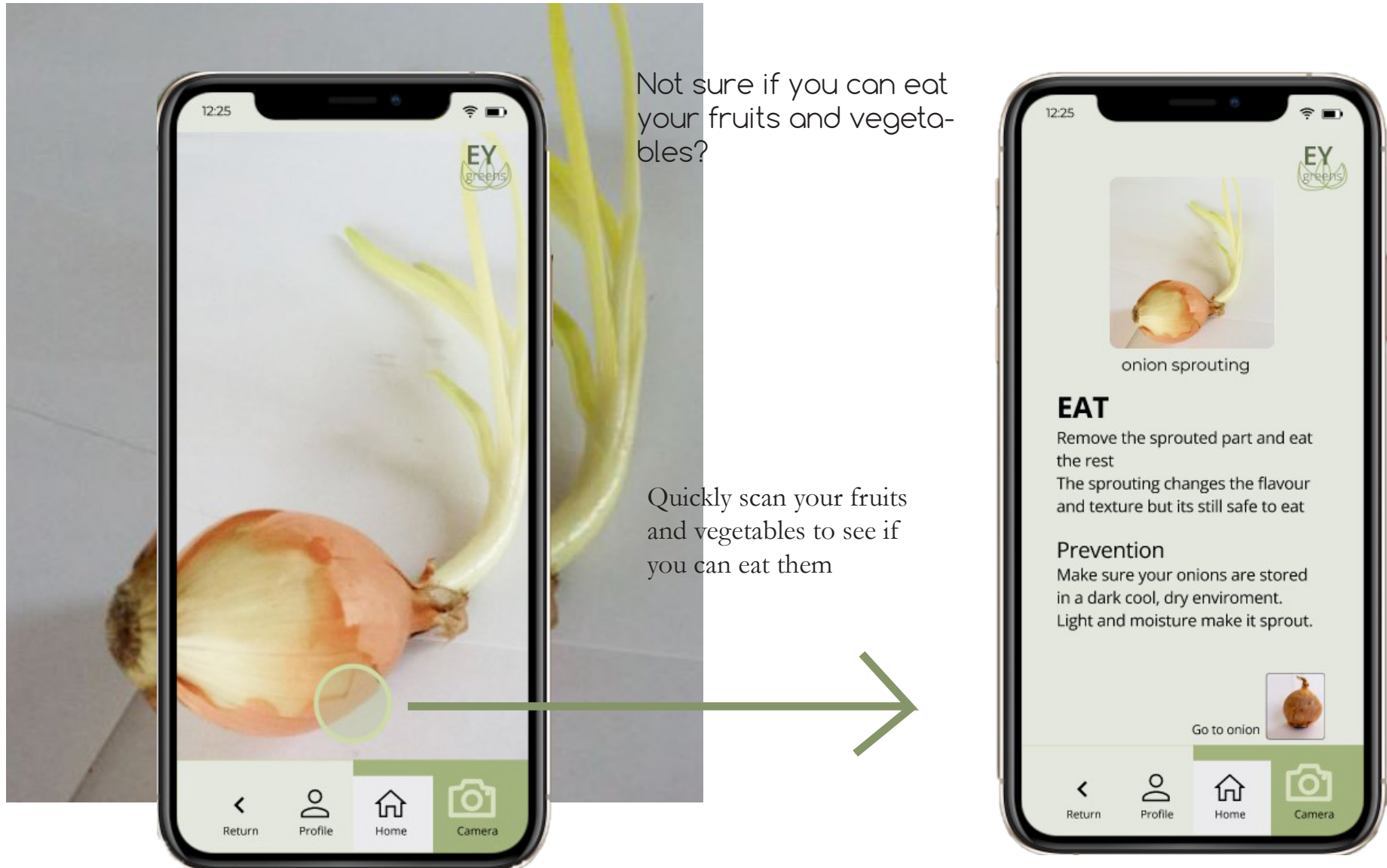
See Fruits and Vegetables

To promote seasonal and local fruits and vegetables. The month and country are displayed when looking at fruits and vegetables; the user can change these in the settings on the profile page. Then the fruits and vegetables are sorted based on the season and country. They are shown in order of ideal behavior. First, the best one is local and seasonal, then seasonal, finally other

fruits and vegetables. In this example, April and Sweden are used. Fruits and vegetables are sorted based on consumer perception, tomatoes as vegetables, and rhubarbs as fruits. When searching for fruits and vegetables, you will not have to specify if it's a fruit or a vegetable.
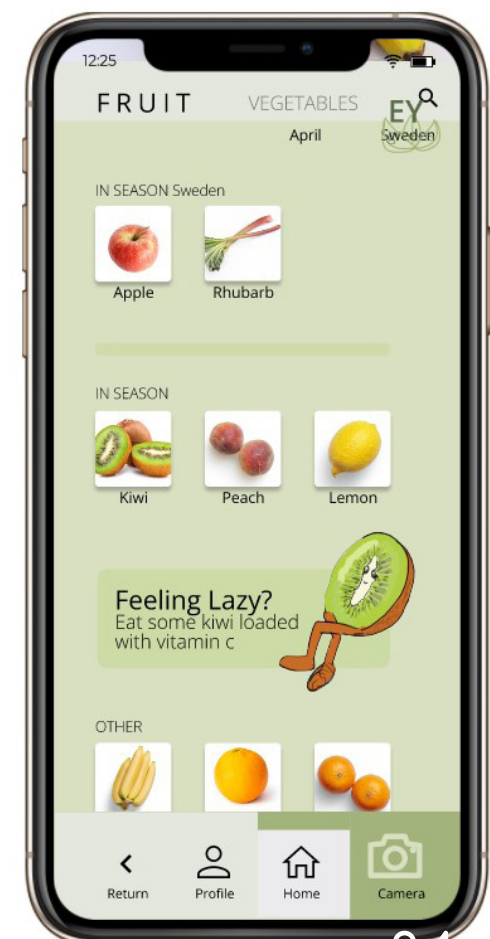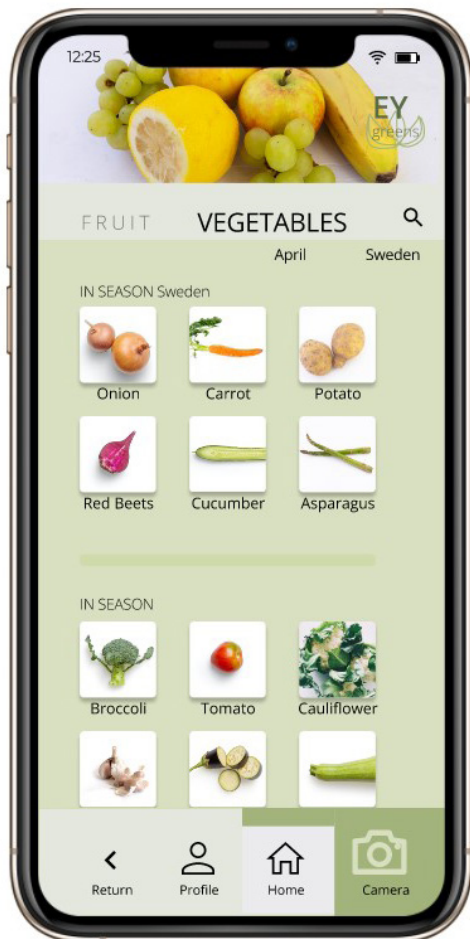
Add fruits and vegetables

Add fruits and vegetables

Add fruits and vegetables to get reminders when to eat them up
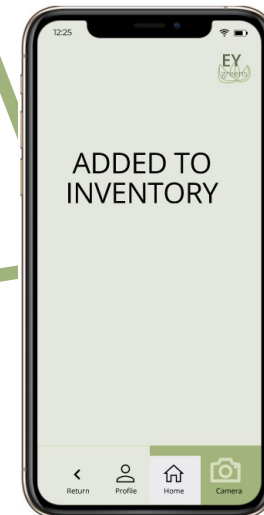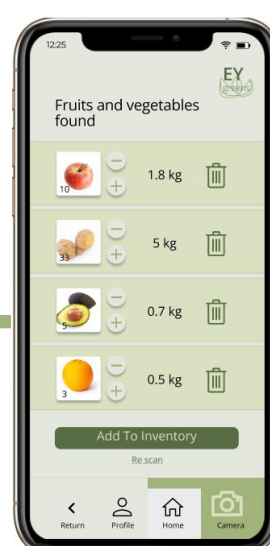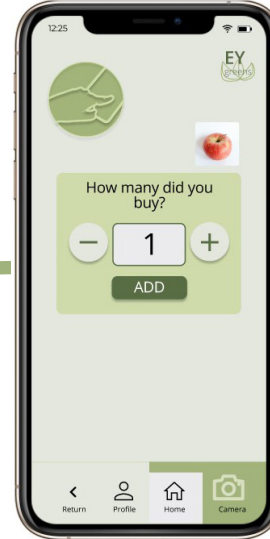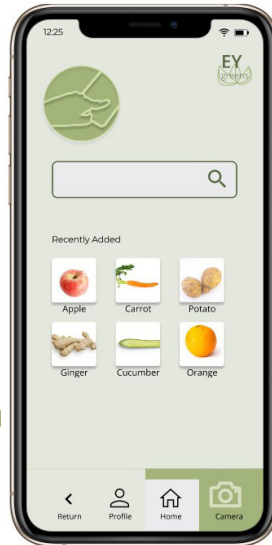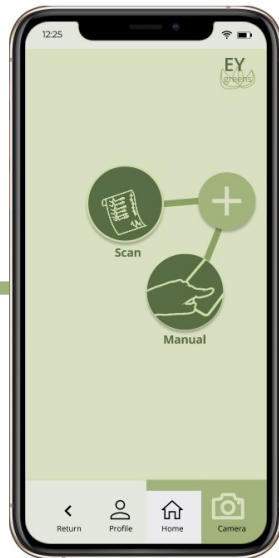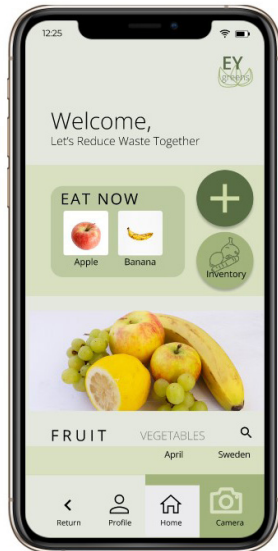
Scan your receite to automatically get an inventory

1. press the +

2. Choose manual or with reciete

Manual

3. Search fruit or vegetable you want to add

4. Add press + or - to choose amount

5. ADDED

6. Repeat for other

Receipt

3. Take picture of the receipt Automatic scan using TECH

4. check so everything is correct

5. Press add or rescan

6. ADDED

Eat fruits and vegetables

Eat don't waste

An animation focusing on one of the primary nutrient sources and benefits of eating that specific fruit or vegetable starts when pressing eaten on a particular fruit or vegetable to incentivize users to say that they have eaten fruits and vegetables. Below you see examples of the animation when eating an apple, glucose traveling down the intestines with the message "you got fiber," to show that you get fiber from apples and that fiber helps your digestion.

Get medals

Reinforce positive behavior

Celebrate your accomplishments with medals

To encourage inventory of what you have and eating what you have, people will be rewarded medals the medals now are very generic however can be used to target harder behaviors to change so people will have an incentive to do that behvaior.

Track behaviors

See your habits so you can change them

Habits are hard to realize that you have therefore it can be good to track them. When pressing thrown or eaten in inventory you will get statis-

tics. These statistics will be divided into month and year so that you can track your progress, you will see top fruits and vegetables in both throw and eat as well as how much money you have wasted when throwing away food to act as an economic incentive to waste less.
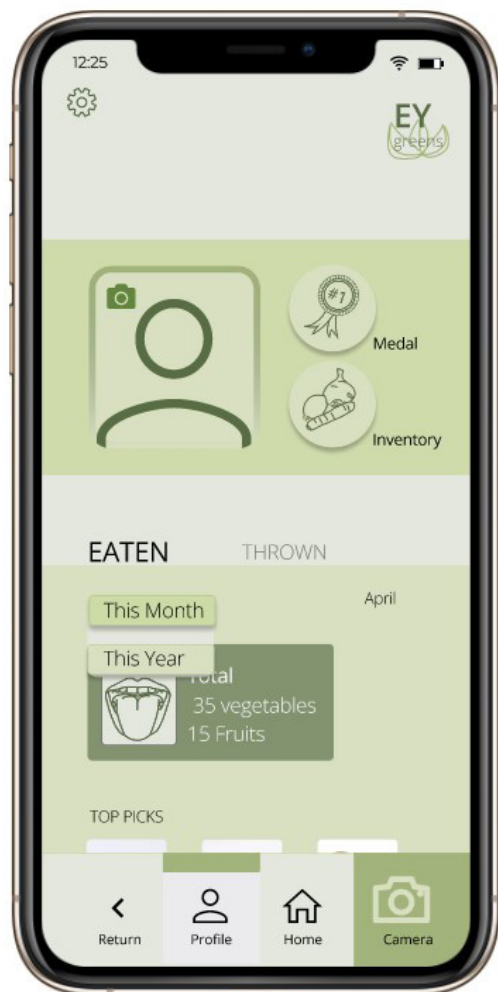
See your fruits and vegetables

Have access to your inventory

Inventory of what you have at home so that you can be reminded when you need to eat something soon. Seperating fruits and vegetables into fridge and room temperature will reinforce the correct storing option for the produce.

Fruit and Vegetable Pages
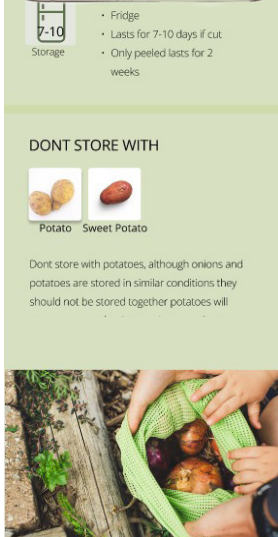
Learn

Storing correctly

Flavor

What flavors suit well

How to eat

How to know when its ripe
using your senses

Screen 1

12:25

Onion

Onions are a versatile vegetable used to flavor food in various cultures

Antioxidants	Storability	Storage	Season
	5/5	30+	

STORAGE   FLAVOR   **EAT OT TOSS**

Use camera to see if your fruit or vegetable is bad

Return   Profile   Home   Camera

Screen 2

STORAGE   **FLAVOR**   EAT OT TOSS

RIPE WHEN

Sight
- yellow tops

Smell
- strong smell when cut or damadged
- weak smell whole

Taste
- sharp and pungent raw

Touch
- firm, should not be soft
- when eating raw has a crunch

PAIRS WELL WITH

As flavor enhancer in most savory dishes.

CAN BE EATEN
- Raw
- Roasted
- Boiled
- Fried
- Caramelized
- Dried

Screen 3

WHOLE ONIONS

Storage
30+

Store in:
- cool, dry, dark enviroment, ideally a basement but a kitchen cabinet works
- Lasts up to 6 months
- Dont use plastic Bag
- Use bag with holes

CUT ONION

Storage
7-10

Store in:
- Fridge
- Lasts for 7-10 days if cut
- Only peeled lasts for 2 weeks

DONT STORE WITH

Potato   Sweet Potato

Dont store with potatoes, although onions and potatoes are stored in similar conditions they should not be stored together potatoes will grow spores and onions easier grow shoots

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Annotations

- Ripeness with senses
- Symbols showing season, storage, storability, nutritional quality
- What it pairs well with
- How its healthy to eat
- Storage whole
- Storage cut
- Avoid storing together with
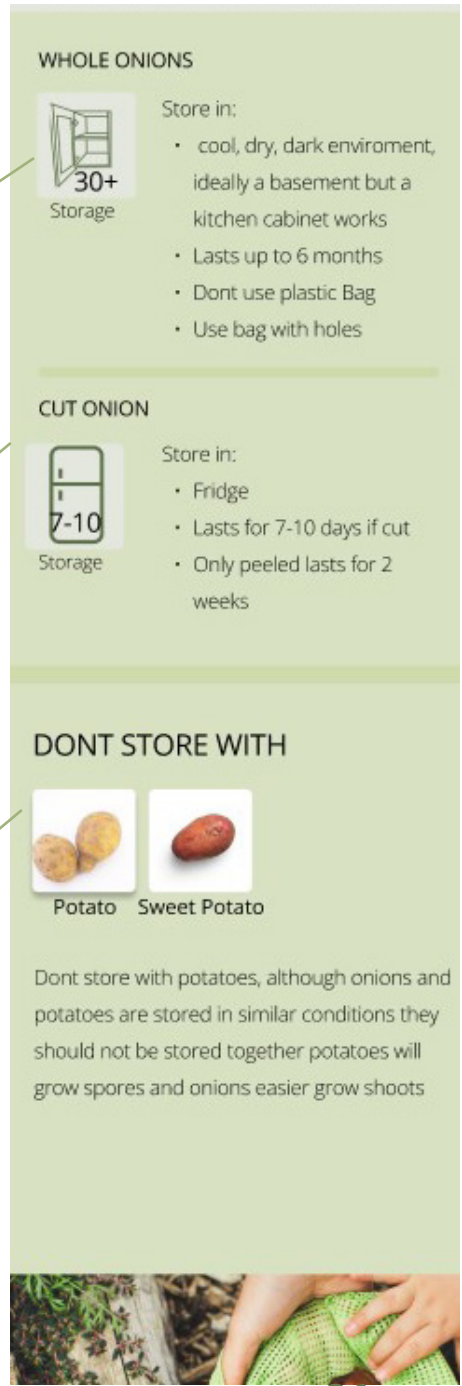
More Fruit and Vegetable Pages

Fruit and vegetable pages made for this version

Seven fruits and vegetables that are in season in April were added. This app is supposed to contain more; however, I could only do the vegetable pages for a few due to time limitations.

Adding information like "how to eat" so that when you are not used to that fruit or vegetable, you feel comfortable knowing that you can fry it or eat it raw without it being a health hazard.

Sketched Fruits and Vegetables

Fruits and vegetables giving information

Fruits and vegetable sketches act as a break between monotonous objects. They add fun characters and liveliness to the app. At the same time, they are adding additional information.
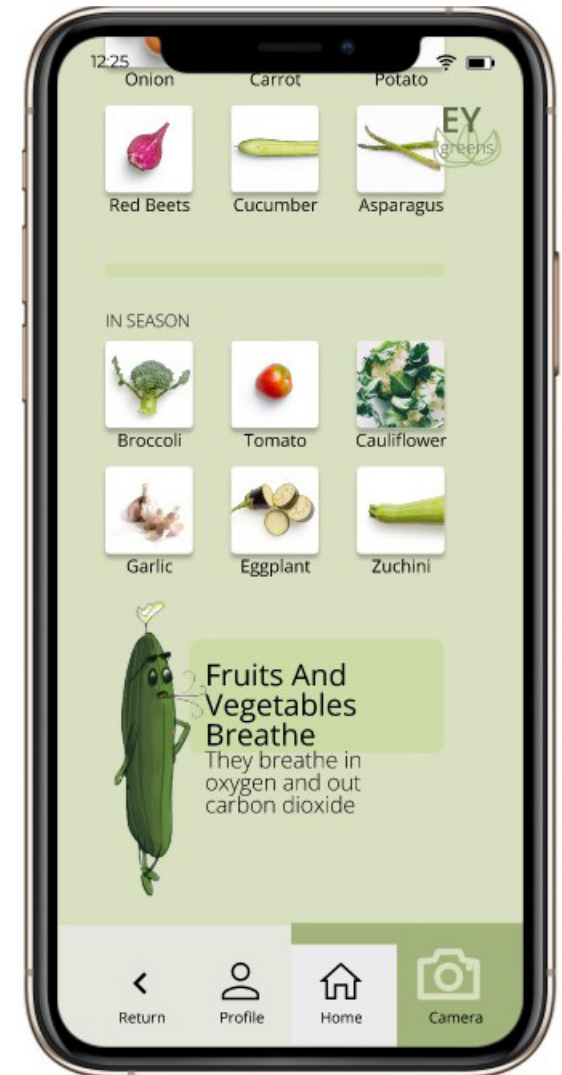
Settings and Error Page

Necessary pages

The settings page is where you can change countries.

It allows you to disable notifications and sounds.

The error page includes an avocado character, states what is wrong, and gives the consumer a call to action to shut down the app.

12:25

Welcome,
Let's Reduce Waste Together

+

EAT NOW

Apple

Banana

Inventory

GETABLES

Sweden

Reflection

Does it acheive the brief?

Regarding the brief reduce fruit and vegetable waste at a consumer level, it tackles some of the problems mentioned by users, for example, knowing when something is good or bad and seeing when your fruit is about to go bad—learning about storage and ways to eat fruits and vegetables. A more thorough analysis of its ability to reduce food waste is necessary to see its efficacy.

Personal reflection

I am not satisfied with the final product since there is still a lot of development to do and critically analyze my chosen actions. Despite this, I feel I have improved my skills. It's far from the desired goal, but it's come a long way.

Keeping up motivation was relatively doable, and I found it very fun to work in Figma and work with creating an app. It is something I could see myself doing in the future. Therefore, it was precious to be able to do this now. I need to have the courage to test out my prototype more. I felt as if my prototype wasn't good enough to test out on multiple people; therefore, this is something I have to find the courage to do so that I develop the app in a helpful way. It was enjoyable doing a lot of research. However, I felt as if understanding the full complexity of fruit and vegetable perishability for every fruit and vegetable was not feasible. And since research took a lot longer than initially anticipated, the time to design the app was less than required.

It finally clicked that graphic design is just a way to organize information so that the reader understands. I have been struggling with graphic design throughout my education, so to get that AHA! moment was extraordinary. Now I find myself more intrigued with graphic layout, typography, and design and will continue to hone my skills in the future.

I aim to explore more animations in the app before the exhibition and genuinely enjoy creating an informing app, something that I didn't expect to learn about myself.

Future improvements

More user studies are necessary to test out this version of the app.

The action of adding fruits is excellent for tracking behavior and seeing the fruits and vegetables people have at home and when they are about to perish. However, this is an exhausting task, and a proper analysis of people's desire and ability to do this must be more thoroughly analyzed.

Improvements to the graphic layout and logo are necessary for the app to be more coherent and improve usability and user understanding.

I tried to add some fruit and vegetable sketches to increase the playfulness and gamification of the app. More sketches and animations in page transitions will increase the fun factor of the app.

EY greens

Eat your greens don't waste them

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Appendix

Appendix A

Questions asked when interviewing people on the street.

1. How often do you buy vegetables and fruits?

2. When you are buying fruit and vegetables what makes you pick a certain fruit or vegetable?

3. When would you consider throwing away a fruit or vegetable?

4. Why do you think people throw away fruits and vegetables?

5. How confident are you in the storage of fruits and vegetables?

6. What information about fruits and vegetables would you consider the most important to reduce food waste?

Appendix B

Questions asked in IKDC building aswell as on online survey.

1. How often do you bring fruit or vegetables with you to work or similar?

How do you store fruits and vegetables?

How much fruit and vegetables do you eat everyday?

Do you throw away fruits and vegetables?

What do you think causes you to throw away fruits and vegetables?

Would you eat these?