Assault on Arrillaga

Designed by Gracielly Abreu, Edwin Pua,
Gordon Yeung and Mayshu Zhan

Overview

Assault on Arrillaga is a competitive, educational multiplayer card game where players race to create nutritionally balanced meals. Designed for young adults, like Stanford University Students, the game challenges players to draw, swap, and strategize to meet the dietary requirements set by role cards, which outline servings of vegetables, proteins, carbohydrates, and fruits.

The game's core objective is to teach essential life skills in an engaging and approachable way, helping players grasp the basics of nutrition and balanced meal planning. Through competitive mechanics, *Assault on Arrillaga* encourages strategic thinking, as players must carefully manage their cards and actions to complete their meal goals before others.

What sets *Assault on Arrillaga* apart is its focus on empowering players with practical knowledge about balanced eating, making nutrition both fun and accessible. Players not only compete to win but also learn valuable skills they can apply to real-world meal preparation and healthy living. By blending education with challenge, *Assault on Arrillaga* creates a dynamic and interactive experience that highlights the importance of nutrition in a competitive and exciting way!

Rules

Background

It's lunchtime! You play as students gathering at Arrillaga but aren't sure how to best assemble your meal. You might know it's important to eat fruits and veggies, but how much?

This is a game that teaches you to build meals with healthy nutrient proportions, as recommended by **choosemyplate.gov**. Generally, a plate should contain 40% vegetables, 30% carbs, 20% protein, and 10% fruit, though this can change depending on your dietary needs.

Now that you know this, it's time to put your plate-making skills to the test!

Game Goal

To make a balanced meal according to the role cards' nutritional goal:

- For an **ordinary person**, a typical meal should include the following, with a total calorie intake of approximately 600-800 calories:
    - 4 servings of vegetables 🥬 ✕4
    - 3 servings of carbohydrates 🍞 ✕3
    - 2 servings of proteins 🥩 ✕2
    - 1 serving of fruit 🫐 ✕1

- For a **runner**, a typical meal should include the following, with a total calorie intake of approximately 800-1000 calories:
    - 4 servings of vegetables 🥬 ✕4
    - 5 servings of carbohydrates 🍞 ✕5
    - 2 servings of proteins 🥩 ✕2
    - 1 serving of fruit 🫐 ✕1

- For a **bodybuilder**, a typical meal should include the following, with a total calorie intake of approximately 1000-1200 calories:
    - 4 servings of vegetables 🥬 ✕4
    - 3 servings of carbohydrates 🍞 ✕3
    - 5 servings of proteins 🥩 ✕5
    - 1 serving of fruit 🫐 ✕1

Game Rules

1. *Setup*

   ● Separate food cards and action cards into two piles and give them a shuffle.

   ● Place **4 food fards face up** and **3 action cards face down** in the center of the table.

   ● The person who most recently cooked a meal chooses a role card, places it in the center, and starts the game as the first player.

2. Turns

- Each player takes turns clockwise around the table, drawing either a face down action card or a face up food card.

  - If a player already has **five** food cards, that player **must** take an action card. And if there are no action cards in the center, that player must pass.

  - Food cards are publicly displayed on the table, but action cards are kept secret and held in the hand of the player.

  - Once a card is drawn from the center of the table, that player's turn ends, and they can no longer play action cards.

- **Prior** to drawing a card, players may play as many action cards as they wish.

  - Playable action cards include **Swap**, **Steal**, **Discard**, or **Exercise**.

  - Once a player draws a card, their turn ends and they can no longer play action cards.

- If there are no cards left to draw, place **4 food cards face up** and **3 action cards face down** in the center of the table.

3. Winning

- The first player to complete a meal that meets the role card's **calorie range** and **nutrient ratio** wins!

- In the above example, Alice has these four cards in front of her. In this scenario, Alice has won the game, because the first three food items add up to **630 calories** and fulfill the 🥬4🧊3🥩2🫐1 **ratio**.

Game Bits/Printables

Printable Rulebook

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BACKGROUND

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This is a game that teaches you to build meals with healthy nutrient proportions, as recommended by **choosemyplate.gov**.

Generally, a plate should contain **40% vegetables**, **30% carbs**, **20% protein**, and **10% fruit**, though this can change depending on your dietary needs.

Now that you know this, it's time to put your plate-making skills to the test!

SETUP

1. Separate food cards and action cards into two piles and give them a shuffle.

2. Place **4 food fards face up** and **3 action cards face down** in the center of the table.

3. The person who most recently cooked a meal chooses a role card, places it in the center, and starts the game as the first player.

TURNS

I. Draw a Card:

Each player takes turns clockwise around the table, drawing either a **face down action card** or a **face up food card**.

- If a player already has **five** food cards, that player **must** take an action card. And if there are no action cards in the center, that player must pass.

- Food cards are publicly displayed on the table, but action cards are kept secret and held in the hand of the player

- Once a card is drawn from the center of the table, that player's turn ends, and they can no longer play action cards.

TURNS (continued)

2. Play Action Cards:

Prior to drawing a card, players may play as many action cards as they wish.

- Playable action cards include **Swap, Steal, Discard,** or **Exercise**.

- Once a player draws a card, their turn ends and they can no longer play action cards.

3. Refill Center:

If there are no cards left to draw, place **4 food cards face up** and **3 action cards face down** in the center of the table.

WINNING THE GAME

The first player to complete a meal that meets the role card's **calorie range** and **nutrient ratio** wins!
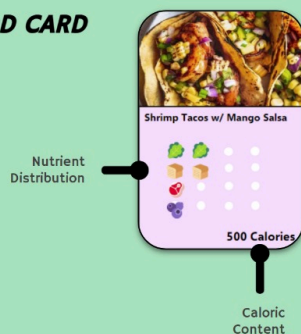

In the above example, Alice has these four cards in front of her. In this scenario, Alice has won the game, because the first three food items add up to **630 calories** and fulfill the 🥬4 🍞3 🍓2 🫐1 ratio.

GAME BITS

- 54 Food Cards
- 54 Action Cards
- 3 Role Cards
- 1 Rulebook

FOOD CARD

Nutrient Distribution

Caloric Content

ACTION CARD

Ability

Swap any two food items

Winning Nutrients and Calorie Range

ROLE CARD

ACTIONS

Swap

Choose a food item, either from you, an opponent, or the center. Swap that food item with any other food item.

Swap
Swap any two food items

Steal

Choose a food item, either from the you, an opponent, or the center. This food item is now yours, if you have less than five food cards.

Steal
Steal any food item

Discard

Choose a food item, either from you, an opponent, or the center. Remove it for the rest of the game.

Discard
Remove any food item from play

ACTIONS (continued)

Exercise

Place this card in front of you. Subtract 100 calories from the next meal you make.

Exercise
Reduce a meal by 100 calories

Block

If you are the target of an action card (including other Blocks), you may prevent that action.

Block
Prevent an action targeted against you, including Block

Redirect

If you are the target of Swap, Steal, or Discard, you may choose another player to be the target instead.

Redirect
Redirect Swap, Steal, or Discard to another player

Printable Cards

https://drive.google.com/drive/folders/1iUZeSH6-aVLozr0xqMAPKkxzHMDWYWva?usp=drive_link

Learning Goals

We developed the learning goals for our game based on Bloom's taxonomy introduced in class.
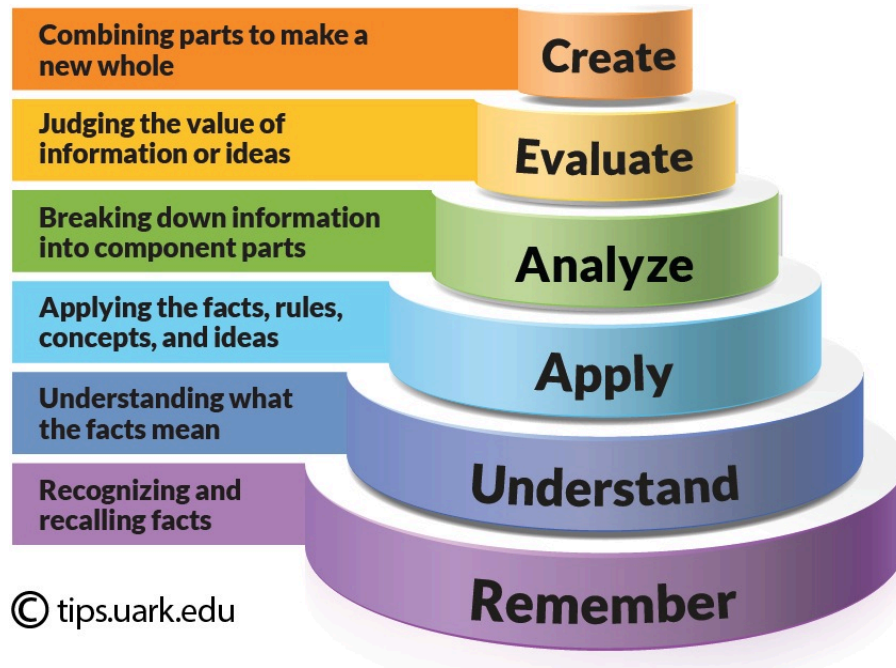
After the end of the game, the players would be able to:

- Recall the recommended nutritional ratios and caloric intake per meal.
- Identify the nutritional and caloric content of common foods found in school cafeterias.
- Create their own balanced meals.

Importantly, we wanted players to evaluate food through two key lenses: nutritional goals and caloric content throughout the process of the gameplay. Players will learn to analyze and balance these factors, understanding how different foods interplay to meet nutritional goals within real-world constraints. This approach encourages them to think critically about their choices and apply strategic thinking to create balanced meals.

Assessment Goals

Methodology

Our primary assessment goal is to measure how effectively *Assault on Arrillaga* teaches players about learning goals we articulated - surrounding on two themes, balanced nutrition and meal planning. We aim to assess whether players can understand and apply the principles of a balanced diet—such as selecting appropriate servings of vegetables, proteins, carbohydrates, and fruits—through their decision-making. On top of that, we want to evaluate how well the game's mechanics promote thoughtful planning and resource management in meeting nutritional goals.

To align with these goals, our data collection method is to implement pre- and post-gameplay questionnaires that players accessed via QR codes. Before the game, players scanned the first QR code to fill out a survey measuring their baseline knowledge of nutrition and balanced diets. After the game, players scanned a second QR code to complete a post-test (identical to pre-test with some additional questions asking for the game mechanics). This approach assessed how the process of gameplay has transferred to their understanding of learning goals on recognizing nutritional / caloric content of different food and components of a balanced meal.

Pre-Test   Post-Test

Data Analysis

$N = 4$ (Pseudonym: G, C, E and J)

Learning Goals Attainments

- **Calories Intake Understanding**

  All participants consistently answered **700 calories** for meal intake in both pre-test and post-test. This indicates a solid understanding of calorie intake.

  In retrospect, this might be due to the questionnaire design (MC questions), instead of a free response.

- **Nutritional Content Intake**

  G, **C**, and **E** shifted their emphasis to intake more **veggies** in the post-test, which is an improvement as it reflects a more balanced view of meal composition.

  J might recall their second round of gameplay, where the role card was the bodybuilder, and hence stated **protein** should be the most prominent portion of the meal.

  All participants recognized **fruits** as the least important component.

- **Proportion of Nutrients**

  G, C and **E** improved her proportions from **1:2:1:0.5** to **4:3:2:1**, indicating an evidently better understanding of nutrient distribution.

  J might recall their second round of gameplay, and hence stated 4: 3: 5: 1 as proportions. Yet, their response altered from **3:3:5:1** to **4:3:5:1**, demonstrating evidence of learning from gameplay.

- **Some Qualitative Feedback from Players**

  "The pre and post tests <u>really cemented for me that I had an intuition of what the game represents in terms of healthy eating</u>. The outcomes were quite simple and clear for the learning aspect."

  "I was surprised <u>how much more confident i felt on the post-quiz</u> after playing."

  "We need <u>more carbs than i thought</u>"

Mechanics Review

- **Game Engagement**

  All participants rated their enjoyment of the game relatively high (4 or 5). This indicates the game's effectiveness in engaging users.

  Responses about their understanding of how to create a balanced meal also improved, with **J** achieving a perfect score (5) in the post-test, suggesting they felt confident after gameplay.

- **Feedback on the Game**

  The feedback shows enthusiasm for the gameplay mechanics, particularly the action cards and engagement strategies.

  Some constructive criticism highlights issues like pacing and difficulty in tracking macronutrient totals, which can be addressed in future iterations to improve usability.

- **Some Qualitative Feedback from Players**

  "I like how they label calories on foods that is common in stanford dining halls"

  "This game seems really well thought out, and I love the mechanics with actions and foods."

  "It is fun "stealing" with each other and seeing actions blocked."

  "Everything is good! I love this version of the game."

  "Great fun!"

  "The action cards is confusing cuz its irrelevant to reality"

  "Rather fun, although it felt like we were just playing our own cards and leaving it at that sometimes. The most fun plays were blocking and swapping cards with other players and convincing other players to "block" someone else rather than myself."

The detailed result of our questionnaire could be found here:

Pretest survey

https://docs.google.com/spreadsheets/d/1PwHV8IEQP_bAXV9YqYMCb23NtiqefJ-HG04x3wY7koM/edit?usp=sharing

Posttest survey

https://docs.google.com/spreadsheets/d/19xPIpCq6-dNiFD74mS5XJHpe68ggxD5_XDR8b8sPQpk/edit?usp=sharing

Design Iterations and Playtests

Initial Brainstorming Session

At the start of our brainstorming session, each of us came up with a variety of initial ideas. We then selected the most promising concept from each person to explore further. For instance, Gracielly proposed a game about evading taxes, Edwin suggested one focused on gratitude journaling, and Gordon pitched the idea of a game about preparing lunch boxes. In hindsight, the lunch box idea that I had was pretty spontaneous—I had just finished eating lunch!
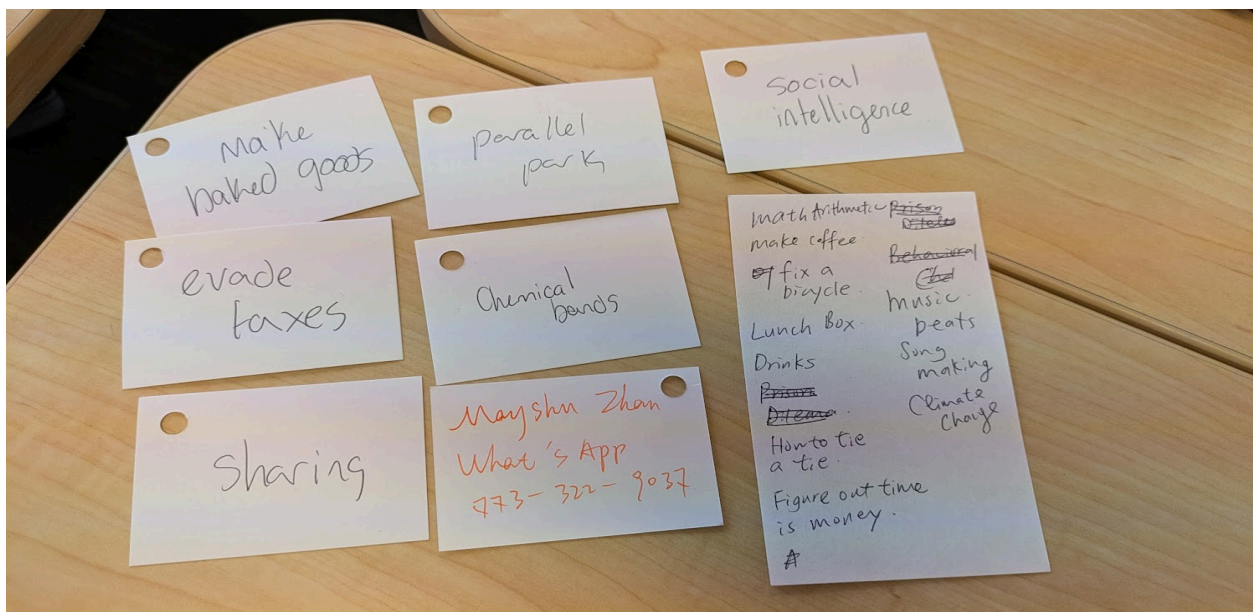

We agreed that people often overlook the nutritional content of the food they eat, even though it's important. Since this is a topic that deserves more attention, we decided to move forward with it, believing it has the potential to be both educational and fun - the major goal of serious games!

Our "Shitty First Draft"

The image showcases the very first draft of our educational game, "Assault on Arrillaga." The draft consists of simplistic, hand-drawn cards with minimal visual detail that convey the essential mechanics: selecting food cards to create three nutritionally balanced meals of a day according to the player's selected role.

This would correspond to a food pyramid diagram and serves as a reference point for players to balance their meals. This initial iteration focuses on functionality over polish, allowing us to quickly prototype the game's core ideas.
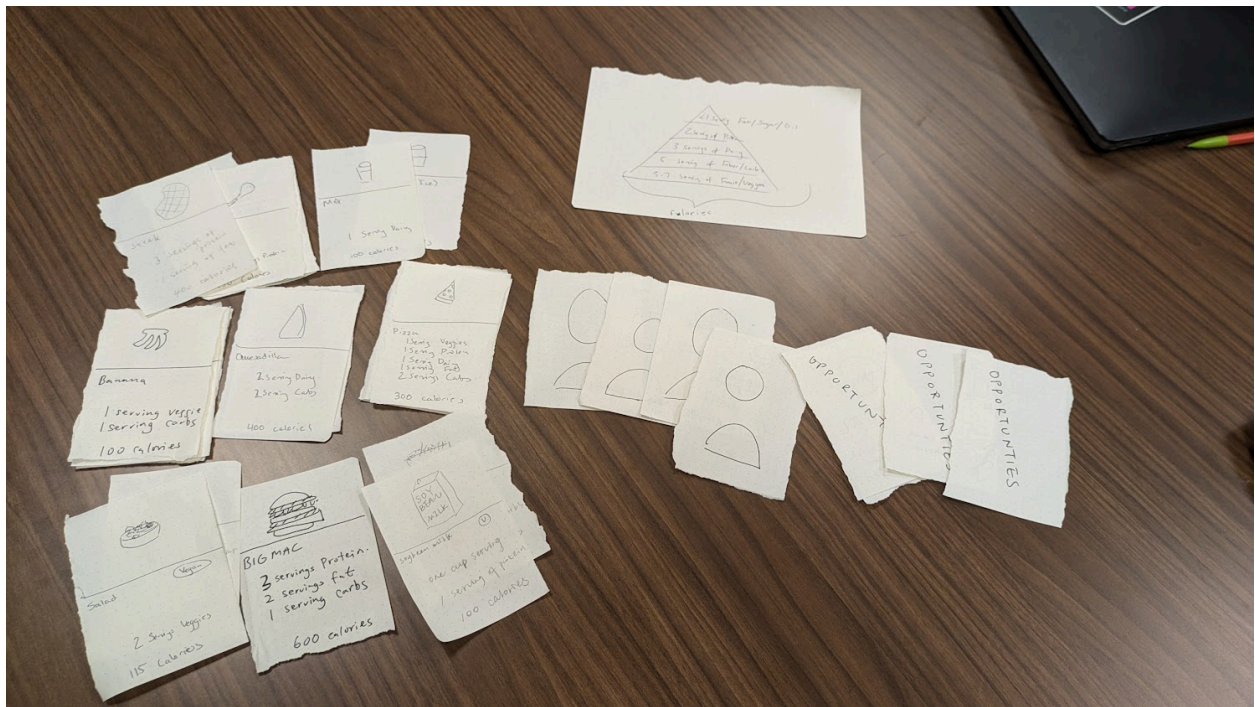
Our very first prototype. Instead of choosing which food or opportunity cards to draw, players drew all cards randomly from a face down deck. There wasn't much player agency or choice, and the game practically played itself!

Initial Thoughts and Playtest on 10/01

During the first test with our core design team, we quickly identified the need to diversify the food cards. We requested more options that catered to specific dietary needs, such as vegan and elderly-friendly meals. Since this is an educational game, we emphasized the importance of providing accurate information, and the feedback reinforced this—highlighting the need for more precise nutritional facts.
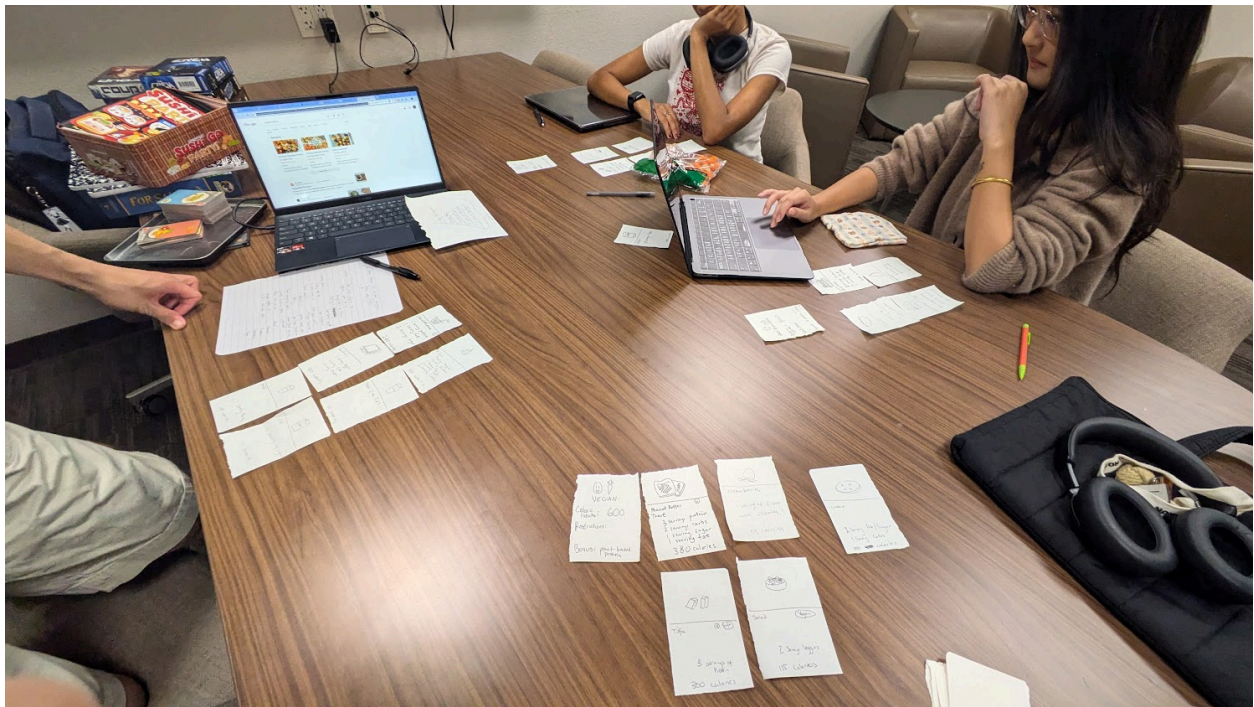

As such, we expanded the variety of food cards to include options that cater to different dietary preferences, ensuring a more inclusive experience for players.

And to increase player interaction, we also enhanced the use of powerups called opportunity cards, which enabled more strategic moves such as blocking, poisoning, stealing or swapping food cards.

Playtest on 10/02 - External Testing (CS 377 students)

Feedback from three females and one male in a game design class helped clarify several mechanics. For example, players felt that cards were overly verbose and wanted more straightforward instructions on tracking calorie intake.
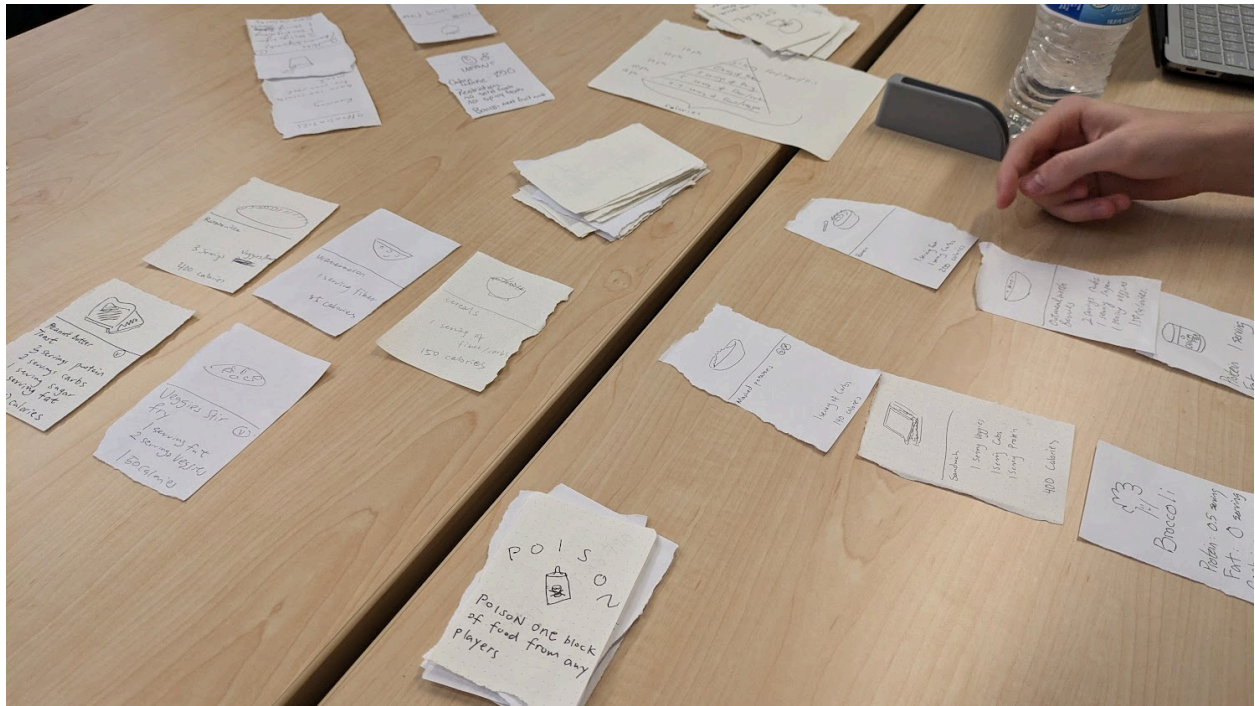

*During the above playtest, we paid close attention to player reactions. When a player would draw a powerful opportunity card, they **gasped** and **smiled**. When a player would draw a card with a lot of text, they would stop to read it, causing everyone else to wait and creating **boredom**. When final scoring came, and players realized they were supposed to pay attention to the food pyramid, this caused **befuddlement** and **confusion**. So even though this prototype was crude, it gave us crucial ideas of what needed to change and shaped the trajectory of our game.*

There was also some confusion around the role settings and challenge system, specifically questioning the feasibility and rationale of incorporating certain roles—like an infant—with young adults as our target audience.

In response, we simplified and clarified the roles. We discovered that, rather than adding more mechanics in hopes of increasing interactivity, it can often be more effective to take a step back and simplify the game.

So we decided to put our focus on mechanics that align directly with our learning objectives. Specifically, we observed that players struggled to manage two numerical dimensions—nutritional

servings and caloric content—simultaneously. For instance, in this current iteration of the game, players did not realize that they should be paying more attention to the number of servings of food their meal had, because the scoring reference was a messy, hastily drawn food pyramid.
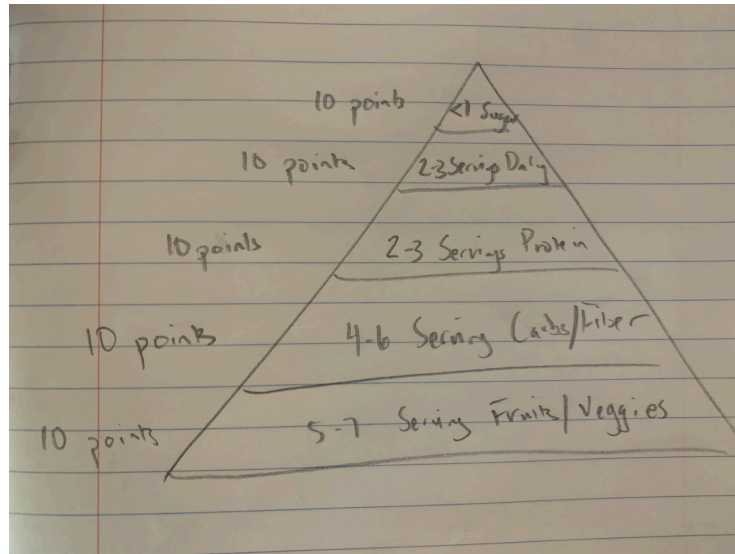
Initial scoring reference. Confusing to follow and easy to ignore for our playtesters, despite its importance to the game.

To improve the way information is encoded in our gaming components, we made several design iterations. First, we replaced the wordy, numerical representation of nutritional servings with more intuitive, visual dots.

Second, we introduced a color scheme, assigning each nutrient a distinct color: Protein (red), Carbs (yellow), Vegetables (green), and Fruits (blue). Given the above two factors, we also introduced corresponding colored tokens, which players can collect and pool together to quickly assess their nutritional status and make faster decisions.
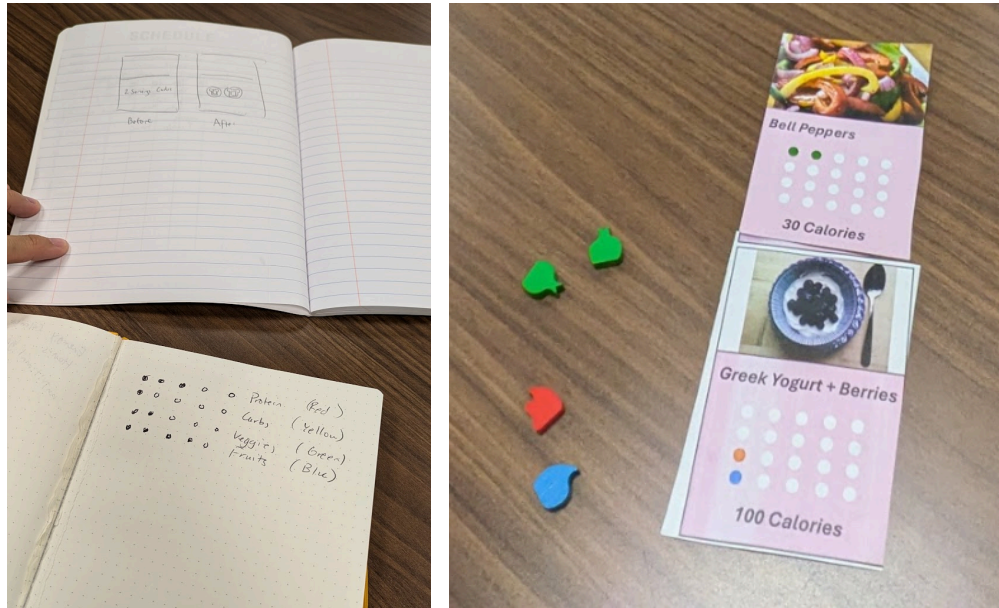
Ideas for new card designs on the left, and printed cards/tokens on the right. More intuitive scoring!
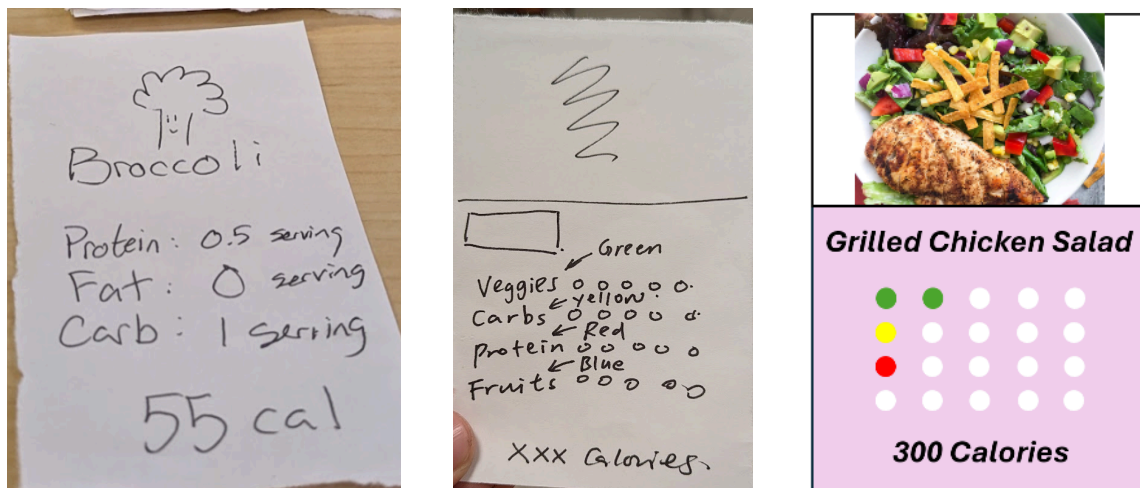
Original Design (left) *vs.* **Low Fidelity Design (middle)** *vs.* **High Fidelity Design (right)**. *Evolution of our card design, tending away from wordiness in favor of more readable, colorful symbology!*

Playtest on 10/05 - Refining Flow and Mechanics

In this session with Stanford students, the opportunity cards made the game more engaging and playful, but it made the session unnecessarily long (over 45 minutes). To resolve this, we updated the win condition to require players to complete just one balanced meal instead of three.

New playtest! Being able to collect and organize resource tokens added fiddliness, but ultimately helped players realize their goal was to meet balanced meal proportions.

To ensure a faster turn, we also changed the rules to allow players to either draw one opportunity card or two food cards per turn, instead of only drawing one card from the pile. This could really speed up the gameplay. However, we observed that, with the reduced number of action cards (potentially) drawn, this rule also reduced the frequency of interactions, which decreased the fun factor.

Finally, we renamed the 'opportunity cards' to 'action cards' to better emphasize their role as actions that a player can perform.

Playtest on 10/07 - Mechanics Feedback

In this session, we focused on clarifying game mechanics and updating the design.

Here, players raised concerns about misinformation in certain cards, particularly the exercise card, which was originally designed to indicate that it could consume all calories from any food. This unrealistic representation could promote unhealthy behaviors, such as over-exercising, raising valid concerns about spreading misinformation.

To prevent misinformation, we revised the exercise card to reflect more realistic calorie expenditure in line with real-world exercise. More specifically, instead of reducing a food item's calories to 0, the Exercise action card reduced a meal's calories by 100.

We also placed the nutritional goals on role cards, keeping them at the center of the table to constantly remind players what their win condition was.

After gameplay, several players also expressed confusion about the purpose of the resource tokens. Cards were sufficient enough at representing nutrients, and trading both cards *and* resource tokens when **Steal** or **Swap** was played became cumbersome.

In response, we decided to eliminate the tangible tokens and replaced the dot system with simpler, more intuitive symbols to represent nutritional elements. This change was also based on accessibility concerns.
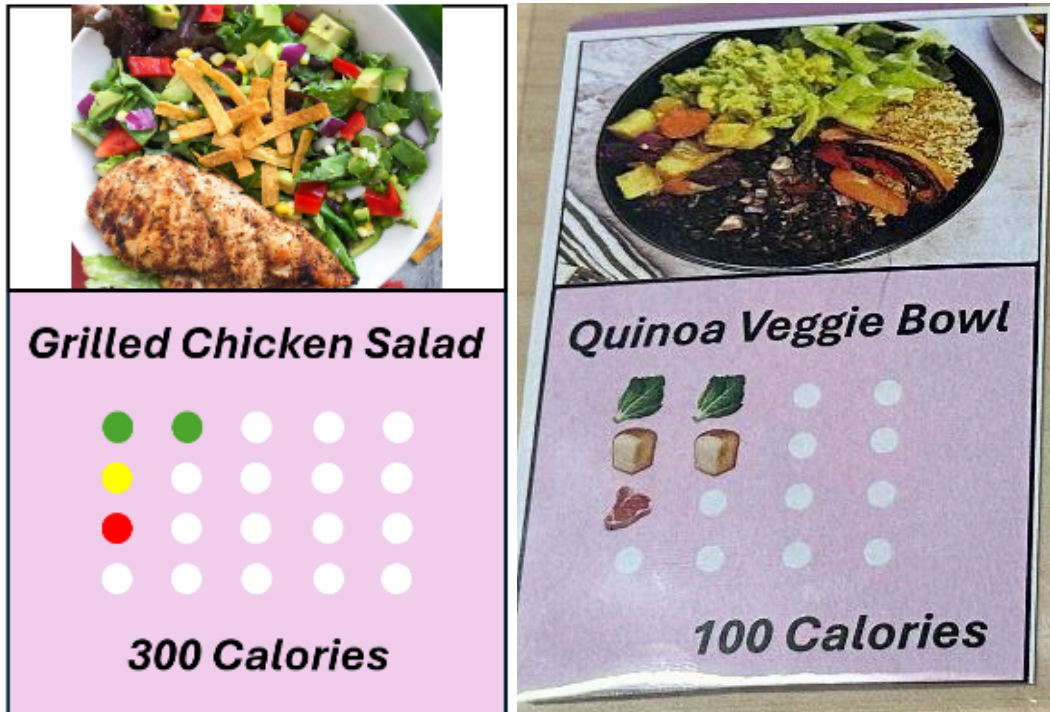
Before (left) vs. After (right). Decreased the number of white dots and made them smaller to reduce visual noise. Also gave the dots more distinct iconography to help make them more distinguishable during gameplay and address concerns about color blindness.

During this playtest, we also noticed that when action cards were visible to players, they selectively choose more powerful cards (e.g. Steal) while avoiding more situational, weaker cards (e.g. Swap), which created a less complex decision space. To solve this, we made a change to mechanics where now the action cards are faced down, introducing an element of uncertainty and tension. The mind games and tug-of-war as a result of hidden action cards manifested itself as SOPHIA, which we were very pleased with.

Before (left) vs. After (right). Now, action cards are face down. This reduces information overload and puts the central focus squarely on the food and meal-building, while still allowing the players the fun mischief that comes with action cards.

We also limited the number of food cards a player could hold to five. This forced players to interact more frequently, as they had to draw action cards once they exceeded the five-card limit. Thus, instead of hoarding and stocking up on food cards, players had to be much more selective about what foods to draft, creating a much more strategic decision space.

Playtest on 10/09 - Final Feedback and Adjustments

In this session, we identified several areas for improvement based on player feedback. One key issue was the misinformation regarding the calorie intake for the builder role, with players pointing out that the builder needed more calories than reflected in the game, which could mislead players about real-world calorie needs. We then adjusted the calorie range requirements of bodybuilders and runners to 1000-1200 and 800-1000, respectively.

Players also expressed dissatisfaction with being forced to take the last available card on the table, especially when it didn't suit their strategy. These players would have no choice but to make a suboptimal decision through no fault of their own.

To address this, we changed the refill phase to replenish seven cards in the center of the table, rather than six. Through some modular arithmetic, we were able to determine that this arrangement ensured that the players that were first to draft and last to draft were different every turn.

	A	B	C	D	E	F	G	H	I	J	K
1	4 Players 6 Cards			4 Players 8 Cards			4 Players 10 Cards			4 Players 7 Cards	
2	Player	Card		Player	Card		Player	Card		Player	Card
3	1	6		1	8		1	10		1	7
4	2	5		2	7		2	9		2	6
5	3	4		3	6		3	8		3	5
6	4	3		4	5		4	7		4	4
7	1	2		1	4		1	6		1	3
8	2	1		2	3		2	5		2	2
9	3	6		3	2		3	4		3	1
10	4	5		4	1		4	3		4	7
11	1	4		1	8		1	2		1	6
12	2	3		2	7		2	1		2	5
13	3	2		3	6		3	10		3	4
14	4	1		4	5		4	9		4	3
15	1	6		1	4		1	8		1	2
16	2	5		2	3		2	7		2	1
17	3	4		3	2		3	6		3	7
18	4	3		4	1		4	5		4	6
19	1	2		1	8		1	4		1	5
20	2	1		2	7		2	3		2	4
21	3	6		3	6		3	2		3	3
22	4	5		4	5		4	1		4	2
23	1	4		1	4		1	10		1	1
24	2	3		2	3		2	9		2	7
25	3	2		3	2		3	8		3	6
26	4	1		4	1		4	7		4	5
27	1	6		1	8		1	6		1	4
28	2	5		2	7		2	5		2	3
29	3	4		3	6		3	4		3	2
30	4	3		4	5		4	3		4	1
31	1	2		1	4		1	2		1	7
32	2	1		2	3		2	1		2	6
33	3	6		3	2		3	10		3	5
34	4	5		4	1		4	9		4	4
35	1	4		1	8		1	8		1	3
36	2	3		2	7		2	7		2	2
37	3	2		3	6		3	6		3	1
38	4	1		4	5		4	5		4	7

Spreadsheet showcasing the modular arithmetic calculations to determine the number of cards that need to be placed on the table during refill phase. This is to prevent the same player from being the last to draft a card.

Another issue we identified was that some action cards, such as **Redirect**, were passive, preventing players from proactively influencing the game. For instance, one player spent four turns drawing action cards, only for all of them to be **Exercise**! This diminished strategic depth and engagement.

Thus, in the latest version, we reduced the number of passive action cards. This encouraged more aggressive play and created more fun "Take that!" moments.

Healthy eating :)