

Legacies (Digital)

Katherine Chen | CS377G Fall 2023



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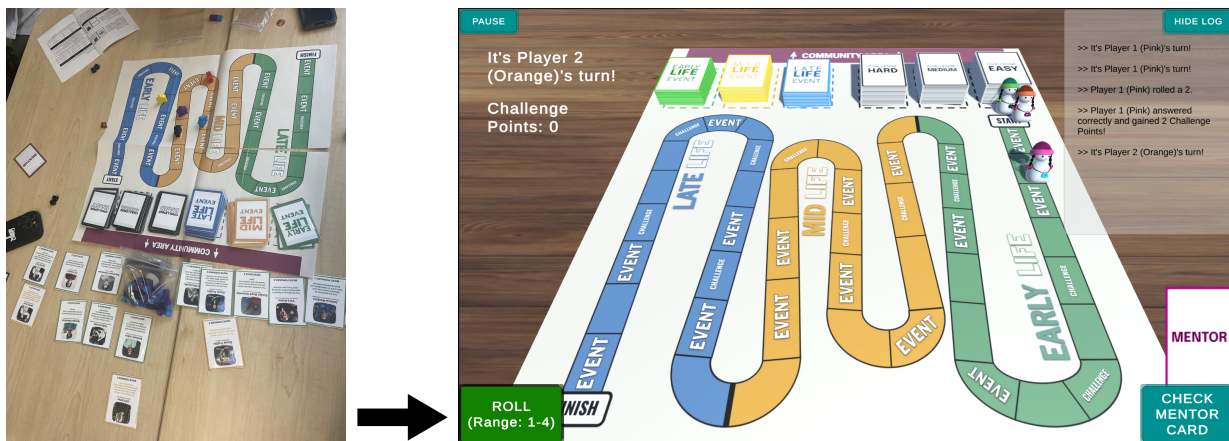
Overview

Legacies began as an [analog board game created by my P1 group](#).

About the game: *Legacies* explores the contributions that many women have made to science over the years, and across the world. You, as a budding female scientist, will go through various stages of life as you try to achieve scientific discovery. Throughout the journey, you will collect achievements, test your knowledge, and experience setbacks that real women scientists have faced for decades. Once you've finished your journey, you will know more about the accomplishments of women in science and the struggles they overcame to get there.

This project is on refining *Legacies* by transitioning it from an analog board game to a digital format. My primary goal is to bring this educational game into the digital realm to enhance accessibility and broaden its reach, ultimately fostering a deeper appreciation for the amazing contributions of women in science. With a target audience of middle-school students in mind, I envision teachers assigning the digital game for play either in small groups during class sessions (multiplayer mode) or as individual homework assignments to be completed at home (single-player mode). The digital adaptation also provides an opportunity to incorporate dynamic and interactive elements that can effectively captivate players, immersing them in the narratives of these scientists.

My focus throughout the project has been on the seamless transition from analog to digital, prioritizing an intuitive user interface to ensure smooth and enjoyable gameplay. Beyond these initial expectations, I delved into refining game mechanics by introducing new features, such as dual challenges, to add an extra layer of fun and engagement. Aesthetically, I adhered to visual design principles, and integrated animations and sound effects for a more immersive experience. The result, hopefully, is a digital game that not only educates but also entertains.



Links to Game, Code, Designs

- [Link to digital *Legacies* \(itch.io\)](#)
- [Link to code](#)
- [Link to card designs](#)

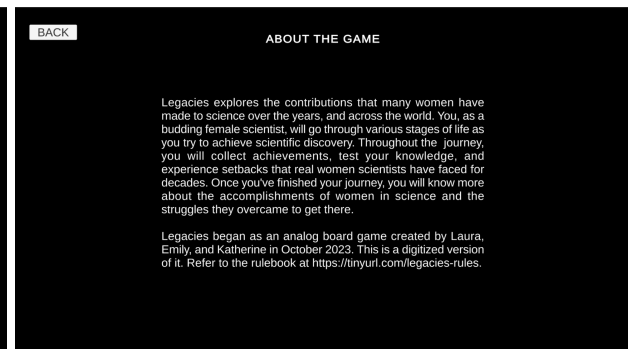
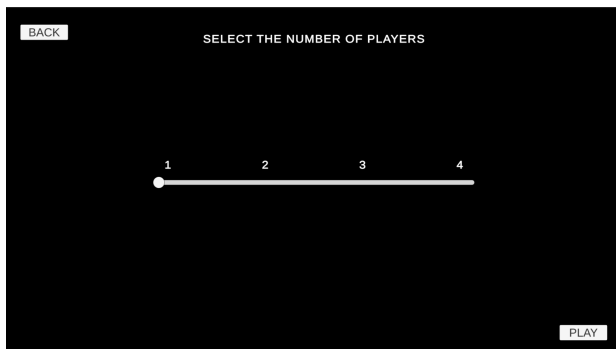
Iteration #1 (almost-complete replication) (<https://kathchen.itch.io/legacies-v1>)

For the initial prototype, I focused on replicating the analog game as much as I could. I transitioned most of the game pieces and mechanics (*Event Cards*, *Challenge Cards*, *Mentor Cards*, dice rolls, *Player Piece* movement, gameplay, and winning and scoring) to its digital version in Unity. I have not implemented the *Community Area* and *Group Challenges*, but I plan to do so in the next version of my prototype. So far, my Unity project has two scenes and supports single or multiple (1 to 4) players. I exported this version and uploaded it to itch.io.

Note: This is not a virtual game, and it requires all players to be physically in the same space as they take turns navigating the digital system. Making it a virtual game requires setting up a remote game server and dealing with network calls, which I believe is out of the scope of this project given the short timeframe.

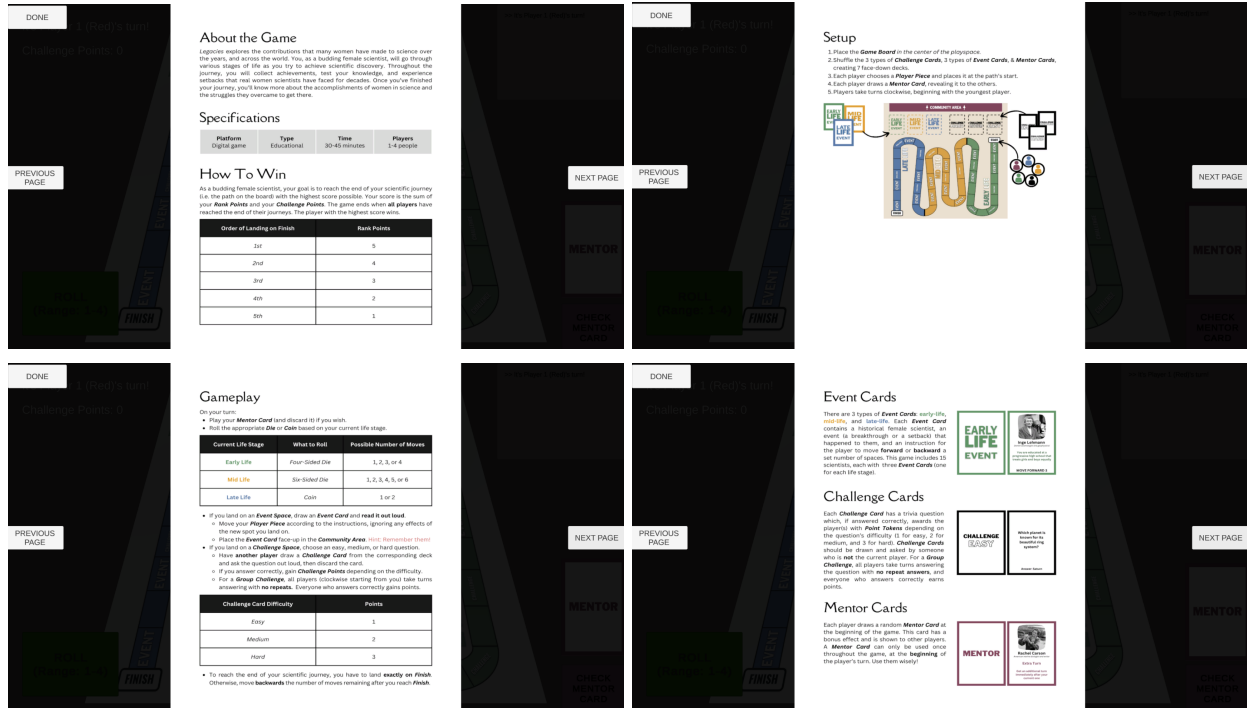
>> Scene 1: Menu Scene

This is the first thing you see when you launch the game. The screen consists of the cover photo of *Legacies*, a “Play” button, and an “About” button. The “Play” button takes you to select the number of players, and the “About” button takes you to a brief overview of the game.

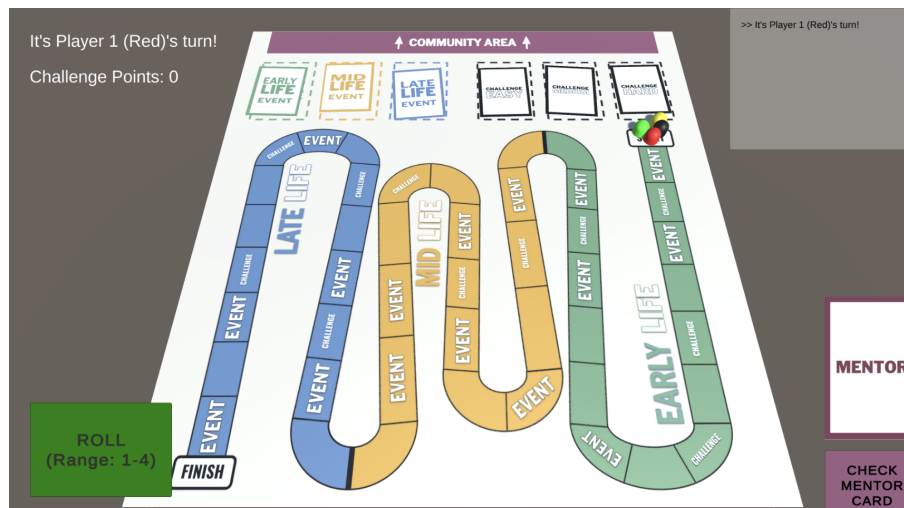


>> Scene 2: Game Scene

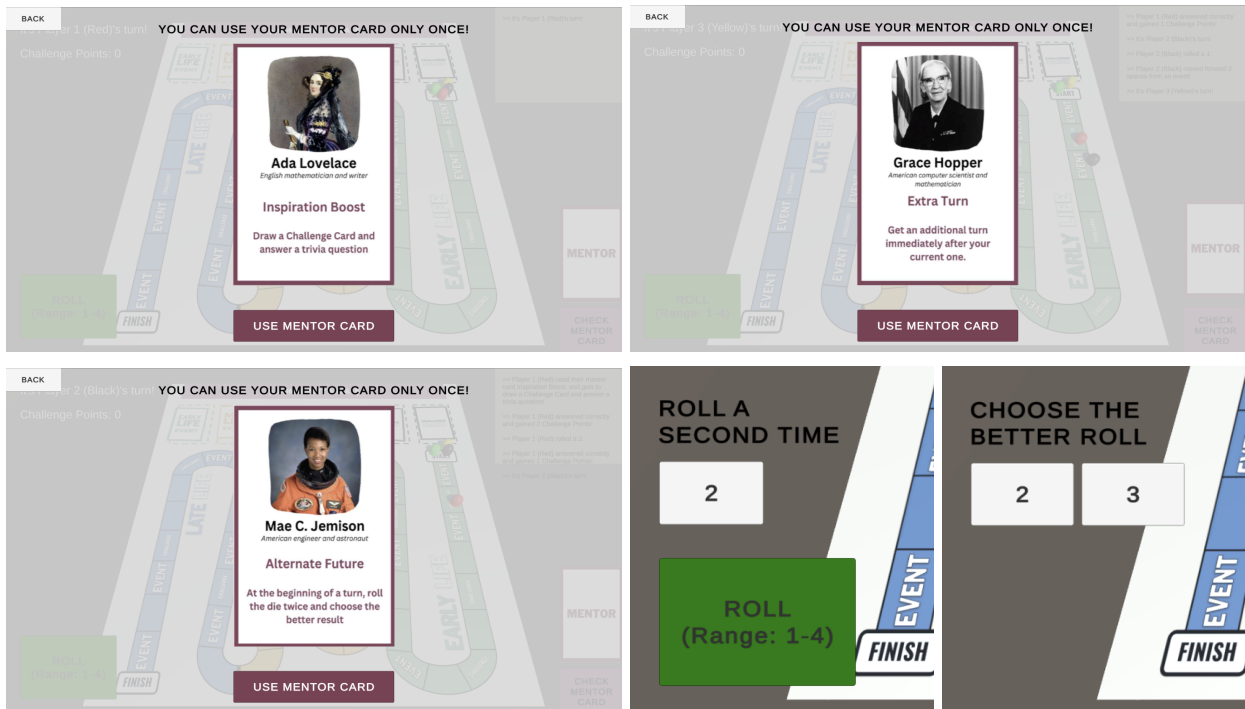
Once you select the number of players and click “Play”, the game will bring you to the **Game Scene**, where you first read the rules, taken directly from the original *Legacies* rulebook. You can click the “Previous Page” and “Next Page” buttons to navigate through 4 pages of rules.



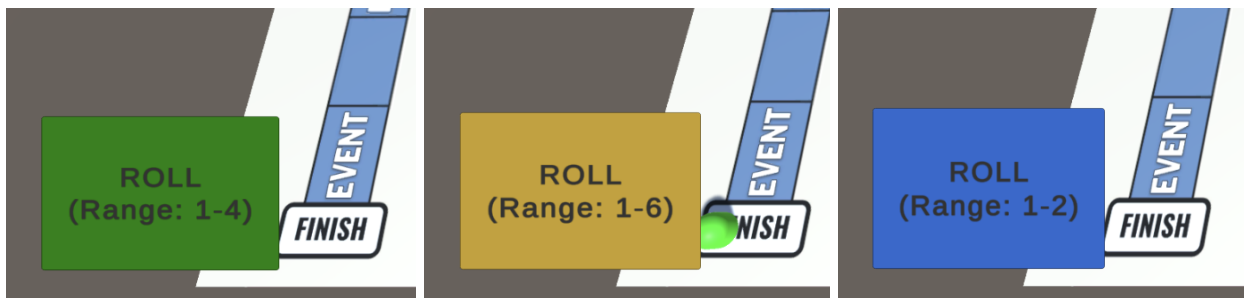
Clicking the “Done” button will reveal a 3D scene with a board that is already set up with the correct number of players, each with a **Player Piece** and a **Mentor Card**, as well as shuffled decks of **Event Cards** and **Challenge Cards**. From here, players take turns using the laptop. Check the top-left corner to see who’s turn it is, and how many **Challenge Points** they currently have. Check the top-right corner to see a log of the five most recent events of the game.



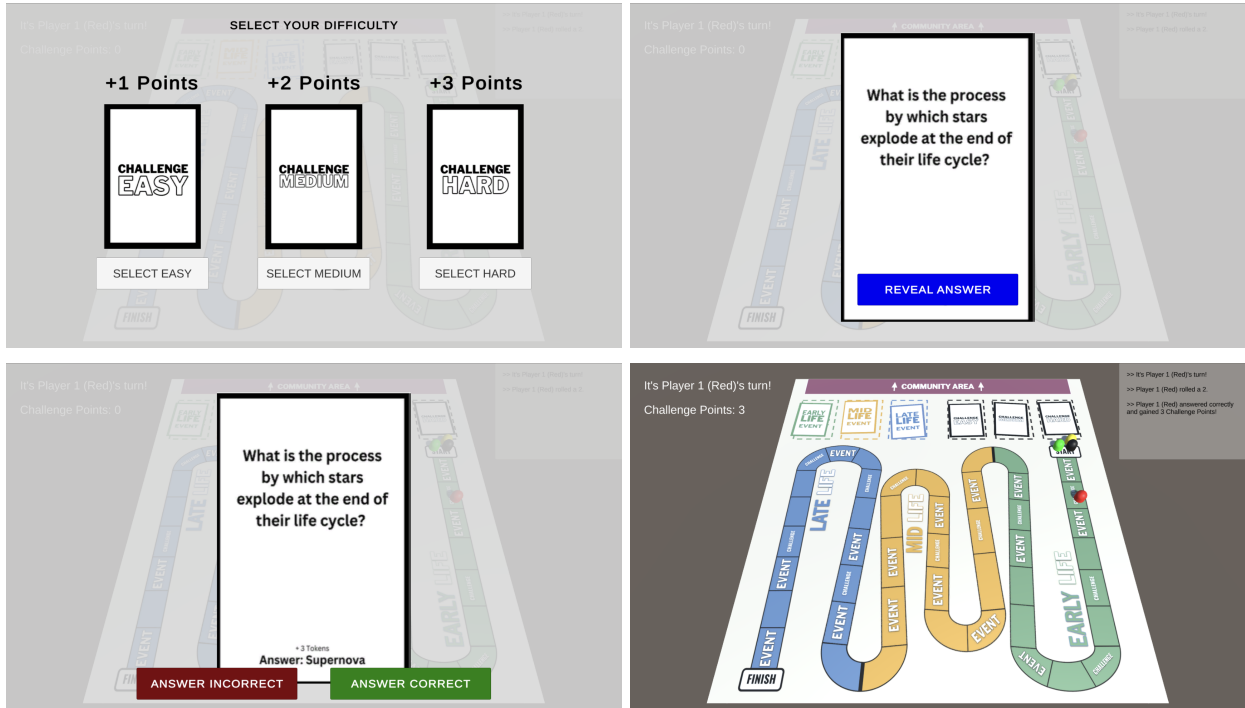
At the beginning of each turn, a player can click the “Check Mentor Card” button which brings up their *Mentor Card*, which they can decide whether or not to use. If they choose to use it, then the power-up given by the *Mentor Card* will come into effect, and the “Check Mentor Card” button will be gone for the rest of the game. I implemented all three types of *Mentor Cards*: “Inspiration Boost”, “Extra Turn”, and “Alternate Future”. *Mentor Card* usages, like most other events, are recorded in the log. For the “Alternate Future” card, there are additional prompts for rolling a second time and choosing one of the two results, as shown below.



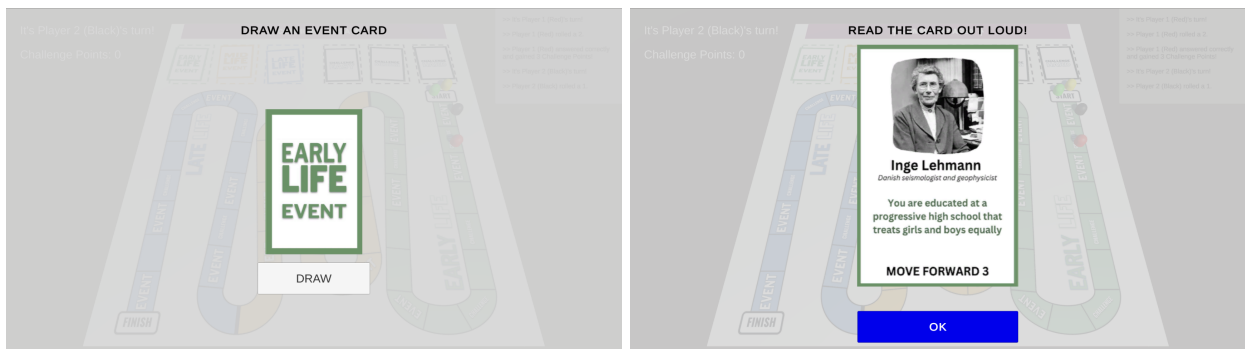
Then, the player clicks the “Roll” button, color-coded corresponding to the life stages and labeled with the range of the outcomes. The game automatically animates their *Player Piece* to show it moving forward the number of spaces that they roll, one space at a time.



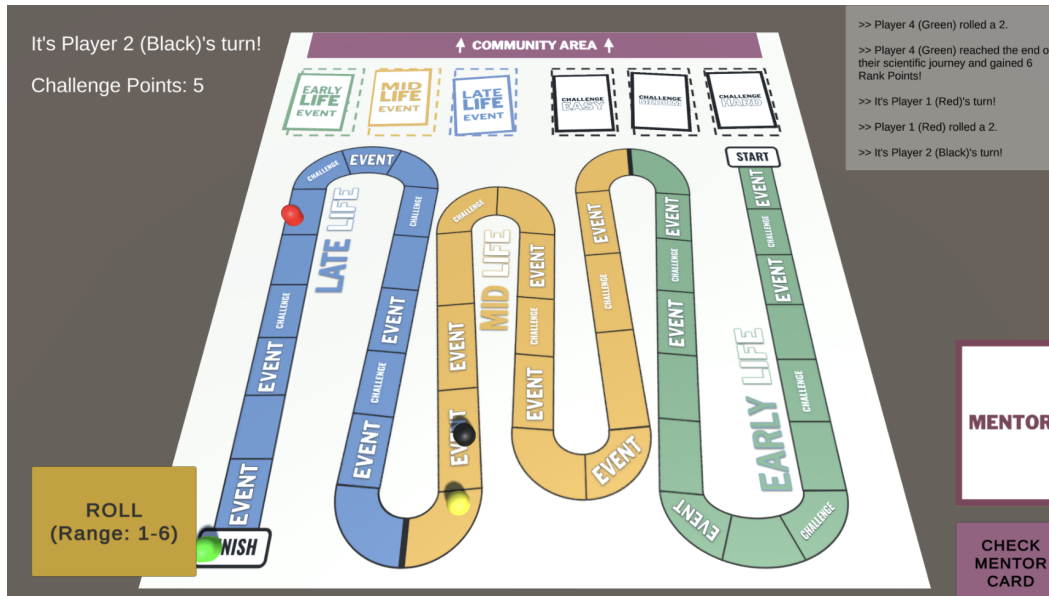
If the player lands on a **Challenge Square**, the game prompts them to choose a challenge difficulty by clicking the “**Select Easy**”, “**Select Medium**”, or “**Select Hard**” buttons. Then, they will have to answer a trivia question, click the “**Reveal Answer**” button to check if they’re correct, and click the “**Answer Incorrect**” or “**Answer Correct**” buttons to indicate the result.



If the player lands on an **Event Square**, the game prompts them to draw an **Event Card** and read it out loud. Once the player clicks “**OK**”, they see the animation of their **Player Piece** moving forward or backward according to the card.

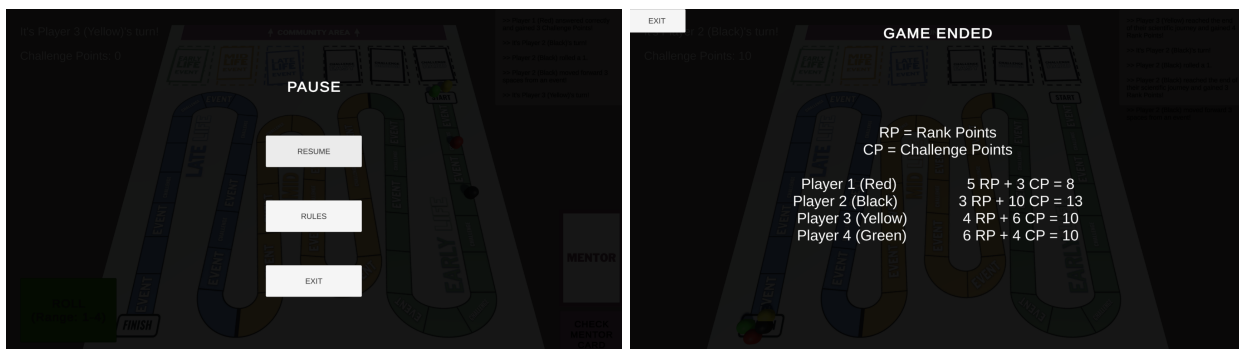


When a player reaches the *Finish Square*, landing exactly on it, then they have reached the end of their scientific journey and gain the appropriate number of *Rank Points*, according to their order of finish. In this case, the *Green Player Piece* finished first and gained 6 *Rank Points*, as indicated in the log. Then, they wait for the other players to also reach the end.



At any point during the game, a player can press the “Escape” key to pause the game and bring up a menu, where they can click “Resume” to resume the game, “Rules” to view the rulebook again, and “Exit” to abandon the game and go back to the *Menu Scene*.

Once all players have reached the end, the ending screen pops up, showing each player’s *Rank Points*, *Challenge Points*, and total score. It is interesting that in this case, even though the *Black Player Piece* was the last to reach the *Finish Square* (hence the fewest *Rank Points*), they have the most *Challenge Points* from answering trivia questions correctly, making them the winner of the game with the highest total score. From here, they can click the “Exit” button to return to the *Menu Scene*.



>> Playtests & Feedback

For this version, I wanted to test both single-player and multiplayer modes. So I asked one of my group mates from P1 to playtest, leveraging her familiarity with the original board game. Subsequently, during class, I conducted a multiplayer playtest involving three participants. By incorporating perspectives from both an insider and external players, I aimed to obtain comprehensive insights for enhancing the digital *Legacies* game.

Playtest #	Date	Playtester Demographics	Duration
1	12/04/23 (online)	1. Female, CS377G student, a creator of analog <i>Legacies</i>	5 min
2	12/05/23 (in-class)	1. Male, CS377G student in International Policy 2. Male, CS377G student in Computer Science (AI) 3. Female, CS377G student in Computer Science (HCI)	25 min

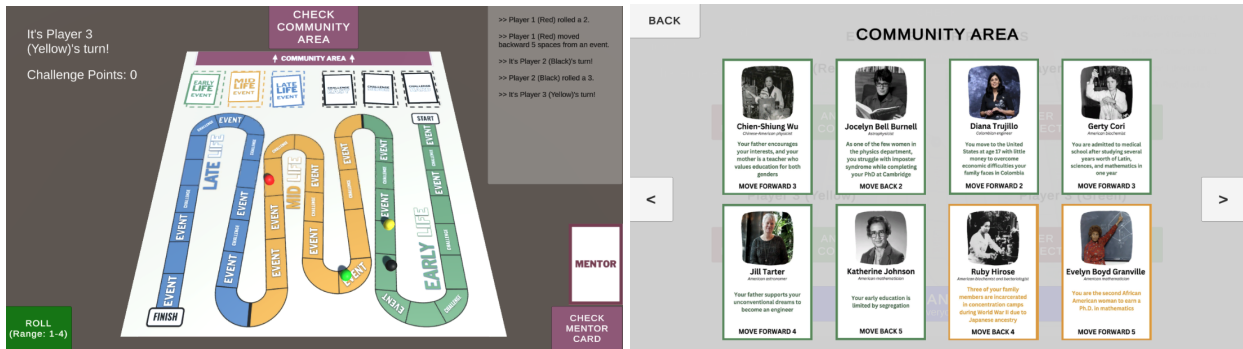
The first playtester, despite breezing through **Challenge Card** questions due to her familiarity with the original board game, expressed satisfaction with the digital version’s interface. She highlighted the absence of confusion, stating, “It’s super smoothed out already... I didn’t have any issues with the interface or not knowing what to click etc.” Overall, her feedback underscores a successful transition from analog to digital, with well-integrated game mechanics and an intuitive user interface.

For the in-class playtest, I received positive feedback regarding the game’s aesthetics, particularly the player movement animations. One tester suggested simplifying the rulebook, tailoring it to the digital format, and omitting setup instructions as they are now automated. She also suggested improving button visibility by incorporating borders and shadows, and adding a background. Another tester, the only one who had played analog *Legacies*, commended the transition to the digital format but noted inherent issues in the original mechanics, particularly the limited player interaction, especially in the absence of **Group Challenges**. Drawing inspiration from Mario Party, players proposed introducing “dual challenges” (e.g. a player quizzes another player on a woman scientist’s fact) or allowing the potential theft of **Challenge Points**, akin to Mario Party’s star-stealing mechanic. Additionally, players expressed a desire for in-game tutorials featuring tooltips for a better onboarding experience.

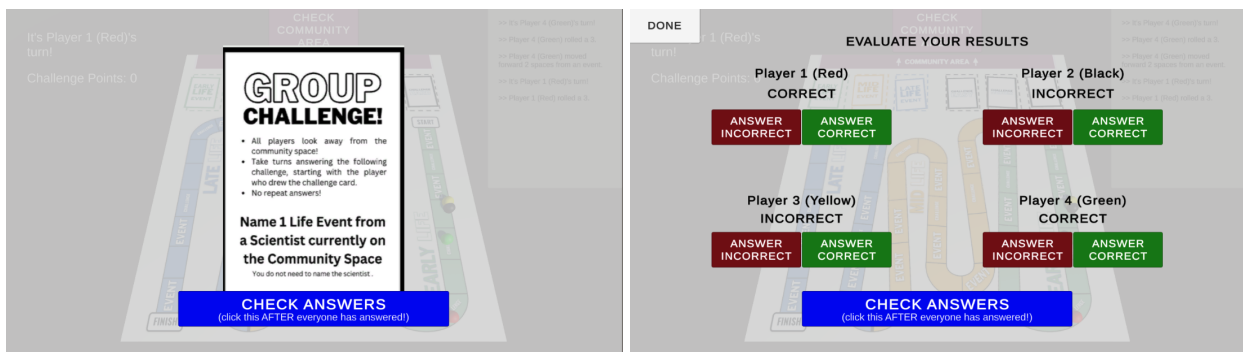


>> Changes Made for Iteration #2

To finish replicating the original game, first, I implemented the **Community Area**. Before, **Event Cards** that were drawn from the deck were simply discarded. Now, they are placed in the **Community Area**, and players can click the “**Check Community Area**” button at the top of the screen to view the **Event Cards**, scrolling through them 8 at a time.



Then, I added the six **Group Challenge** cards from P1 – two for each difficulty level (easy, medium, hard) – to the project. Now, when a player draws a **Group Challenge Card**, the game system will instruct players to take turns answering the question based on the **Event Cards** encountered so far. Once done, they click the “**Check Answers**” button to bring up the **Community Area** panel and check their answers. For each player, click the “**Answer Incorrect**” or “**Answer Correct**” button to inform the system of their result, and their **Challenge Points** will be incremented appropriately upon clicking the “**Done**” button.



At this point, I had faithfully replicated all the core mechanics from the original analog game. Moving forward, I focused on 1) improving the game’s aesthetics, and 2) modifying the mechanics for more effective learning and engaging gameplay.

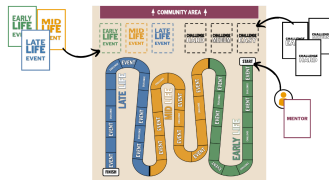
To address feedback from Playtest #2, I added an image of a wooden table surface as the background, and simplified the rulebook to include only the parts necessary for the digital version, removing unnecessary sections (e.g. setup instructions) and cutting the rules from 4 to 3 pages.

How To Win

As a budding female scientist, your goal is to reach the end of your scientific journey (i.e. the path on the board) with the highest score possible. Your score is the sum of your Rank Points and your Challenge Points. The game ends when all players have reached the end of their journeys. The player with the highest score wins.

Order of Landing on Finish	Rank Points
1st	6
2nd	5
3rd	4
4th	3

Setup (Automated)



Gameplay

On your turn:

- Play your Mentor Card (and discard it) if you wish.
- Roll the appropriate Die and move along the board.

Current Life Stage	Possible Number of Moves
Early Life	1, 2, 3, or 4
Mid Life	1, 2, 3, 4, 5, or 6
Late Life	1 or 2

- If you land on an Event Space, draw an Event Card and read it out loud.
 - Move your Player Piece according to the instructions, ignoring any effects of the new spot you land on.
 - Place the Event Card face-up in the Community Area. *Hint: Remember them!*
- If you land on a Challenge Space, choose an easy, medium, or hard question.
 - Draw a Challenge Card from the corresponding deck.
 - If you answer correctly, gain Challenge Points depending on the difficulty.
 - For a Group Challenge, all players (clockwise starting from you) take turns answering with no repeats. Everyone who answers correctly gains points.

Challenge Card Difficulty	Points
Easy	1
Medium	2
Hard	3

- To reach the end of your scientific journey, you have to land **exactly** on Finish. Otherwise, move backwards the number of moves remaining after you reach Finish.

Event Cards

If you land on an Event Space, draw an Event Card based on your current stage (early life, mid-life, or late-life). Read it out loud and try to remember it! You may be quizzed on the information later. Each card contains a historical female scientist, and a number of spaces to forward or backward. This game includes 15 scientists, each with three Event Cards (one for each life stage).



Challenge Cards

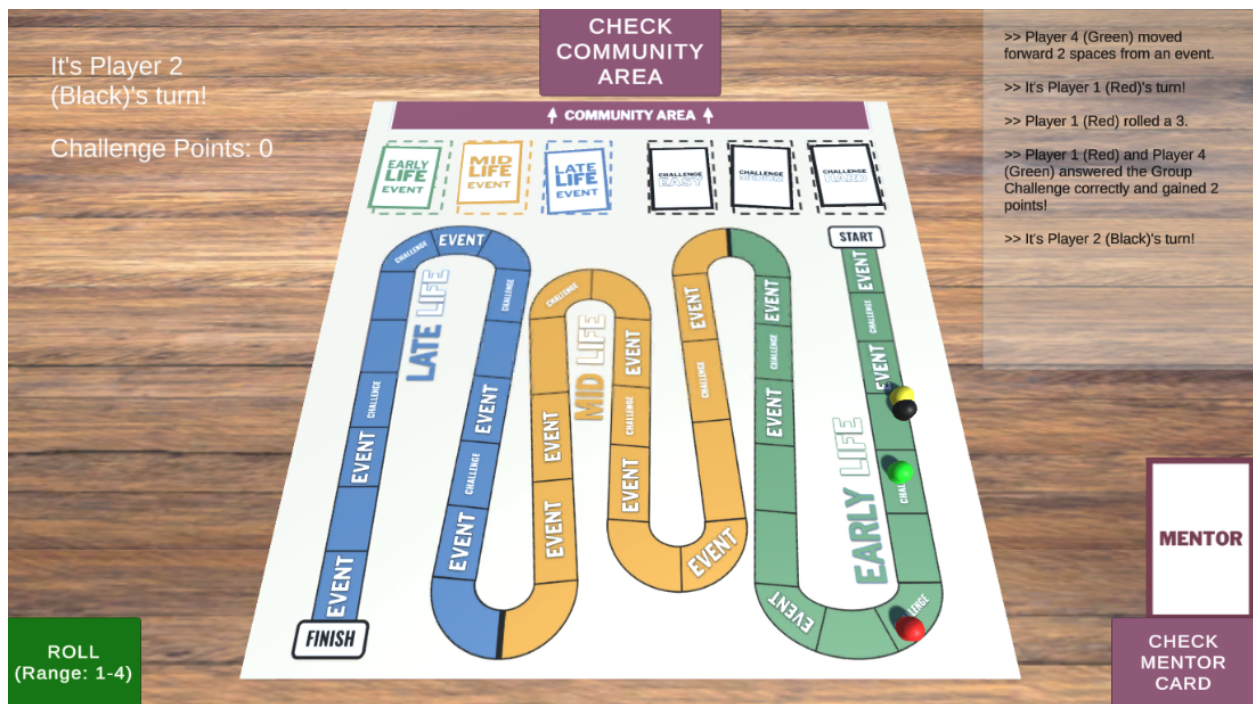
If you land on a Challenge Space, choose a difficulty (easy, medium, or hard) and draw a Challenge Card. Each card has a question which, if answered correctly, gives a number of Challenge Points depending on difficulty.



For a Group Challenge, all players take turns (clockwise starting from you) answering the question with no repeats, and everyone who answered correctly earns points.

Mentor Cards

Each player draws a random Mentor Card at the beginning of the game. This card has a bonus effect and is shown to other players. Note that a Mentor Card can only be used once throughout the game, at the beginning of the player's turn. Use them wisely!



I was eager to test out the *Community Area* and *Group Challenge* features and see if they would help with addressing the feedback from Playtest #2 about limited player interaction. In future iterations, I plan to convert these rules to tooltips in an “onboarding” experience, and introduce the “dual challenge” mechanic that was mentioned by the playtesters.

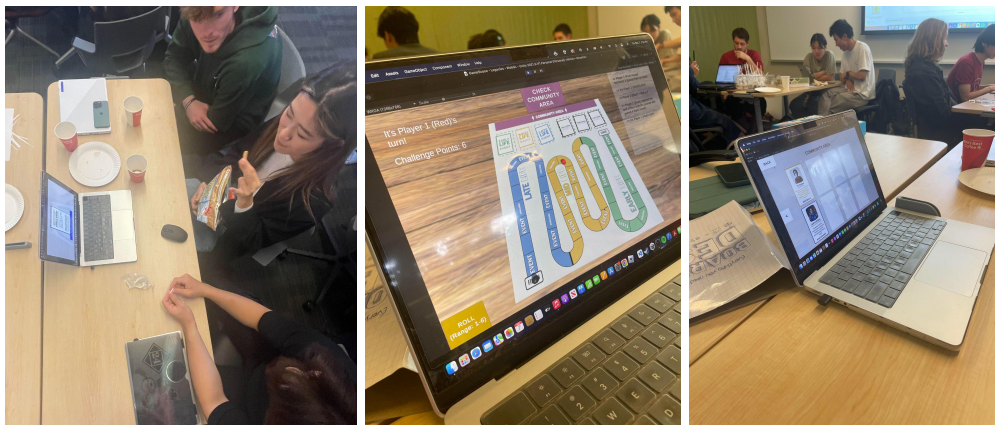
Iteration #2 (complete replication of analog *Legacies*)

>> Playtests & Feedback

Playtest #	Date	Playtester Demographics	Duration
3	12/07/23 (in-class)	1. Male, CS377G student in Computer Science (AI) 2. Female, CS377G student in Comparative Literature 3. Male, CS377G student in Computer Science & Psychology	30 min
4	12/07/23 (in-class)	1. Male, CS377G student in Computer Science (AI) 2. Male, Stanford third-year PhD student in Physics	15 min

During the third playtest, all three participants recommended breaking the rules down into smaller, more digestible pages, emphasizing that the rules were intuitive and could be picked up during gameplay. They suggested embedding brief in-game tutorials instead of relying heavily on a rulebook. One specifically suggested relocating the “Done” button in the **Group Challenge** evaluation panel to the bottom-right corner for a more intuitive action-oriented placement. Overall, the 3D simulation of a tabletop board game was well received, with another participant expressing enthusiasm for the educational value, stating, “It’s really good and fun! The group challenges made me actually learn and remember the scientists. I also learned more about science through trivia.” The third participant wanted more interaction between players – this will be addressed in the next iteration with the introduction of “dual challenges.” Finally, participants noted that the “Read out loud” instruction above the **Event Cards** was not noticeable enough.

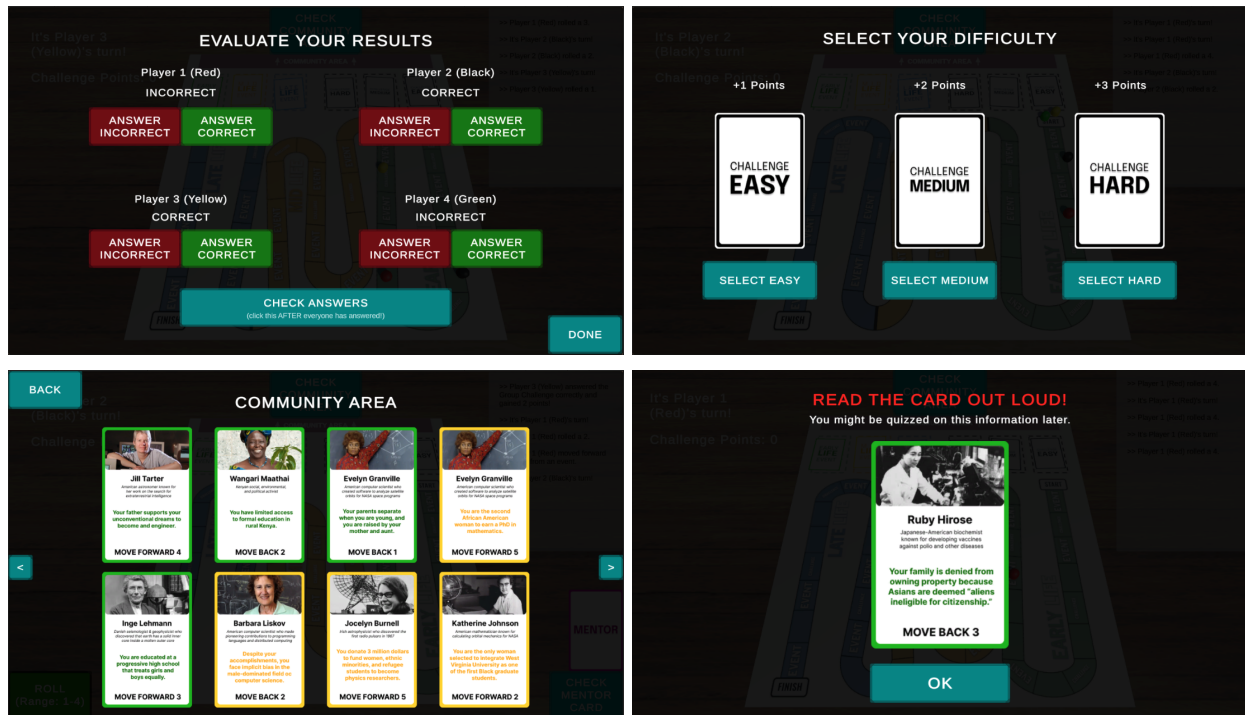
In the fourth playtest, one participant appreciated the memory aspect of the **Group Challenges**, recognizing their role in making players remember the scientists’ facts. The other participant noted the lack of decision-making beyond dice rolls and answering questions, but he appreciated the “moving back” mechanic in the game, recognizing them as opportunities to gain **Challenge Points** – a reflection of real-life setbacks leading to opportunities for growth. Additionally, he recommended increasing the **Rank Points** difference between each player, and emphasizing instructions to ensure everyone sees the screen and uses a mouse for better interaction.



>> Changes Made for Iteration #3

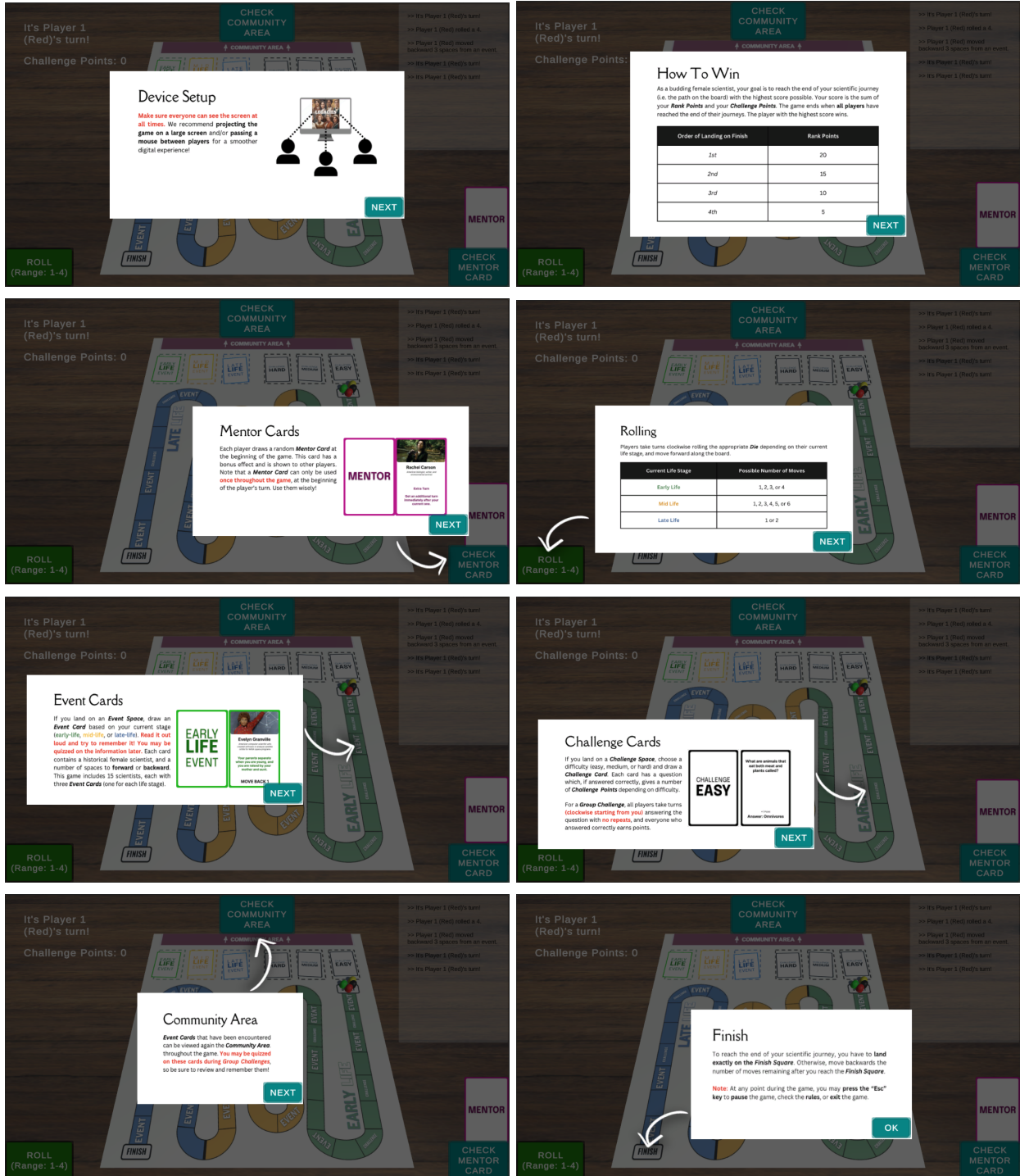
First, to address the feedback from Playtest #4, I **increased the Rank Points** players could earn, striking a better balance between the strategies of finishing early versus taking the time to answer more **Challenge Card** questions. Instead of the original one-point difference, there is now a **five-point difference** between each rank, with the first player to finish gaining **20 Rank Points**.

To address the feedback from Playtest #3, I moved the “Done” button of the **Group Challenge** panel from the top-left corner to the bottom-right corner, a position that signifies an action rather than a cancellation. I **revamped the UI**, introducing a **theme color (turquoise)**, adding **borders to buttons**, **rounding the corners** of all cards, and **standardizing typography and color** for all texts, buttons, and panels.

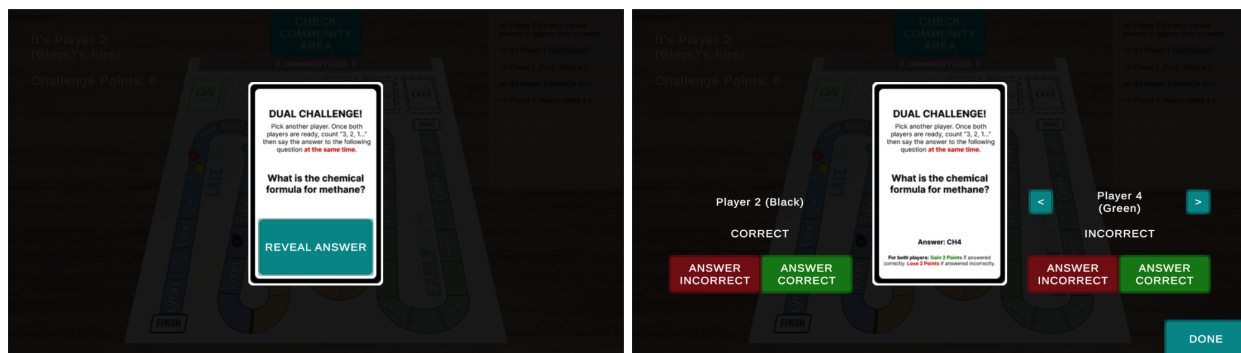
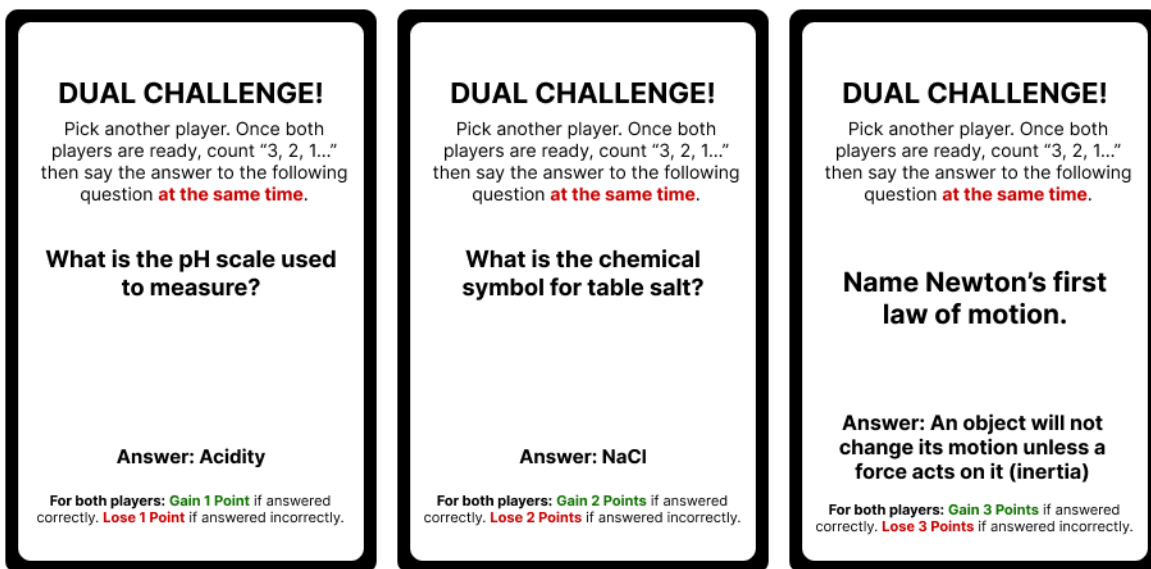


Since playtesters did not pay attention to the “**read the card out loud**” instruction in the **Event Card** panel, I made the text larger, bolded it, made it flash red, and added a hint that “You might be quizzed on this information later.” Furthermore, based on the feedback from Playtest #4, I changed all the **Event Cards** and **Mentor Cards** to include a **bigger image of the scientist**, and added a **short description of what the scientist is known for**.

To create a smoother onboarding experience, I **implemented an onboarding sequence** with pop-up panels as suggested by participants in Playtests #2 and #3. At the beginning of the game, instead of making players read the rulebook, they click through a 8-step sequence of short instructions about the game pieces and rules, as shown below. If they want, they can review the rules later by pressing the “Escape” key at any point during the game. This tutorial emphasized instructions for everyone to see the screen and pass a mouse around, as suggested by one of the participants in Playtest #4.



In order to have more player interaction, as requested by participants in Playtest #2, I introduced some **Dual Challenge Cards**. When players draw a card from each of the three **Challenge Card** decks, they now have a 53% chance of getting a regular trivia question, a 21% chance of getting a **Group Challenge**, and a 26% chance of getting a **Dual Challenge** (if there is at least one other player). In a **Dual Challenge**, the player who drew the card picks another player, they count down from 3 and answer the question together. Then, they click the “**Reveal**” button to see the answer, and evaluate the results by clicking the “**Answer Correct**” or “**Answer Incorrect**” buttons for both players. Set the chosen opponent by clicking the left/right arrow buttons. Unlike the other types of challenges, **Dual Challenges** can cause you to lose points if you answer incorrectly.



Iteration #3 (onboarding, dual challenges, aesthetics) (<https://kathchen.itch.io/legacies-v3>)

>> Playtests & Feedback

Playtest #	Date	Playtester Demographics	Duration
5	12/09/23 (online)	1. Male, Stanford undergrad student in Civil Engineering 2. Female, CS377G student in Product Design	15 min

In Playtest #5, both participants appreciated the ease of setup and the visually appealing board design. During gameplay, there were discussions about forgetting to check **Mentor Cards**, a tendency to overlook text on **Event Cards**, and moments of amusement, such as one player lagging behind. Participants praised the smooth movement of game pieces and the intuitive user interface, but they were still overwhelmed by the amount of rules presented during the onboarding sequence: “A lot of rules were shown to me in the beginning – I wonder if they could come up as we play? Like the event card information pops up right before I pick them up for the first time.” They also didn’t notice that pressing the “Escape” key would allow them to pause the game and review the rules.

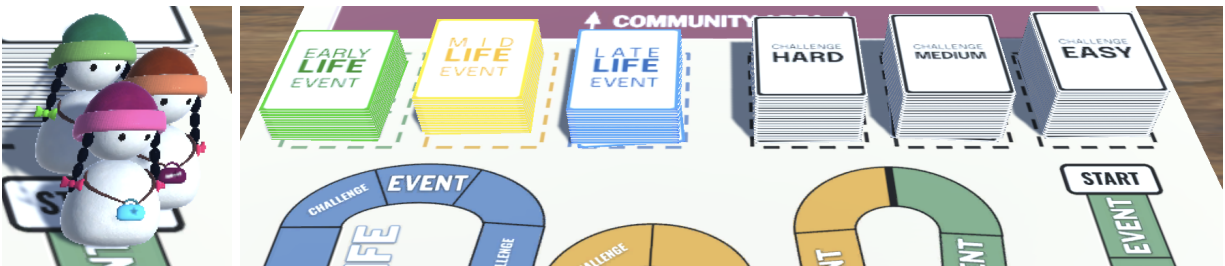
The first participant wished the end screen could be more celebratory, with confetti and emphasis on the winner. He also suggested displaying the decks with cards stacked on top of each other, instead of having just one flat image for each deck. The second participant suggested increasing the text size of the **Mentor Cards** and **Event Cards** as they were hard to read even with a monitor screen, and making the player pieces characters rather than just spherical objects. She also noted that she didn’t pay attention to the log at the top-right corner – “just by paying attention, I know enough of what happened” – suggesting that I could introduce an option to hide the log.



The **Dual Challenges** successfully increased player interaction, with one participant stating, “Those worked out well, we just followed the directions, which were very clear.” The overall learning experience was great, with the participants acknowledging that familiarity with each other enhanced the fun factor of the game.

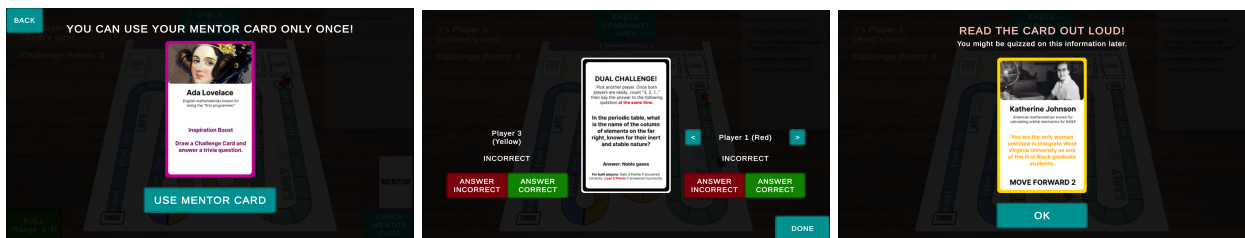
>> Changes Made for Iteration #4

First, I **replaced the capsule-shaped player pieces with actual characters** – little snowman-shaped girls – as suggested by one of the participants in Playtest #5. This adds a visual element to each player’s representation on the board, enhancing the game’s overall aesthetics. Furthermore, players now **see card stacks diminish** as they are drawn and discarded throughout the game. This dynamic display provides a clearer indication of the game’s progression and the number of cards remaining.

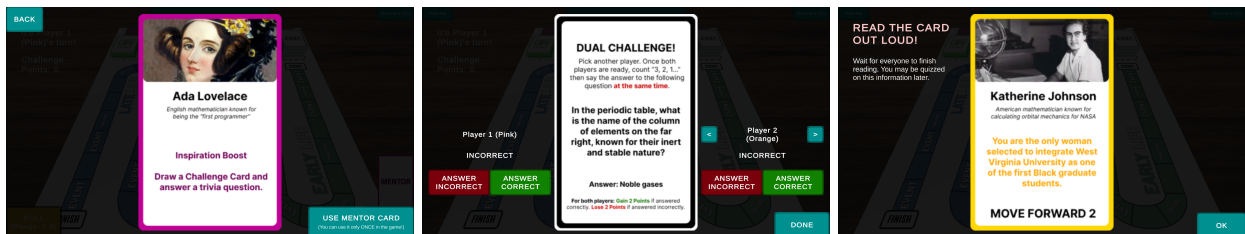


To address readability issues mentioned during the playtest, I **enlarged all Mentor Cards, Event Cards, and Challenge Cards** in their respective panels. The increased text size improves legibility even on smaller screens, making it easier for players to grasp the details of the cards without straining their eyes and contributing to a more comfortable experience.

Before:

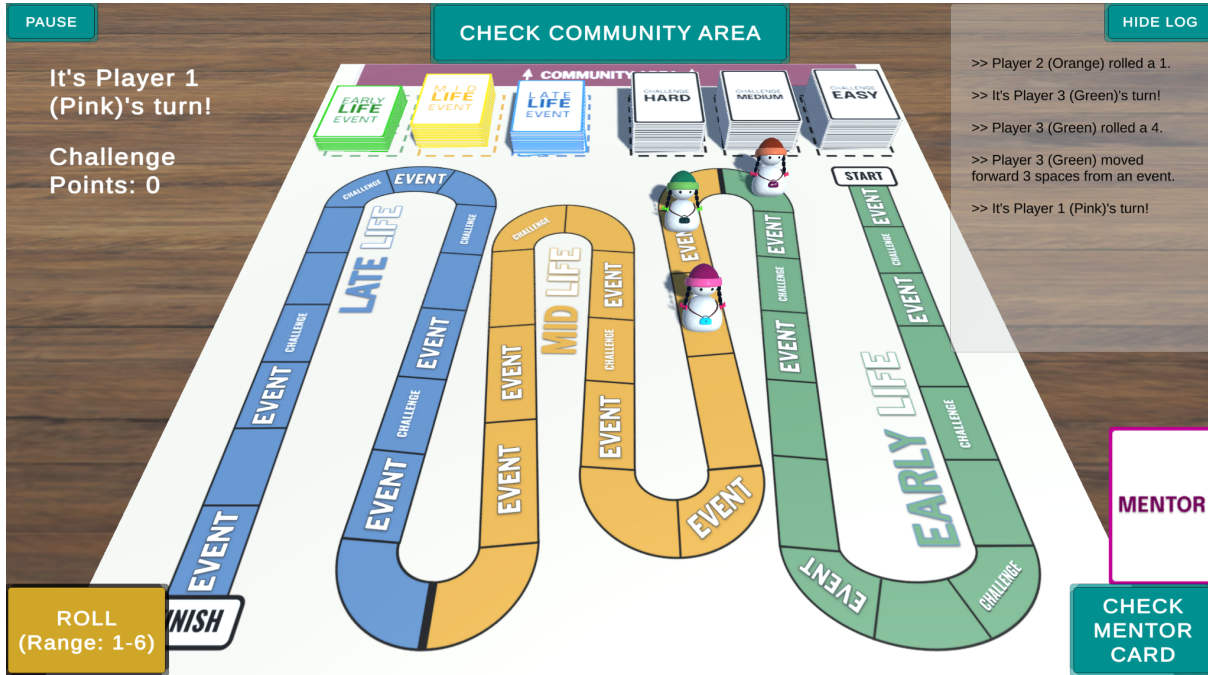


After:

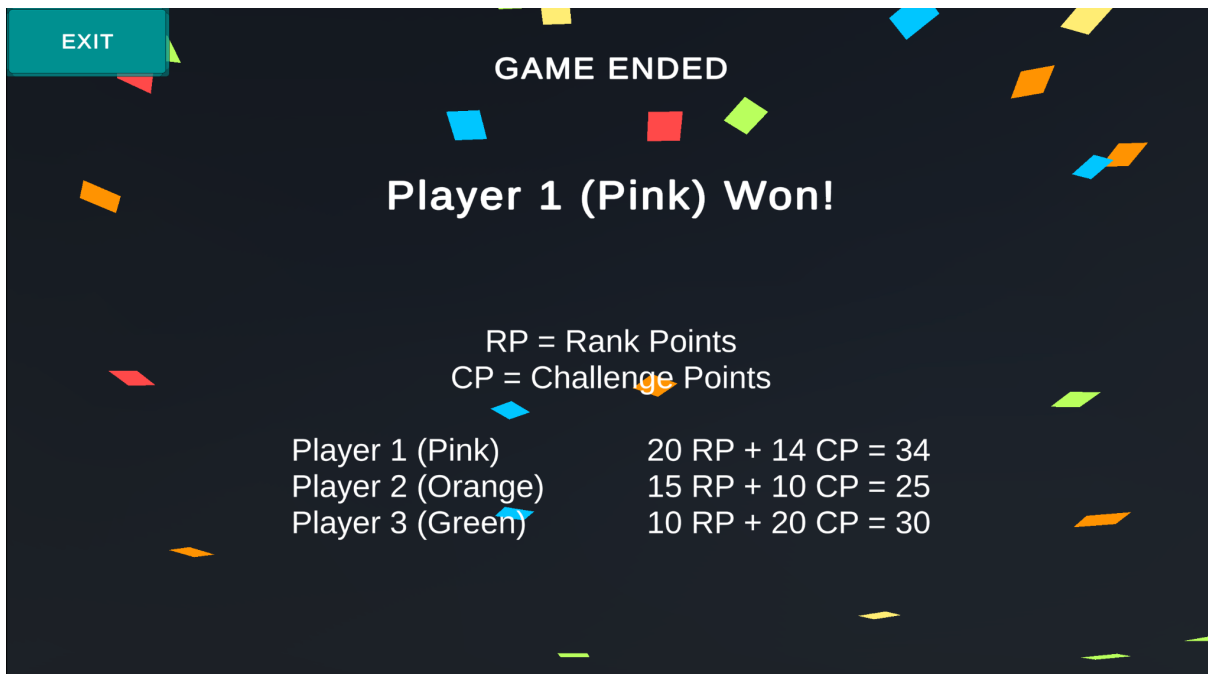


Then, I adjusted the onboarding sequence by **making each piece of information appear the first time players encounter it** during gameplay. For example, the *Event Card* rules are triggered the first time a player lands on an *Event Square*, and the “must land exactly on finish” rule would not be shown until one player reaches the *Finish Square*. This change addresses concerns about overwhelming players with too many rules upfront, ensuring a smoother learning curve and reducing cognitive load during the initial stages of the game.

In response to feedback about the user interface, I added a **“Hide Log”** button to hide the log panel, allowing players to declutter the screen and focus on the main gameplay area. The **“Hide Log”** button turns into a **“Show Log”** button, which can be clicked to bring up the panel again. I also added a **“Pause”** button at the top-left corner to eliminate the need to remember keyboard shortcuts.



Finally, to address the desire for a more celebratory end-game experience, I made the ending panel feature a **winner announcement** accompanied by **confetti effects** in addition to the original score breakdown.



Iteration #4 (smoother onboarding & more aesthetics) (<https://kathchen.itch.io/legacies-v4>)

>> Playtests & Feedback

Playtest #	Date	Playtester Demographics	Duration
6	12/11/23 (online)	1. Male, UC Berkeley grad student in Information & Data Science 2. Female, CS377G student in Computer Science (HCI)	15 min

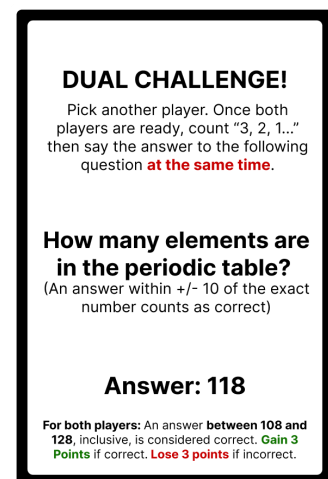
The playtest feedback highlighted several areas for improvement. Participants expressed dissatisfaction with the low resolution of the cards and suggested enhancing the visual quality. Additionally, the first participant wanted the initial game title screen to span the entire width. While participants found the game and appreciated its straightforwardness, they suggested adding sound effects and music for a more engaging experience. During gameplay, the hard **Dual Challenge** card asking for the number of elements in the periodic table came up, and the first participant simply gave up, only to learn upon the reveal that an answer in the range of +/- 10 from the exact answer counts as correct. That same player also thought that “player interaction was close to nonexistent,” but it was okay because “this doesn’t feel like a game that needs interaction, especially if the primary goal is to learn the scientists’ facts.” Both players made an effort to remember the **Event Cards** that came up, because the rules clearly hinted that they may be quizzed on the information later. Overall, the players thought that “the game was fun because it was straightforward – there were many names and events to remember, it struck a good balance, without becoming overwhelming or impossible to recall.”

>> Changes Made for Final Version

I **increased the resolution of all the cards** to address participants’ dissatisfaction with the visual quality. Responding to the first participant’s feedback, I adjusted the **initial game title screen to span the entire width**, providing a more visually appealing introduction.

In response to the confusion encountered with the **Dual Challenge Card** related to the number of elements in the periodic table, I modified the card such that now, participants will be informed that an answer within a range of +/- 10 from the exact answer is considered correct.

Finally, to create a more immersive experience, I incorporated **sound effects for button clicks and player piece movement**, and added **background music** that players can enjoy throughout the game. Moreover, players have the option to toggle both the background music and sound effects on and off at any time using the pause panel, allowing for customization based on personal preferences.



Final Version (with sound and minor adjustments) (<https://kathchen.itch.io/legacies-v5>)



BACK

ABOUT THE GAME

Legacies explores the contributions that many women have made to science over the years, and across the world. You, as a budding female scientist, will go through various stages of life as you try to achieve scientific discovery. Throughout the journey, you will collect achievements, test your knowledge, and experience setbacks that real women scientists have faced for decades. Once you've finished your journey, you will know more about the accomplishments of women in science and the struggles they overcame to get there.

Legacies began as an analog board game created by Laura, Emily, and Katherine in 2023. This is a digitized version of it. Refer to the original rulebook at <https://tinyurl.com/legacies-rules>.

BACK

SELECT THE NUMBER OF PLAYERS

1 2 3 4

MUSIC SOUND EFFECTS

PLAY

PAUSE **HIDE LOG**

It's Player 1 (Pink)'s turn!
Challenge Points: 0

Device Setup

Make sure everyone can see the screen at all times. We recommend projecting the game on a large screen and/or passing a mouse between players for a smoother digital experience!

ROLL (Range: 1-4) **MENTOR** **CHECK MENTOR CARD**

PAUSE **HIDE LOG**

It's Player 1 (Pink)'s turn!
Challenge Points: 0

How To Win

As a budding female scientist, your goal is to reach the end of your scientific journey (i.e. the path on the board with the highest score possible). Your score is the sum of your **Rank Points** and your **Challenge Points**. The game ends when all players have reached the end of their journeys. The player with the highest score wins.

Order of Landing on Finish	Rank Points
1st	20
2nd	15
3rd	10
4th	5

ROLL (Range: 1-4) **MENTOR** **CHECK MENTOR CARD**

PAUSE **HIDE LOG**

It's Player 1 (Pink)'s turn!
Challenge Points: 0

Mentor Cards

Each player draws a random **Mentor Card** at the beginning of the game. This card has a bonus effect and is shown to other players. Note that a **Mentor Card** can only be used **once throughout the game**, at the beginning of the player's turn. Use them wisely!

ROLL (Range: 1-4) **MENTOR** **CHECK MENTOR CARD**

PAUSE **HIDE LOG**

It's Player 1 (Pink)'s turn!
Challenge Points: 0

Rolling

Players take turns **clockwise** rolling the appropriate die and moving along the path.

Current Life Stage	Possible Number of Moves
Early Life	1, 2, 3, or 4
Mid Life	1, 2, 3, 4, 5, or 6
Late Life	1 or 2

ROLL (Range: 1-4) **MENTOR** **CHECK MENTOR CARD**

PAUSE **HIDE LOG**

It's Player 1 (Pink)'s turn!
Challenge Points: 0

Challenge Cards

If you land on a **Challenge Space**, choose a difficulty (easy, medium, or hard) and draw a **Challenge Card**. Each card has a question which, if answered correctly, gives a number of **Challenge Points** depending on difficulty.

For a **Group Challenge**, all players take turns (clockwise starting from you) answering the question with no repeats, and everyone who answered correctly earns points.

ROLL (Range: 1-4) **MENTOR** **CHECK MENTOR CARD**

SELECT YOUR DIFFICULTY

+1 Points +2 Points +3 Points

CHALLENGE
EASY

SELECT EASY

CHALLENGE
MEDIUM

SELECT MEDIUM

CHALLENGE
HARD

SELECT HARD

What is the process of a gas turning into a liquid called?

REVEAL ANSWER

What is the process of a gas turning into a liquid called?

+2 Points
Answer: Condensation

ANSWER INCORRECT ANSWER CORRECT

It's Player 2 (Orange)'s turn!

Challenge Points: 0

ROLL (Range: 1-4)

HIDE LOG

- >> It's Player 1 (Pink)'s turn!
- >> It's Player 1 (Pink)'s turn!
- >> Player 1 (Pink) rolled a 2.
- >> Player 1 (Pink) answered correctly and gained 2 Challenge Points!
- >> It's Player 2 (Orange)'s turn!

MENTOR

CHECK MENTOR CARD

Event Cards

If you land on an Event Space, draw an Event Card based on your current stage (early-life, mid-life, or late-life). Read it out loud and try to remember it! You may be quizzed on the information later. Each card contains a historical female scientist, and a number of spaces to forward or backward. This game includes 15 scientists, each with three Event Cards (one for each life stage).

EARLY LIFE EVENT

MOVE FORWARD 2

NEXT

DRAW AN EVENT CARD

EARLY LIFE EVENT

DRAW

READ THE CARD OUT LOUD!

Wait for everyone to finish reading. You may be quizzed on this information later.

Gerty Cori
Austrian-American biochemist & the third woman to win a Nobel Prize in science

You are admitted to medical school after studying several years worth of Latin, sciences, and math in one year.

MOVE FORWARD 3

OK

CHECK COMMUNITY AREA


Community Area

Event Cards that have been encountered can be viewed again the Community Area throughout the game. You may be quizzed on these cards during Group Challenges, so be sure to review and remember them!

NEXT

BACK

COMMUNITY AREA



Gerty Cori
American chemist & the first woman to win a Nobel Prize

You are selected to attend school at MIT and study chemistry. You are selected to study life, chemistry, and math in one year.

MOVE FORWARD 3



Jocelyn Burnell
Astronomer

As one of the few women in the field, you are selected to study astronomy at Cambridge.


MOVE BACK 2



Rajeshwar Chatterjee
Chemist

You are selected for a government program that allows you to study abroad, and enter the University of Michigan.

MOVE FORWARD 3



Jessica Watkins
Astronomer

As a graduate of Caltech, you test physical properties of the Moon rocks on the Curiosity rover team.


MOVE FORWARD 3



Jessica Watkins
Astronomer

You are selected to Stanford University and earn a B.S. in Biological & Environmental Sciences.

MOVE FORWARD 2



Diana Trujillo
Astronomer

If you still study the sciences, you are selected to attend your family focus in Colombia.

MOVE BACK 2



Vera Rubin
Astronomer

You work to gather scientific evidence for the existence of dark matter.

MOVE FORWARD 4



Wangari Maathai
Environmental activist

You found the Green Belt Movement in Kenya, encouraging women to engage in planting trees, and your activism challenged traditional values leading to resistance.


MOVE BACK 4

MENTOR

CHECK MENTOR CARD

BACK

Player 2 (Orange)'s turn
Challenge Points: 0



Mae C. Jemison
American engineer, doctor, and NASA astronaut

Alternate Future
At the beginning of a turn, roll the die twice and choose the better result.

USE MENTOR CARD (You can use it only ONCE in the game!)

It's Player 3 (Green)'s turn
Challenge Points: 0

GROUP CHALLENGE!
Take turns answering the following challenge, starting with the player who drew this card. **No repeats!**

Name 1 Life Event of a Scientist currently on the Community Area
(You do not need to name the scientist)

All players that answer correctly earn 2 points.

CHECK ANSWERS (Click the JETTER everyone has answered)

It's Player 3 (Green)'s turn
Challenge Points: 0

EVALUATE YOUR RESULTS

Player 1 (Pink) CORRECT
ANSWER INCORRECT ANSWER CORRECT

Player 2 (Orange) CORRECT
ANSWER INCORRECT ANSWER CORRECT

Player 3 (Green) INCORRECT
ANSWER INCORRECT ANSWER CORRECT

CHECK ANSWERS (Click the JETTER everyone has answered)

DONE

It's Player 2 (Orange)'s turn
Challenge Points: 0

DUAL CHALLENGE!
Pick another player. Once both players are ready, count "3, 2, 1..." then say the answer to the following question **at the same time.**

What is the chemical symbol for table salt?

REVEAL ANSWER

It's Player 2 (Orange)'s turn
Challenge Points: 0

DUAL CHALLENGE!
Pick another player. Once both players are ready, count "3, 2, 1..." then say the answer to the following question **at the same time.**

What is the chemical symbol for table salt?

ANSWER: NaCl

For both players: Gain 2 Points if answered correctly, Lose 2 Points if answered incorrectly.

Player 2 (Orange) CORRECT
ANSWER INCORRECT ANSWER CORRECT

Player 1 (Pink) INCORRECT
ANSWER INCORRECT ANSWER CORRECT

DONE

It's Player 3 (Green)'s turn
Challenge Points: 0

PAUSE

RESUME

RULES

EXIT

MUSIC SOUND EFFECTS

MENTOR

CHECK MENTOR CARD

DONE

Device Setup

Make sure everyone can see the screen at all times. We recommend projecting the game on a large screen and/or passing a mouse between players for a smoother digital experience!

How To Win

As a budding female scientist, your goal is to reach the end of your career's journey (ie. the path on the board) with the highest score possible. Your score is the sum of your **Rare Points** and your **Challenge Points**. The game ends when all players have reached the end of their journey. The player with the highest score wins.

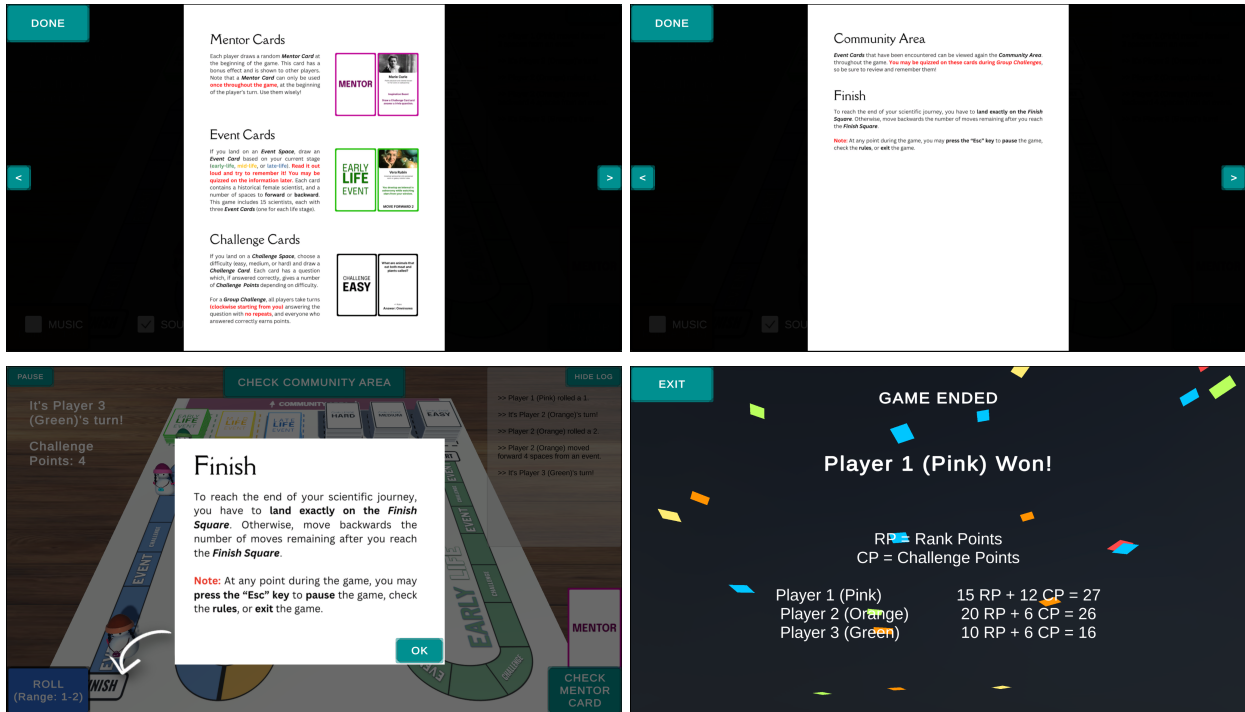
Order of Landing on Path	Rare Points
1st	20
2nd	15
3rd	10
4th	5

Rolling

Players take turns **shaker** rolling the appropriate die and moving along the path.

Current Life Stage	Possible Number of Moves
Early Life	1, 2, 3, or 4
Mid Life	1, 2, 3, 4, 5, or 6
Late Life	1 or 2

MUSIC SOUND EFFECTS



Reflection

My journey of transitioning *Legacies* from an analog board game to a digital format has been a rewarding process. I am proud of not just replicating the analog version but also crafting an accessible and intuitive digital game that reaches a wider audience. With each iteration, I was committed to addressing user feedback and enhancing the game's aesthetics, mechanics, and engagement.

My favorite part was making the onboarding experience that contributed to a smoother learning curve for players. The most difficult part was building out the game's flow in Unity, which involved transitioning all the game mechanics to code, waiting for and handling events, and moving game pieces across the board within specific timeframes. I also enjoyed adding sound effects, music, and visual elements like the snowman-shaped girls that further immerse players in the educational journey, making the game both informative and enjoyable. Throughout the six playtests involving 13 participants, I collected valuable feedback that played a pivotal role in shaping these improvements. Overall, through this project, I learned to design digital game experiences with clear instructions and a good balance between educational content and engaging gameplay.