

Pipe Racer

Tag: Race, Pipe-Build, 2-Player, Action

URL: <https://piperacer.itch.io/pipe-racer>

Play time: 25mins

This is a two-player competitive game where you act as a lord, build pipes and compete with other countries to secure water sources for citizens. Save your country during droughts by building pipes, drawing water sources, and using various props to disrupt your opponent!

Time: 2023.7-2023.9 (1.5 months)

Team: 4 people

My Role:

Project Lead

60% Game Design

100% Art

Skill & Tools:

Adobe Photoshop

Paper prototype test

Player Research(Questionnaire & Structured interview)

01 Background

Inspiration



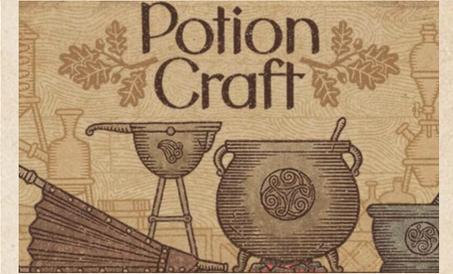
1. Fulfillment of pipes linked

It feels visually comfortable!



2. Thrillment of party game

Friends make games more exciting!



3. Medieval parchment art

“Unlike-game” art style is immersive.

Target Player

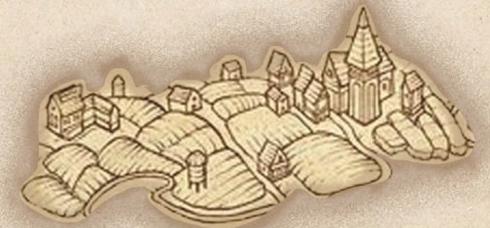


Players with moderate action-game proficiency
Players with experience in casual competitive games

We made a questionnaire and filtered 6 players to be our core target players. They have average 3 months of casual competitive game experience, like *Fall Guys* and *Crazy Arcade* and frequently engage in local co-op games like *Overcooked* and *It Takes Two*.

Story Background

After a long drought, the Alimair region suffers from a shortage of water and dry riverbeds. This led to fierce battles between Agamemnon and Hector — fighting to seize the water from the collapsed ground.



02 Gameplay

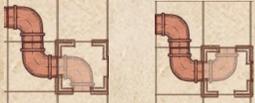
Core Rules

1. Goal:

Build pipes to get water  as much as possible within  5mins.

2. Player Abilities:

i. Build pipes



You can **rotate** pipes before build.

ii. Dismantle pipes



But only do to your **own** pipes.

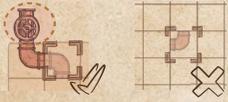
iii. Use prop



To interfere rivals and protect yourself.

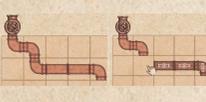
3. Building Rules:

i. Start Point



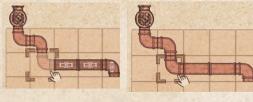
Build from **start** instead of anywhere.

ii. Disconnected



Pipes will be **invalid** if disconnected from the start.

iii. Reconnect



Build in break point to reconnect pipes.

Core Experiences

1. Building pipes smoothly and intuitively



i. Random pipes & high time pressure provide a highly stimulating experience with fast operations and quick-thinking layouts.



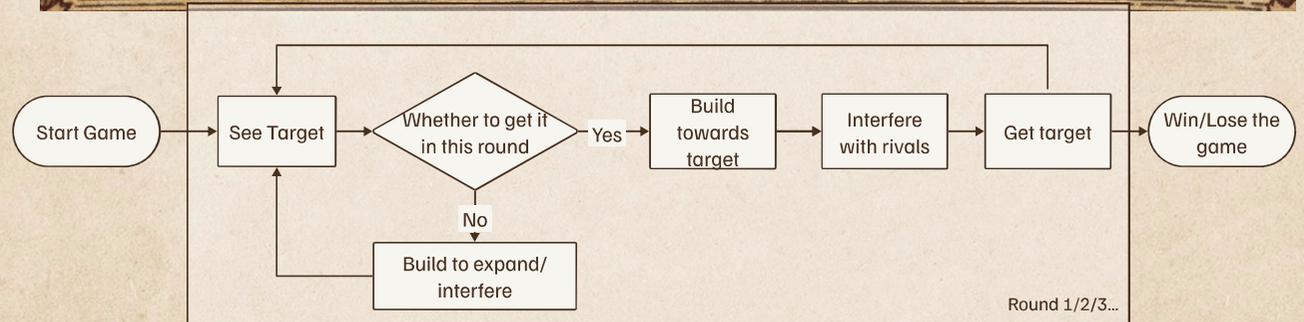
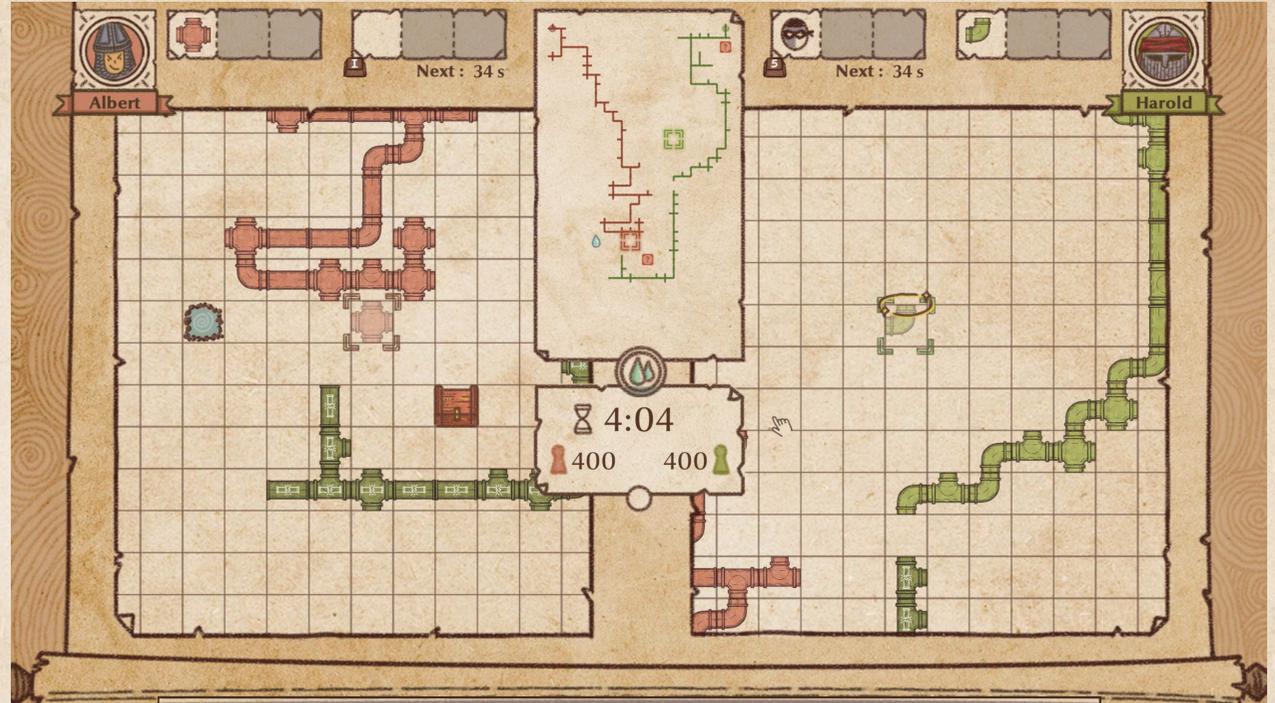
ii. Smooth linked pipes provide a comfortable visual and psychological experience.

2. The Thrill of Player Interaction



Racing pressure and various ways to make trouble provides an intense and thrilling competitive experience.

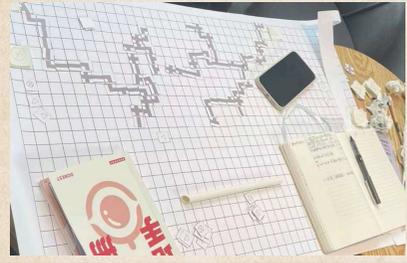
Game View & Flow



03 Design Process

Step1: Paper Prototypes

By building & playing mini board prototype, we verified the fun of connecting pipes



Step2: Video Prototypes

We repeatedly made demos and tested them with 6 core players, detecting problems:

- P1 To make building smooth and intuitive
- P2 To promote interaction
- P3 To improve falling players' experiences



Step3: Broader Testing

We made survey questionnaire & interview to gather feedbacks from 14 players:

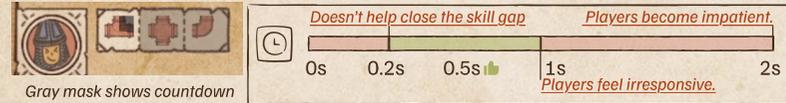
- P4 To build Rhythmic levels
- P5 To Help Train

P1 To make building smooth and intuitive

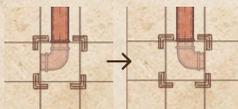
1. Smooth in Action: Improve hand feeling and rhythm

i. Set appropriate cooling down time

We set the cooling time to 0.5s to **reduce the skill gap** between experienced and average players. After placing a pipe, players have to wait a short time before building the next one.



ii. Adaptive rotation



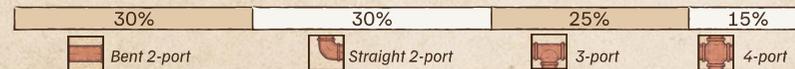
only need to rotate 1 time

Players no longer need to manually rotate pipes in all four directions. Pipes now automatically rotate to connect.

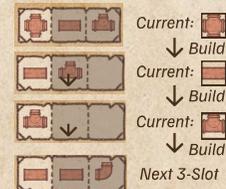
2. Intuitive in thinking: Only requires a little bit of thinking

i. Set weights of different pipe types

Each pipe type makes a different path, which affects how players plan.



ii. "Future Pipes" Provides thinking sets



If pipes were randomly given each time, it felt like just luck.
If all the pipes were shown, it's too much to think about at once.

Our solution is to show **three upcoming pipes**, which only change after all are used. This lets players plan easily without feeling overwhelmed.

P2 To promote interaction

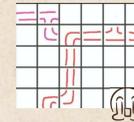
After testing, we found that players were not interacting enough, which shows they lacked a reason to do so. We did two main things to fix this problem.

1. Optimize Connecting Pipe Rules

i. Take over disconnected pipes? NO!

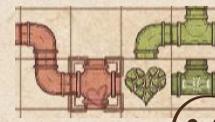
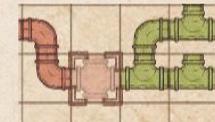


Our first rule let players **take each other's disconnected pipes**, but we removed it because it left the losing player upset for a long time and did not make the winner more involved, so players started to avoid interacting to stay safe.



By changing the rule so **disconnected pipes stay with their original owner**, we improved the competition. Now, players can build and compete for space **without being afraid of losing everything**.

ii. "Kiss" Pipes



To make player interaction more interesting, we added a "kissing" rule where one player's pipe touches another's. At first, this rule let players destroy each other's pipes completely, but this was too harsh because it could block a player from playing. The new rule changes **the kissed pipe into "ruins," a broken piece only its owner can remove**. This keeps the game challenging without causing problems that cannot be fixed.

03 Design Process

P2 To promote interaction

2. Prop System

i. Added more props

At first, we only had one prop: hammer. We enriched props to 15 as below.

However, after testing, we kept props that are easy-to-use props and have clear impact.

To interfere off-court

 Dizzy Reverse rival's movement direction for 10s.	
 Ink Obscure rival's vision for 10s.	
 Turtle <i>Weak Effect</i> Extend rival's building cooldown.	

To block rivals

 Lock Lock a 3x3 area for 10s.	
 Stone Lay down a stone.	

To protect self

 Shield Immune to all debuffs for 5s.	
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To gain more

 Thief Steal one random prop from rival.	
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To impact rivals' pipes

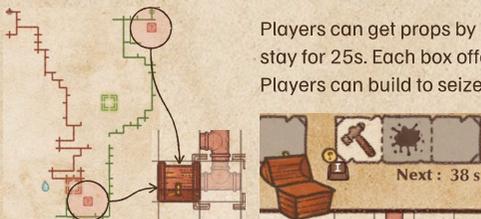
 Hammer Dismantle one rival's pipe.	
 Bomb Destroy others' pipes in a 3x3 area.	
 Landmine <i>Too Frustrating</i> Explode 3x3 area when rival builds here.	
 Blower <i>Hard to learn</i> Clear straightly linked pipes by blowing.	
 Rotate <i>Too Frustrating</i> Rotate one rival's pipe.	

To speed up Building

 Rabbit <i>Weak Effect</i> Reduce building cooldown.	
 X3pipes <i>Weak Effect</i> Refresh future pipes with 3 4-port pipes.	
 Poorly made pipes <i>Weak Effect</i> Build temporary pipes without cooling for 15s.	

ii. Limited-time refresh treasure box

Players can get props by reaching treasure boxes that appear on the map every 30s and stay for 25s. Each box offers 1 random prop. These boxes served as strategic targets. Players can build to seize these boxes to interfere with rivals and get water goals quicker.



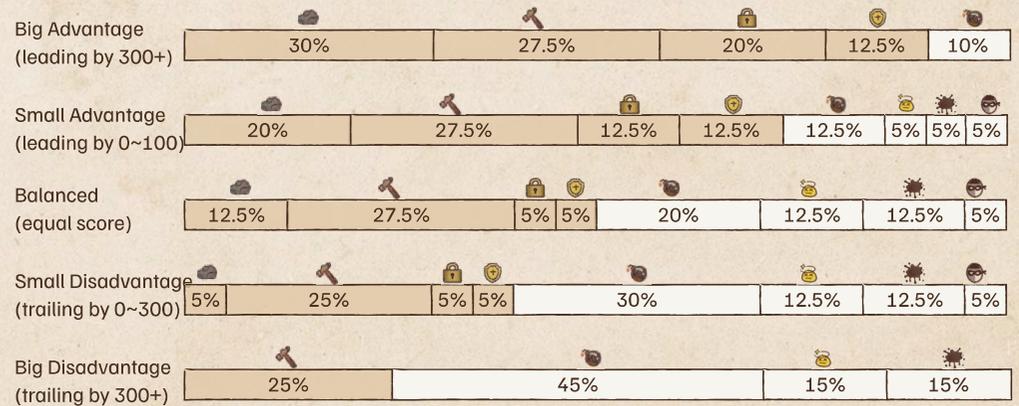
P3 To improve falling players' experiences

1. Win Condition: From Single Race to Dynamic Rounds

The main way to win changed from a single long race with a single water source to several quick rounds. Players now try to capture water sources before time runs out, making the game faster and giving more chances to catch up.

2. Dynamic Prop Balancing for Fair Play

A tiered prop system was added to keep the game fair. When a player gets a prop, the game checks how far ahead or behind they are. This decides which group of props they can get, so players who are losing get stronger tools to help them catch up.



Falling players have easier and more effective props to use, such as bomb, dizzy, and ink, which cause direct, obvious effects. **Advantaged players** receive interference props that require more strategic thinking and have indirect effects.

03 Design Process

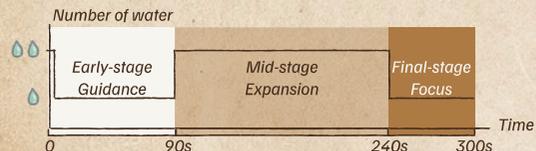
P4 To build Rhythmic levels

1. Multiple and Dynamic Water Goals

i. The number of water

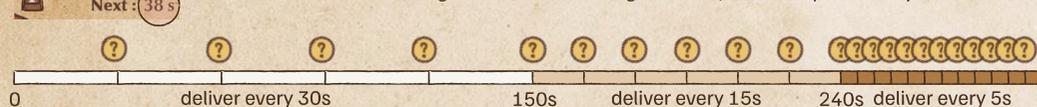
To make the level feel more lively, we replaced the old rule of adding one water goal every 60s with this new setup:

- Generated 2 water goals when the game starts
- New water goals appear after all the water sources are either collected or gone
- Appears on the map and disappears after 60s



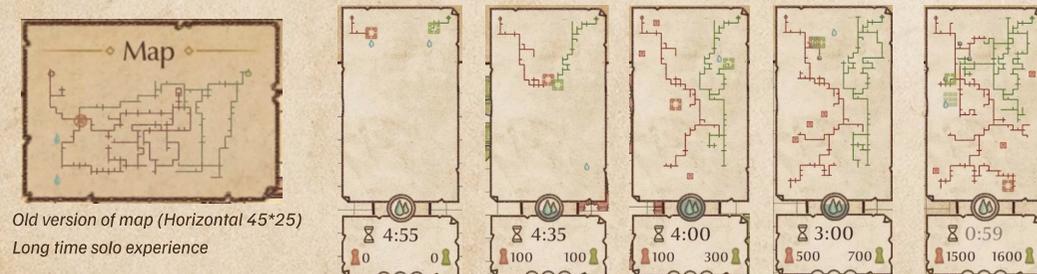
2. Prop delivery time interval

To add more excitement and increase the fight chance in the game, we deliver props to players at intervals. The intervals change based on the total game time, which helps build rhythmic levels.



3. Map scale (35*21)

The map's width has been reduced to let players meet earlier, reduce isolation, and increase competitiveness without leaving too little time to understand how to play.

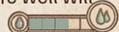


ii. High-Pressure Well Water



In the middle & later stages, disconnected pipes are like broken branches, restricting construction and causing discomfort.

We improved the design: after 5 small wells show up, a high-pressure well will appear.



- Digging to this will destroy all disconnected pipes
- This well gives twice as much water as a small well. It also becomes a key spot in the game, giving players a small boost in the middle.

P5 To Help Train

1. Multiple Levels of AI combat

We created 3 AI difficulty levels based on the robot's operating speed and building strategy.

- Easy: slow and won't dismantle its pipes
- Normal: normal speed and won't dismantle its pipes
- Hard: fast and will dismantle its pipes to quickly get to the goal

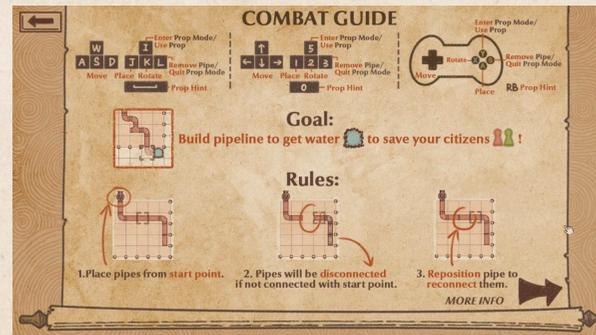
2. Add Best-of N games (BO1/BO3/BO5)

Give everyone more chances to get familiar with the game and to win!

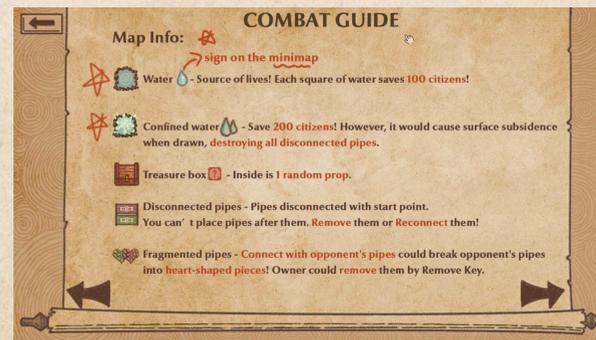
3. Add Guide Book and Hint Button

Due to production time constraints, we could only add a guidebook rather than a new tutorial level.

We tried to make a clear combat guide and put effort into structuring the points.



Press Space to see hint



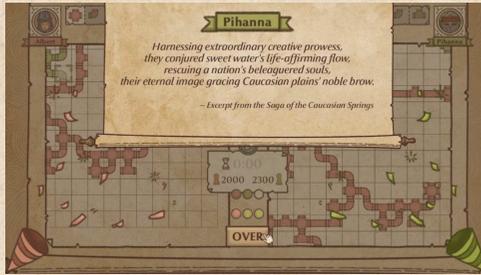
Button Hint shown when use

04 Immersive Art Design

Story Background & Avatar



Choose Name and Profile



Winning Hymn

Animation Feedback



Bomb Animation Feedback

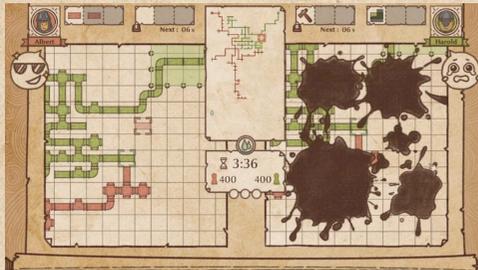


Get Treasure Box Feedback

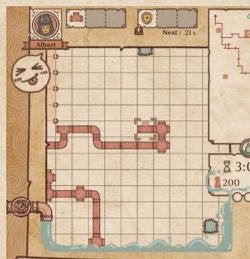


Kiss pipe Feedback

Hummer Emoji



When You slash ink on rivals' face



When you get water



When You destroy rivals' pipes



When you are kissed

05 Feedback

When we conduct user research, we collect plenty of feedback. Some help us discover and solve problems, while others strengthen our confidence.

Common Rate: 4.42/5 (N=14)

"There is a big surprise that greatly exceeds expectations."

Comments Clips:

"Interesting mechanism! It's simple but elegant!"

"Love this art! It feels so immersive!"

"Really enjoy the moments making trouble!"



06 Take-home Messages

About Game Design

1. You do not need to listen to every player's suggestion. Focus on your target core players.
2. Clearly define the core experience keywords you want to bring to players and achieve this through specific designs.

About Game Test

3. Multiplayer games need frequent player tests to observe how interactions shape game experiences.
4. Structured player interviews are rewarding.

About Teamworks

5. Clear demands and deadlines for teammates matter.