

# GAME DESIGN DOCUMENT

## GAME OVERVIEW

### Title

- Working Title: *Heximperium*

### Genre

- Casual 4X Strategy (Single-Player, Turn-Based)

### Platforms

- PC - Steam

### Engine

- Unity

### Pitch

- A **streamlined single-player 4X** (Explore, Expand, Exploit, Exterminate) that **replaces warfare (Exterminate) with a tactical puzzle** for the final scoring. The player **manages scouts, claims files, invests in infrastructures, and positions military units** to maximize their score.
- Marketing :  
Single-player, **miniaturized 4X game** where players **grow their empire and score** through smart **military placement—replacing** the traditional “**exterminate**” phase with an “**enforce**” puzzle. Explore a **procedurally generated map**, expand your territory to gather new resources, exploit them to develop your economy, and then enforce your domain with units to earn points (**Explore, Expand, Exploit, Enforce**).  
Designed as a **fresh take on the 4X genre**, it introduces **newcomers** to 4X mechanics while offering **regular** players a more **relaxed, streamlined experience**—without sacrificing deep strategic planning.
- Elevator :  
A concise single-player 4X experience that replaces traditional warfare with a puzzle-like military system.

- Key selling points:
  - **“Experience Streamlined 4X”**: Fewer mechanics, same strategic depth—making it more accessible.
  - **“Stress-Free Game”**: No competitors, no defeat—just score as much as you can.
  - **“Endless Replayability”**: Procedurally generated maps keep each session fresh.
  - **“Master Puzzle Warfare”**: Replace battles with a unique puzzle system that rewards creativity and planning.
  - **“Single Player & Adult-Life Friendly”**: Play whenever you want and finish a full session in just 1–2 hours.

## Pillars

- **Strategic Optimization**: Every decision (tile claiming, resource investment, unit placement) has a lasting impact.
- **Minimalist 4X Experience**: Captures the essence of 4X in a compact, approachable format.
- **Puzzle Endgame**: Non traditional warfare; instead, players place military units in puzzle-like combos for final victory points.
- **Clarity**: All costs, incomes, and information are clearly communicated to the player.

## References

- Classic 4X games (*Civilization*, *Humankind*, *Endless Space*) for the overarching structure.
  - Board games with **tile-laying and resource management** (*Carcassonne*, *Settlers of Catan*) as a reference for simplicity and clarity.
  - *Dorfromantik*
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# GAME DESIGN

## 3C (Character, Camera, Controls)

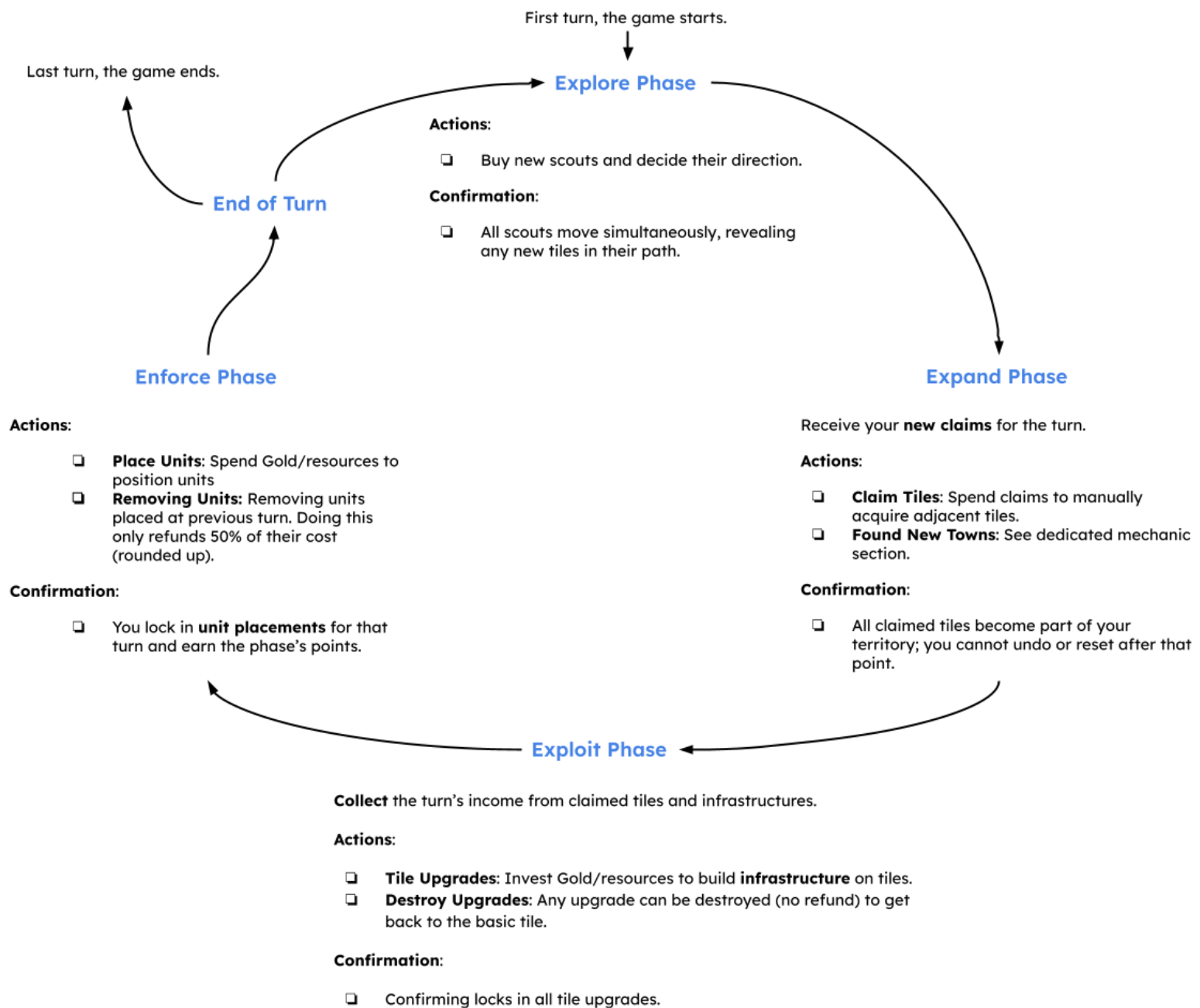
- **Character** :
  - The player takes on the role of an unseen ruler managing the empire’s expansion, resource acquisition, and final military deployments. There is no avatar or persona—this is a purely strategic perspective, allowing the player to interact directly with the hex map and its resources.

- **Camera :**
  - **Perspective**
    - **Top-down** view of the hex grid.
    - No rotation or tilt; the map is always oriented in a fixed direction.
  - **Zoom**
    - **Continuous, linear zoom** controlled by the **mouse wheel**.
    - **Minimum Zoom:** Focus on a small cluster of tiles (around a dozen).
    - **Maximum Zoom:** Overview of the entire discovered map.
    - The zoom speed and exact values will be **fine-tuned** during prototyping.
  - **Panning**
    - **Keyboard:** Move the camera using **WASD** or **directional arrow** keys.
    - **Edge-Scrolling:** Moving the mouse cursor to the screen edges also pans the camera.
    - **Click-and-Drag:** **Right-click** and drag the mouse to move the view.
    - The camera is **locked within the map bounds**, preventing scrolling into void space.
  - **Accessibility & Rebinding**
    - **All camera controls** (keybinds for panning, zoom speed, etc.) are fully **rebindable**.
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- **Controls :**
  - **Mouse**
    - **Left Click:** Select/interact with tiles, confirm actions in UI (e.g., building infrastructure).
    - **Right Click:** Camera panning (as already noted under “Camera”).
  - **Keyboard**
    - **WASD / Arrow Keys:** Camera panning.
    - **Enter:** End turn / proceed to the next phase.
    - **Escape:** Open pause menu or settings.
    - **Ctrl:** Multiple selection of tiles.

## Gameplay Loop

Each **turn** is split into four **phases**, in the order of **Explore** → **Expand** → **Exploit** → **Enforce**. The player must **finish** each sub-phase before moving on to the next turn.

- **Reset:** allow players to **undo all actions** in the current phase, as long as they haven't confirmed it yet.
- **Upgrade tree:** Available in a dedicated menu at every phase, offering upgrades for expansion, economy, and military.
- **Trade:** Manually sell or buy advanced resources if desired. Available at any given phase in a dedicated menu.



## Mechanics

All written values are subject to change.

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### Tiles

#### Basic Tiles

Simple tiles that only **generate Gold**. They can be **upgraded** (see below) once to **increase income** or **add a special effect**.

- Plain → 1 Gold
- Hill → 1 Gold
- Forest → 2 Gold

#### Resource Tiles

Advance tiles, bringing **Gold** and **unique resources** if upgraded (does not increase income).

- Iron vein → access to iron
- Stone deposit → access to stone
- Coal vein → access to coal
- Horse breeding ground → access to horse
- Ebony wood → access to ebony
- Dragon graveyard → access to emberbone
- Crystal cave → access to magic crystal

#### Hazardous Tiles

Harsh terrain that **slows scouts** and **provides no income**. They **cannot be upgraded** unless a Special Tile grants a unique effect.

- Mountain
- Desert
- Water
- Swamp
- Ice

## Special Tiles

Specific tiles, with **powerful effect** unlocked once the tile is claimed. Rarity is variable. Can't be upgraded.

Tile Name	Biome	Effect	Rarity
Mountain Pass	Mountain	+5 Gold, no speed penalty for scouts on this tile; +5 points for unit stationed on this tile	Common
Oasis	Desert	+3 Gold, surrounding desert tiles can be upgraded as they were plains	Rare
Frozen Citadel	Ice	+5 Gold, Double on-tile & surrounding unit points	Very Rare
Ancient Bog	Swamp	+3 Gold, +1 point on each Mage in your empire	Rare
Ancient Stone Circle	Grassland	+2 Gold, for each other Ancient Stone Circle you own, this tile gains an additional +2 Gold	Common
Faery Pond	Deep Forest	+2 Gold, +20 Gold when claimed	Rare
Sunken Ruins	Any (-mountain & desert)	+10 Gold	Very Rare
Mage Tower	Any	+3 Gold, increase income of every infrastructure on Crystal cave tiles by +1	Very Rare
Volcano	Any (-swamp & ice)	Increase surrounding farm infrastructure income by +4. But at every starting round there is a 5% risk that surrounding infrastructures get destroyed.	Rare
Ancient Battlefield	Any	+5 Gold, units placed here and on surrounding tiles gain +1 Points.	Common
Sacred Grove	Any	+5 Gold, +5 Ebony	Rare
Nomad's Trade Hub	Any (-ice)	+3 Gold, +5 Horse, increase trade limit	Rare

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## Scouts

Scouts are **specialized units** designed to **explore the map**, uncovering new tiles and resources. They play a crucial role in expanding the player's domain and ensuring access to valuable territories.

## Acquisition

- **Purchasing Scouts**
  - Cost: Scouts are purchased using Gold. Firsts scouts are free, the number depends on the game settings.
  - New Scout Cost: 30 Gold
- **Starting Scouts**
  - Configuration: The number of starting scouts is a variable in game configuration, directly impacting the game's difficulty.

## Scout Variables

Scouts are governed by **three variables**, all of which are **upgradable**:

- 1. Speed**
  - Definition: Number of tiles a scout can move per turn.
  - Base Value: 3 tiles per turn
- 2. Lifespan**
  - Definition: Number of turns a scout remains active before vanishing.
  - Base Value: 4 turns
- 3. Reveal Radius**
  - Definition: Number of tiles revealed around the scout's current position.
  - Base Value: 1 (the tile the scout is on and adjacent tiles)

## Mechanics

- **Direction Assignment**
  - Players assign a starting point and direction for each scout.
  - Scouts move in a straight line along their assigned direction each turn.
- **Interaction with Hazardous Tiles**
  - Movement Cost: Moving into a hazardous tile doubles the movement cost (i.e., costs 2 instead of 1).
  - Effect: Scouts are slowed but do not detour; they continue in their assigned direction unless they hit the edge of the map, in which case they vanish.
- **Starting position**
  - Default: Scouts can only start in towns.
  - Infrastructure: Certain infrastructures will allow scouts to start from new positions, enabling access to additional scouting areas.
- **Fire-and-Forget**
  - Once dispatched, scouts operate autonomously until their lifespan expires.
  - Scouts vanish automatically after their lifespan expires.
- **Permanent reveal**

- A revealed tile stays revealed for the whole game.
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## Claims

Claims are a fundamental mechanic that allows players to **expand their empire's territory** by acquiring new tiles. Each turn, players earn a certain number of claims, which they can use to **manually select** and add **adjacent tiles** to their domain.

### Earning Claims

- **Base Claims per Turn:** Players gain a fixed number of claims at the start of each turn.
  - Initial Value: 4 claims per turn at the start of the game.

### Using Claims

- **Manual Selection:** Players use claims to select adjacent tiles and add them to their empire.
    - **Adjacent Tiles Only:** New tiles must be directly adjacent to already claimed tiles.
  - **Claim Cost**
    - **Basic & Resource Tiles:** 1 claim per tile.
    - **Hazardous Tiles:** 3 claims per tile (reflecting their role as obstacles).
    - **Special Tiles:** 2 claims per tile (aligned with their higher rarity and powerful effects).
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## Towns

Towns serve as key **expansion points**, allowing the player to establish new territories **without relying solely on adjacent tile** claims. Unlike other infrastructures, towns can be **placed directly on unclaimed tiles**, effectively creating **separate regions** that remain part of the same empire.

### Mechanics

- **Placement:** New towns can be established during the *Expand Phase*.
- **Tile Restrictions:** Towns can only be placed on basic tiles. There are no other placement restrictions.
- **Unlocking Towns:** The number of towns a player can found starts at zero and increases through a specific upgrade.



- **Confirmation & Permanence:** Once a town is placed and the *Expand Phase* is confirmed, it cannot be destroyed or relocated.

## Functionality

- **Expansion Hubs:** Towns can create a new territory not linked to the initial one, and so avoid claiming too many Hazardous Tiles.
  - **Income Boost:** Towns increase the Gold income of all adjacent infrastructure by +2.
  - **Scouting Points:** Towns serve as starting points for scouts, identical to the initial town. There is no concept of a "capital"; all towns function equally.
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## Resources

Resources are divided into **two categories: Gold**, used for general actions, and **Advanced Resources**, which serve specific strategic purposes.

### Gold

- **Primary currency** used for:
  - Recruiting scouts
  - Constructing infrastructure
  - Placing military units
  - Unlocking upgrades
  - Trading advanced resources
- **Income Source:** Gold is generated passively each turn from claimed tiles and can be increased through infrastructures and upgrades.

### Advanced Resources

Advanced resources **accumulate passively** per turn **once the appropriate infrastructure has been built** on a resource tile. They are used for specialized functions such as unit recruitment, infrastructure, and upgrades.

Resource	Usage	Rarity
Iron	Units, Military upgrades	Common
Stone	Advanced infrastructures, Economic upgrades	
Coal	Advanced infrastructures, Economic upgrades	
Horse	Units, Military/Economic/Expansion upgrades	
Emberbone	Units, Military upgrades	Rare
Ebony	Units, Military upgrades	
Crystal	Units, Advanced infrastructures, Military/Economic/Expansion upgrades	Very rare

## Infrastructures

Infrastructure represents **tile upgrades** that unlock **advanced resources**, increase **Gold yield**, or provide **special effects**. Each infrastructure is **typed to specific tile types**, meaning it can only be built on compatible terrain. Some infrastructures are available in a **limited number** (can be upgraded).

Infrastructure	Allowed Tiles	Effect	Cost	Available copy
Farm	Plain, Hill	+2 Gold Income	5 Gold	
Lumbermill	Forest	+4 Gold Income	5 Gold	
Iron Mine	Iron Vein	+3 Iron	10 Gold	
Stone Quarry	Stone Deposit	+3 Stone	10 Gold	
Coal Mine	Coal Vein	+3 Coal	10 Gold	
Horse Ranch	Horse Breeding Ground	+3 Horse	10 Gold	
Emberbone Refinery	Dragon Graveyard	+3 Emberbone	15 Gold	
Ebony Workshop	Ebony Wood	+3 Ebony	15 Gold	
Crystal Mine	Crystal Cave	+3 Crystal	20 Gold	

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*Heximperium*

Tavern	Plain, Hill	+2 Gold Income, Scout Starting Position	10 Gold	2
Windmill	Plain, Hill	Double surrounding Farm Income	30 Gold	
Hunter's Cabin	Hill, Forest	+2 Gold Income	5 Gold	
Village	Plain, Hill, Forest	+X Gold Income (X equal the sum of the income of adjacent tiles)	10 Gold	3
Tool Manufactory	Plain, Hill, Forest	Double surrounding Advanced Resource Income	30 Gold + 10 Stone + 10 Coal	2 after building 1 Stone Quarry & 1 Coal Mine
Fortress	Plain, Hill, Forest	Double on-tile & surrounding unit points	50 Gold + 30 Stone	2 after building 1 Stone Quarry
Smokehouse	Hill, Forest	Doubles income from adjacent Hunter's Cabins	40 Gold + 30 Coal	2 after building 1 Coal Mine
Arcane Spire	Plain, Hill, Forest	Doubles adjacent Village & Fortress bonuses	50 Gold + 25 Crystal + 15 Stone	1 after building 1 Crystal Mine & Stone Quarry
Magical Foundry	Plain, Hill, Forest	+3 Gold & +3 Unit Score to adjacent tiles	50 Gold + 15 Crystal + 15 Coal	1 after building 1 Crystal Mine & Coal Mine

## Units

Units are **placed on tiles**, it does not matter if the tile has infrastructure or not nor if the tile is claimed or not. Each unit has two variables, **cost and points**.

Unit	Cost	Points
Militia	5 Gold	1
Bowman	20 Gold	2
Soldier	15 Gold & 5 Iron	3
Horseman	25 Gold & 5 Horse	3
Dragonbreath Catapult	30 Gold & 3 Emberbone & 2 Ebony	4

Mage	40 Gold & 5 Crystal	5
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## Combos

Combos reward strategic **unit placement** and **synergy**, adding depth to gameplay. They are divided into:

- **Basic Combos**, which enhance unit scoring based on relationships and terrain.
- **Advanced Combos**, which unlock powerful rewards for achieving specific patterns or objectives. They are hidden to the player until he accomplishes them one time, he can only see their names and a short hint.

Mastering combos is essential for **achieving the highest possible score**.

<b>Basic combos</b>	
<b>Unit</b>	<b>Combo</b>
Militia	+2 per adjacent Militia, +1 on Forest
Bowman	+2 per adjacent Soldier/Bowman, +2 on Hill
Soldier	+3 per adjacent Soldier/Mage, +1 on Plain & Hill
Horseman	+4 per adjacent Horseman, +2 on Plain
Dragonbreath Catapult	+4 per adjacent Dragonbreath Catapult/Bowman/Mage, +3 on Town, Village & Fortress
Mage	+2 per adjacent unit, +5 on Fortress, Arcane Spire & Magical Foundry

<b>Advanced combos</b>			
<b>Name</b>	<b>Hint</b>	<b>Trigger Condition</b>	<b>Effect</b>
Supply Line	Forge a path that unites distant homes.	A line of units connects two Towns.	Double the points of every unit in this formation.
Sage's Guard	Shield your arcane master from every side.	A Mage is surrounded by 6 Soldiers.	Double the points of every unit in this formation.
Nomadic Tribe	Live with the horse, and only the horse	A Horseman is surrounded by 6 other Horsemen.	Double the points of every unit in this formation.



*Game Design Document*  
*Heximperium*

The Iron Wall	Hold the line, stand together !	5 Soldiers form a straight line.	Double the points of every unit in this formation.
The Burning Crusade	Fire and magic shall cleanse the battlefield.	3 Dragonbreath Catapults and 3 Mages are adjacent.	Double the points of every unit in this formation.
Sacred Watchtower	High in arcane spires, the wise sees what steel cannot.	3 Mages are placed on Arcane Spires.	All Mages gain +5 points.
The Phalanx	Protect the common folk with a wall of steel, and watch them become unstoppable.	6 Soldiers surround 1 Militia.	Double the points of every unit in this formation.
Mosaic Front	Variety is the key to a strong army	Every unit type is placed in a straight line.	Double the points of every unit in this formation.
Incandescent Boulders	Enhance the fire with the magma.	A Dragonbreath Catapult is placed on a Volcano.	All Dragonbreath Catapults gain +5 points.
Mountain Stronghold	Archers and soldiers stand strong in the peaks.	3 Soldiers and 3 Bowmen are adjacent on Mountain tiles.	Double the points of every unit in this formation.
Legion Formation	Disciplined ranks of steel and arrows carve the battlefield.	3 Soldiers and 3 Bowman form a triangle.	Double the points of every unit in this formation.
The Maginot Line	Fortress to fortress, don't let them pass.	Two Fortresses are connected by units.	Double the points of every unit in this formation.
Cavalry Charge	A sixfold strike: swift hooves in perfect formation.	6 Horsemen form a triangle.	Double the points of every unit in this formation.
Elven Legacy	The forest whispers its ancient teachings to skilled archers.	A Bowman is placed on a Sacred Grove.	All Bowman gain +2 points.
Memories of the Dead	Only the untrained can truly hear the whispers of the fallen.	A Militia is placed on an Ancient Battlefield.	All Militia gain +2 points.
Blazin Charge	Fire paves the road, hooves finish the charge.	3 Horsemen and 2 Dragonbreath Catapults are placed in a straight line.	Double the points of every unit in this formation.

## Upgrades

Upgrades enhance different aspects of gameplay and are divided into **three categories**:

- **Expansion** - Improves scout efficiency and expansion mechanics.
- **Economy** - Enhances infrastructures.
- **Military** - Strengthens units.

Upgrades can have different properties:

- **Tiered** - Can be purchased multiple times to increase their effect.
- **Unique** - One-time powerful effects that change gameplay dynamics.
- **Conditional** - Requires specific achievements (e.g., having X units placed, owning a specific infrastructure).

Expansion Upgrades				
Upgrade	Effect	Type	Cost	Unlock Condition
Scout speed	On all scouts, +1 tile per turn	Tiered (x3)	50 Gold	
Scout sight	On all scouts, +1 reveal radius	Tiered (x2)	100 Gold	
Scout lifespan	On all scouts, +1 turn	Tiered (x3)	50 Gold	
Mounted Scout	On all scouts, +2 tiles per turn	Unique	50 Horse	Building 3 Horse Ranch
Trained Scout	On all scouts, ignores hazardous tile speed penalty	Unique	500 Gold	Building 1 new Town
Final Sight	When a scout reaches the end of its lifespan, it reveals all tiles in a 6-tile radius.	Unique	50 Crystal	Building 1 Arcane Spire
Surveyor	Every revealed resource tile gives +1 Gold when scouted	Tiered (x5)	30 Gold	Revealing 50 tiles in total
Claim Authority	Gain +1 additional claim per turn.	Tiered (x5)	50 Gold	
Claim Conservation	Allows saving 1 additional unused claim per turn	Tiered (x10)	30 Gold	Claiming 10 tiles in total
Pioneer Settlement	Allows placing 1 additional Town.	Tiered (x3)	200 Gold & 100 Stone	Claiming 100 tiles in total
Urban Expansion	Each town generates +1 additional claim per turn.	Tiered (x3)	100 Gold	Building 1 new Town

Economic Upgrades				
Upgrade	Effect	Type	Cost	Unlock Condition
Tavern Licensing	Allows building 1 additional Tavern	Tiered (x5)	50 Gold	Owning 2 Taverns
Smokehouse Industry	Allows building 1 additional Smokehouse	Tiered (x5)	100 Gold & 20 Coal	Owning 2 Smokehouse
Workshop Permits	Allows building 1 additional Tool Manufactory	Tiered (x5)	100 Gold & 10 Stone & 10 Coal	Owning 2 Tool Manufactory
Defensive Network	Allows building 1 additional Fortress	Tiered (x5)	100 Gold & 20 Stone	Owning 2 Fortress
Settler's Boom	Allows building 1 additional Village	Tiered (x5)	200 Gold	Owning 3 Village
Mystic Expansion	Allows building 1 additional Arcane Spire	Tiered (x4)	200 Gold & 30 Crystal & 30 Stone	Owning 1 Arcane Spire
Eldritch Forgeworks	Allows building 1 additional Magical Foundry	Tiered (x4)	200 Gold & 30 Crystal & 30 Coal	Owning 1 Magical Foundry
Improved Farm Techniques	Farms generate +1 additional Gold	Tiered (x3)	30 Gold	Owning 3 Farm
Lumber Processing	Lumbermills generate +1 additional Gold	Tiered (x3)	30 Gold	Owning 3 Lumbermill
Market Place	Villages generate +2 additional Gold	Tiered (x3)	30 Gold	Owning 4 Village
Master Trappers	Hunter's Cabins generate +1 additional Gold	Tiered (x3)	30 Gold	Owning 3 Hunter's Cabin
Industrial Process	Advanced resource infrastructures generate +1 additional resource	Tiered (x4)	50 Gold	Owning 1 Iron Mine, Stone Quarry, Coal Mine, Horse Ranch
Commercial Hub	Towns increase the Gold income of all adjacent infrastructure by +1 Gold.	Tiered (x3)	80 Gold	
Arcane Windmill	Farms lose -1 Gold income but gain +1 Crystal production.	Unique	30 Crystal	Owning 3 Windmill

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*Heximperium*

Itinerant Caravan	Each Village increases the trade limit.	Unique	50 Horse	Owning 1 Village
Magocratic Courriers	Each Town increases the income of all infrastructures by +1 Gold.	Unique	500 Gold & 50 Horse & 30 Crystal	Building 2 new Town
Golden Crossroad	Towns gain +X Gold Income (X equal the sum of the income of adjacent tiles).	Unique	500 Gold	Building 1 new Town
Tavern Trade Route	Taverns gain +1 Gold income after each 100 advanced resources units sold or bought.	Unique	250	Owning 1 Tavern

<b>Military Upgrades</b>				
<b>Upgrade</b>	<b>Effect</b>	<b>Type</b>	<b>Cost</b>	<b>Unlock Condition</b>
Crowd Tactics	Militia gain +3 Points when adjacent to at least 3 other units.	Unique	150 Gold	Placing 6 Militia
Infantry Training	Soldiers gain +1 Point	Tiered (x3)	20 Iron	
Cavalry Discipline	Horsemen gain +1 Point	Tiered (x3)	20 Horse	
Archery Mastery	Bowmen gain +1 Point	Tiered (x3)	15 Ebony	
Artillery Calibration	Dragonbreath Catapults gain +1 Point	Tiered (x3)	15 Emberbone	
Mage Empowerment	Mages gain +1 Point	Tiered (x3)	10 Crystal	
Fortified Positioning	Units gain +3 Points when placed on a Fortress	Unique	250 Gold	Owning 2 Fortress
Harsh Terrain Adaptation	Units gain +2 Points when placed on a Mountain, Swamp or Desert	Unique	500 Gold	Owning 3 Mountain, 3 Swamp and 3 Desert Tiles
Reinforced Equipment	All units gain +1 Point	Tiered (x5)	30 Ebony	Placing 5 Units
Strategic Supply Lines	Units gain +1 Point when stationed on a tile with	Unique	250 Gold	Placing 15 Units



	Advanced Resource Infrastructure.			
Tactical Synergy	On all units : gain +1 additional Point if at least 3 different unit types are adjacent.	Unique	500 Gold	Placing 30 Units

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## Trade

Players can **buy and sell advanced resources** every turn.

**Trade actions per turn are limited:**

- **Buy Limit:** 10 units of advanced resources.
- **Sell Limit:** 100 Gold worth of resources.

The **trade limit** can be **increased**. Every time something increases it, it is by **10 units of advanced resources** and **100 Gold worth of resources** (like the Itinerant Caravan upgrade).

**Fixed Pricing:**

- **Common resources** (Iron, Stone, Coal, Horse) → **5 Gold per unit**.
- **Rare resources** (Emberbone, Ebony) → **10 Gold per unit**.
- **Very Rare resources** (Crystal) → **20 Gold per unit**.

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## Scoring & Victory Conditions

This game is a **score-based experience with no traditional victory or defeat**. The goal is to **optimize unit placement and combos** to achieve the **highest score** possible.

### How Scoring Works

- Each unit placed generates **Base Points** based on its type.
- At the end of **each Enforce Phase** the player earns the **points of every placed unit**.
- **Basic Combos** provide bonus points for unit and tile synergies.
- **Advanced Combos** reward strategic unit formations and can only be triggered once per game.

- **Terrain & Infrastructure** bonuses affect unit scores based on their placement.

## Game Completion & Score Evaluation

- A **standard game lasts 50 turns**.
- Once the final turn is reached, the player's **total score is calculated**.
- The **final score screen** includes a breakdown of:
  - Total Base Score
  - Total Combo Score
  - Total Tiles Modifiers

## Replayability & Optimization Challenge

- **Map Seeds are recorded**, allowing players to **retry the same map** for a better strategy.
- Every session is **procedurally generated**, ensuring **unique challenges** each time.
- Players can experiment with **different unit compositions and infrastructure layouts** to refine their strategies.

## Leaderboard

- A **leaderboard system** is planned for future development.
- **Score categories may use specific seed-based maps** for fair global rankings.
- Further adjustments may be made to encourage **competitive score chasing**.

## Game Settings

Heximperium is designed to be **approachable for newcomers** while still offering **meaningful challenges for veteran 4X/puzzle players**. To accommodate different playstyles and schedules, players can select both the **session length** and the **challenge level at the start**. By focusing difficulty adjustments on a few core parameters, the game fosters a balanced experience that remains easy to understand and compare across multiple runs. Since Easy mode grants faster expansion and typically higher final scores, **separate leaderboards** for each difficulty level ensure fair competition.

## Game Length

- **Short:** 30 turns
- **Standard:** 50 turns
- **Marathon:** 100 turns

## Game Difficulty

Difficulty	Starting Scouts	Base Claim per Turn	Pre-Claim Territory
Wealthy Heir (easy)	5	6	2-hex radius around the starting Town
Ambitious Merchant (medium)	3	4	1-hex radius around the starting Town
Self-Made Man (hard)	1	2	None

## Tutorial

The tutorial uses a **predefined map** where players must complete **specific actions**. This controlled environment ensures that new mechanics are introduced in a **deliberate sequence**. Each mechanic is explained via **detailed pop-ups**, allowing players to **learn step-by-step** while maintaining a consistent pace throughout the onboarding experience.

## Save system

Players have access to a saving system. Allowing them to **save mid-game**. The save saves the game state at the **start of the current phase**.

Multiple save slots are available, and each slot has its **seed clearly specified**.

## MAP DESIGN

### Overview

#### Purpose of the Map

In *Heximperium*, the **map is central** to the player's strategic journey and puzzle-like experience. A diverse spread of biomes, each offering a unique combination of terrain and resources, ensures that no two expansions play out the same. By carefully **balancing resource variety, special tiles** and **terrain constraints**, the map layout challenges players to plan their claims, upgrades, and final unit placements with precision. The result is a **dynamic board** that supports **replayability**, fosters engaging tactical decisions, and highlights the game's core 4X-meets-puzzle identity.

### Biomes

#### List of Biomes

- Grassland
- Deep Forest
- Mountain
- Desert
- Swamp
- Ice

### Biome Characteristics

Biome	Basic Tiles	Resource Tiles	Hazardous Tiles	Special Tiles
Grassland	Plain Hill Forest	Iron vein Stone deposit Coal vein Horse breeding ground	Mountain Water	Ancient Stone Circle Sunken Ruins Mage Tower Volcano Ancient Battlefield Sacred Grove Nomad's Trade Hub
Deep Forest	Plain Hill Forest	Iron vein Stone deposit Coal vein Ebony wood	Mountain Water Swamp	Faery Pond Sunken Ruins Mage Tower Volcano Ancient Battlefield Sacred Grove Nomad's Trade Hub
Mountain	Hill Forest	Iron vein Stone deposit Dragon graveyard Crystal cave	Mountain Water Ice	Mountain Pass Sunken Ruins Mage Tower Volcano Ancient Battlefield Sacred Grove Nomad's Trade Hub
Desert	Hill Forest	Iron vein Stone deposit Dragon graveyard	Mountain Desert	Oasis Mage Tower Volcano Ancient Battlefield Sacred Grove Nomad's Trade Hub
Swamp	Hill Forest	Iron vein Coal vein Ebony wood	Water Swamp	Ancient Bog Sunken Ruins Mage Tower Ancient Battlefield Sacred Grove Nomad's Trade Hub
Ice	Forest	Stone deposit Crystal cave	Mountain Water Ice	Frozen Citadel Sunken Ruins Mage Tower Ancient Battlefield Sacred Grove

### Biome Distribution Rules

Biomes	Min Size (in tiles)	Max Size (in tiles)	Representation on the map	Potential Neighbors	Shape
Grassland	15	30	35%	Grassland Deep Forest Mountain Desert Swamp Ice	Anything, to fill blank between biomes
Deep Forest	10	25	20%	Grassland Deep Forest Mountain Swamp Ice	Anything, to fill blank between biomes
Mountain	10	20	17.5%	Grassland Deep Forest Desert Swamp Ice	Anything, to fill blank between biomes
Desert	5	20	15%	Grassland Mountain Swamp	Clustered "round"
Swamp	5	15	7.5%	Grassland Deep Forest Mountain Desert	Clustered "round"
Ice	5	20	5%	Grassland Deep Forest Mountain	Clustered "round"

### Biome Tiles Frequency

Detailed biome tiles frequency available here:

[Heximperium - Biome Tiles Frequency](#)

## Special rules

### Starting position

The starting position is the **center of the map**. It must be on a **Grassland tile**, and within two hexes of that position (i.e., the 18 surrounding tiles), there can be **no special tiles and at most four hazardous tiles**. The center tile is replaced by a Town at game start, and the ring of tiles within that one-hex (**depending on difficulty**) radius is automatically included in the player's territory .

### Special tiles restrictions

Each tile should appear at least one time and no more than one Special tile per biome patch.

Tile Name	Minimal Required Neighbor	Maximum (linearly scale depending on map size)
Mountain Pass	Mountain x2	5 to 10
Oasis	Desert x3	3 to 8
Frozen Citadel	Ice x1	1 to 3
Ancient Bog	Swamp x1	3 to 8
Ancient Stone Circle	None	3 to 8
Faery Pond	Forest x1	2 to 5
Sunken Ruins	Water x1	1 to 3
Mage Tower	None	2 to 4
Volcano	None	3 to 6
Ancient Battlefield	None	5 to 10
Sacred Grove	None	3 to 6
Nomad's Trade Hub	None	3 to 6

## High-Level Map Generation Algorithm

Basic algorithm, it will be further detailed on a technical document.

### Step-by-Step Process

#### Step 1: Define Map Dimensions

- **Map Size:** Define the map size in terms of the number of hex tiles. The map should be circular with a specified radius.
  - **Radius:** Determine the radius of the circular map, which dictates the total number of hex tiles. 12 to 22 (469 tiles to 1519 tiles)
  - **Total Hex Tiles:** Calculate using the formula: Total hex tiles =  $3 \times \text{Radius} \times (\text{Radius} + 1) + 1$

#### Step 2: Generate Biome Layout

- **Central Grassland Patch:** Start by creating a central Grassland patch as the starting position for the player. This ensures a consistent starting point.
- **Noise Functions or Voronoi/Perlin Noise:** Use noise functions or Voronoi/Perlin noise to generate natural-looking biome patches. These algorithms help create organic shapes and distributions.
  - **Biome Distribution:** Define the global distribution of biomes based on predefined percentages or rules.
  - **Patch Size Constraints:** Ensure that each biome patch respects minimum and maximum size constraints.
  - **Adjacency Rules:** Implement rules for biome adjacency to ensure realistic and varied transitions between biomes.

#### Step 3: Populate Tiles

- **Tile Type Determination:** Within each biome, determine the type of each tile based on predefined probabilities and restrictions.
  - **Basic Tiles:** Assign basic tiles (e.g., Plain, Hill, Forest) according to biome-specific probabilities.
  - **Resource Tiles:** Randomly assign resource tiles (e.g., Iron vein, Stone deposit) within biomes where they are likely to occur.
  - **Hazardous Tiles:** Place hazardous tiles (e.g., Mountain, Desert) according to biome-specific rules and constraints.
  - **Special Tiles:** Distribute special tiles (e.g., Oasis, Ancient Stone Circle) sparingly and ensure they meet rarity and placement criteria.



#### Step 4: Validate/Adjust

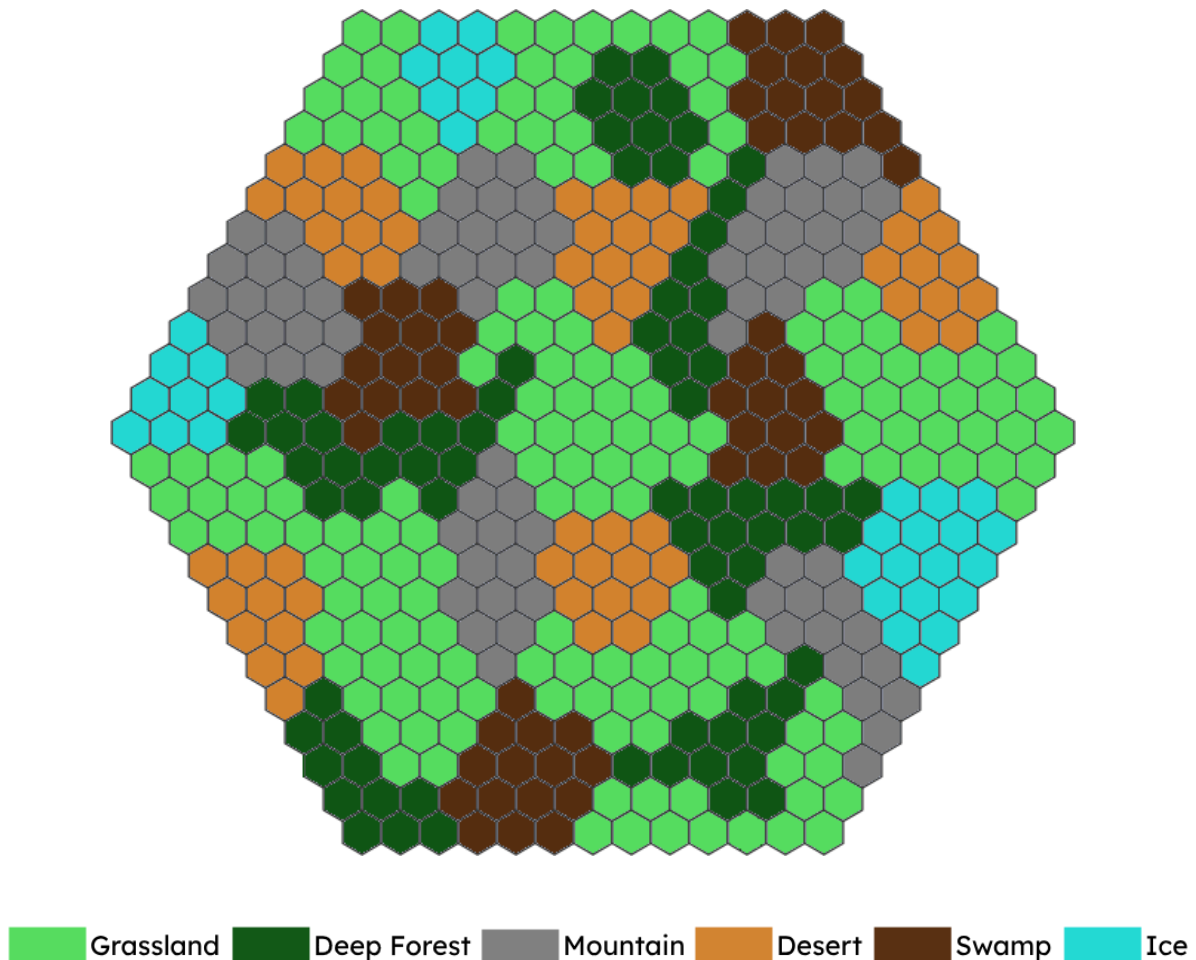
- **Fairness Checks:** Implement checks to ensure the map meets basic fairness criteria, such as resource distribution and tile variety.
  - **Rebalance:** If the map fails fairness checks, consider or re-rolling certain tiles to meet the criteria.
  - **Biome Occurrence:** Ensure that each biome appears at least once on the map to maintain diversity.

#### Step 5: Finalize & Save

- **Lock Map Data:** Once validated, lock the map data to prevent further changes. This finalizes the map layout and tile properties.
- **Save Map:** Save the map data, including tile types, biome layout, and any special features, for use during gameplay.
- **Seed Storage:** Store the seed used for generation to allow players to replay the same map if desired.

## Visual Representation

Healthy biomes distribution (469 tiles)



## UI

### UI Overview & Goals

#### Core Principles

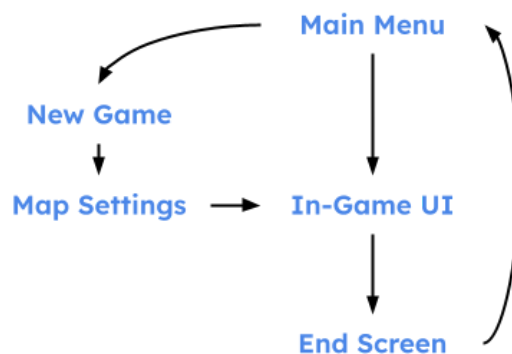
- Clarity and Minimalism: Emphasize easy navigation, show only relevant information.
- Phase-Based Separation: Only show actions relevant to the current phase.

#### Color-Coded Phases

- Each phase has a unique color tint, to guide the player.
  - Explore → Blue
  - Expand → Green
  - Exploit → Yellow
  - Enforce → Red
- This quick color association makes it instantly clear which phase the player is in, supporting the game's emphasis on sequential, phase-by-phase gameplay.

### Menus Structure

#### Menu Flowchart



#### Menu Roles

- **Main Menu:** Start a new game, load a saved game, access settings, exit.
- **Map Settings:** Let the player select map size, difficulty, seed, etc.
- **In-Game UI:** The main gameplay interface, described in detail below.
- **End Screen:** Displays final score, combo breakdown, and offers restart or main menu options.

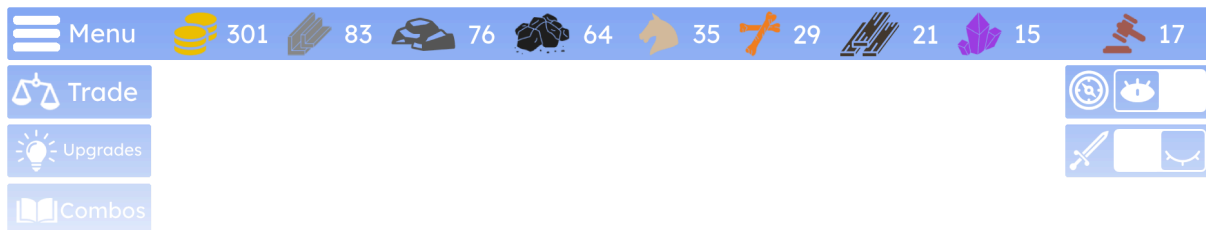
## In-Game UI Layout

This section details the standard HUD elements visible during gameplay.

### Global

#### Resource Bar

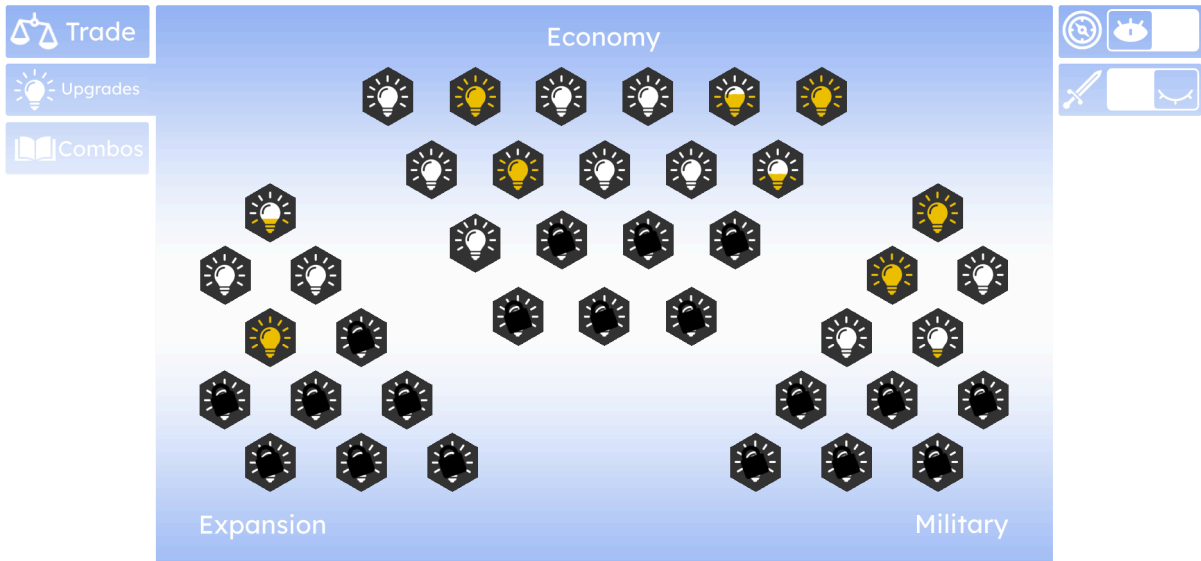
- Shows current Gold and each advanced resource. Advanced resources appear only once the player has gained at least one unit of it.
- Show current available Claims.
- A trade button is present right under the bar to open a dedicated menu. Samely as the resource bar, advanced resources appear in the trade menu only if the player gained at least one unit of it.
- Hovering a resource opens a tooltip explaining current income.



*Resources Bar Mock-up*

#### Upgrades Menu

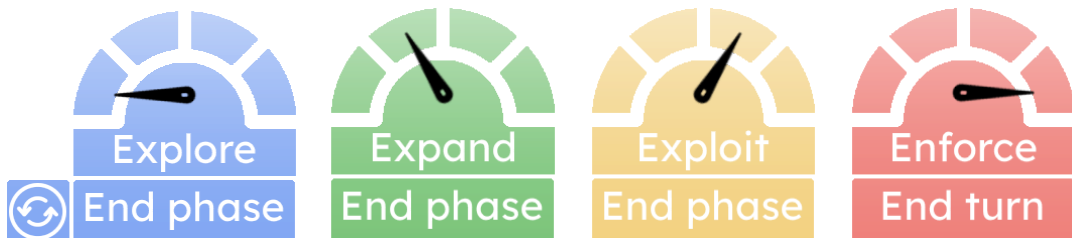
- A button is available below the resource bar to open the Upgrades Menu.
- The menu is divided in three categories: Expansion/Economy/Military.
- All upgrades are visibles, but locked ones are clearly marked as, on hovering them the player can see the condition to unlock them.
- Hovering an upgrade shows all the information, its effect, its cost and if it is unique or tiered.
- Each upgrade has a unique icon, to help navigate between upgrades.
- Bought upgrades are filled, proportionally if they are tiered.



Upgrades Menu Mock-up

## Phase Indicator

- A clear “Phase Title” label showing the active phase (Explore, Expand, Exploit, Enforce).
- The whole UI change is color depending on the current phase.
- A button “End Phase” is present to confirm the phase and pass to the next.
- A button to reset the current phase is present, restarting the phase, cancelling all actions done.



Phase indicator Mock-up



Color palette

## Information Pop-up

- Appears when hovering on a tile or a unit.
- Displays tile type, current income and claim cost (if not claimed) or unit's points.

## Combo Compendium

- A button is available below the resource bar to open the Combo Compendium, it contains two tabs.
- **Basic Combos Tab**
  - All units are listed with their basic combo.
- **Advanced Combos Tab**
  - All Advanced Combo are listed.
  - Before the player achieved them he can only see their names and a hint.
  - Once he has performed them on at least one game their trigger condition and effect are shown.

## Scouts and Units visual ON/OFF

- Two buttons are available to hide or show Scouts and Units.
  - Scouts are by default shown during the Explore Phase, and hidden during other phases.
  - Units are by default shown during the Enforce Phase, and hidden during the other phases.

### Explore Phase

All tiles serving as starting positions for scouts are highlighted.

Clicking on those tiles shows a button to buy a scout at this position. By doing so the player has a new scout and has to choose a direction.

### Expand Phase

Clicking on an unclaimed tile locks the pop-up and adds a button “Claim” (grayed out if not enough claims) and a button “Found new Town” (if available).

### Exploit Phase

Clicking on a claimed tile without an infrastructure shows a radial menu listing all possible infrastructures for the tile. Hovering those infrastructure buttons, shows a pop-up detailing the infrastructure (cost, effect and what the player will actually gain with it). Clicking on a button builds the infrastructure.

Clicking on a claimed tile with an infrastructure locks the pop-up and adds a button “Destroy”.



*Infrastructure menu Mock-up*

Unavailable buildings are in red (not enough resources or cap reached).  
Locked infrastructures are marked with a lock.

## Enforce Phase

Clicking on a tile shows a radial menu listing all units. Hovering those units buttons, shows a pop-up detailing the unit (cost, basic combo and points at this position).  
Clicking on a button places the unit.

## End Screen & Score Breakdown

- **Final Tally**
  - Summarizes:
    - **Base Score** (sum of unit base points).
    - **Combo Score** (basic + advanced combos triggered).
    - **Tile/Infrastructure Modifiers** (bonuses from infrastructures and special tiles).
- **Replay Options**
  - Option to replay the same map seed for a better score or to return to the main menu.

**Design Note:** Details (icons, exact panel layout, pop-up styles) may evolve during implementation or user testing.

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## ART DIRECTION

### Moodboard

The art direction for Heximperium aims to be **clear and readable**, with each biome and tile type visually distinct. The initial release will use a **simple, stylized look** (as shown in the “First version moodboard”) for easier production and a consistent, uncluttered experience. A **richer, more detailed art style** (see “Final version moodboard”) is planned for later, pending the availability of an artist.

#### First version moodboard





## Final version moodboard



## Biomes identity

Biome	Main color	Color tone	Base
Grassland	Light green	Light colors	Grass visible on each tile
Deep Forest	Dark green	Dark colors	Trees visible on each tile
Mountain	Grey	Dark colors	Rocks visible on each tile
Desert	Orange	Warm colors	Sand visible on each tile
Swamp	Brown	Dark colors	Water pools visible on each tile
Ice	Light blue	Light colors	Snow visible on each tile

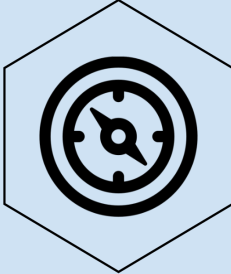
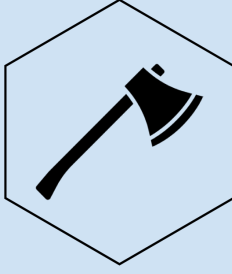
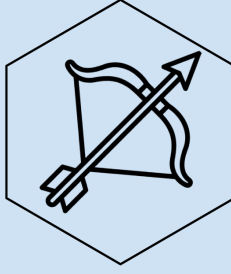


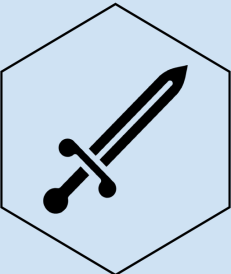

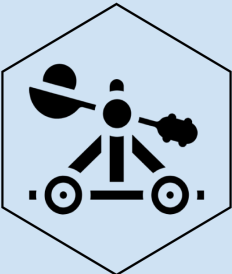
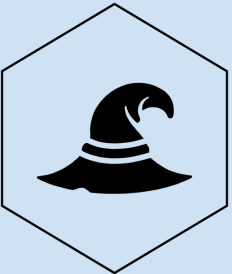
## Tiles variations

Tiles and infrastructures appear in **biome-appropriate variants** to reinforce each region's identity. For example, a Farm in Grassland shows a grassy field, while a Farm in Desert might have a more arid, sandy look. Some biomes or tile types require **multiple variants** if they are more common on the map. Each tile is designed **without** connecting borders (e.g., roads or rivers) to avoid orientation issues and streamline production.

## Units icons

Units and Scouts **aren't shown as physical models** on each tile. Instead, they appear as **floating icons above the tile**. If both a Scout and a Unit occupy the same tile, the icons are scaled down and positioned side by side so both remain visible.

Scout	Militia	Bowman
		

Soldier	Horseman	Dragonbreath Catapult	Mage
			

## VFX & Animations

Type	Trigger	Details
VFX	Scout/Unit spawn	Sparks around the tile
Animation	Scout/Unit spawn	Fade in icon
Animation	Tile revealed	The tile spins on itself (one side fog of war, the other the actual tile) then stops on the actual tile side
Animation	Claim tile	Borders spawn as a point in the center of the tile, then expand to reach the edges
VFX	Claim tile	Sparks around the tile when the animation is complete
VFX	Build or destroy infrastructure	Big dust cloud over the whole tile, hiding the transition
VFX	Score reveal at the end of the game	Big fireworks around the score
Animation	Hover a tile or a unit	Highlight around the tile (or unit icon)

## UI Style

The interface adopts a **minimalist, flat-colored** design with **slight transparency**, inspired by titles like *Humankind*. Its key elements include:

- **Light, Neutral Background Panels:** Softly tinted panels that allow a partial view of the map underneath.
- **Clean Iconography and Typography:** Straightforward, modern icons and a clear, readable font to minimize visual clutter.
- **Consistent Layout:** UI components are grouped logically, ensuring important information stands out without overwhelming the player.
- **Reduced Ornamentation:** Minimal gradients and borders, focusing on function over form to keep the player's attention on the board.

## NARRATION

Heximperium is primarily a strategic and puzzle-focused experience, with **no story elements**. There is no linear campaign or scripted narrative, and gameplay does not hinge on a plot-driven progression. Instead, the world is presented as a **low-fantasy setting** where remnants of draconic magic (e.g., emberbone) and rare fantasy landmarks (e.g., Faery Pond, Mage Tower) hint at a broader mythical background.

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## SOUND DESIGN

### Sound needs

Trigger	Details	Superposable
Ambient music	Chill medieval music, various instruments, long loop	No
Scout/Unit spawn	<i>Tudum</i> , with military vibe	Yes
Tile revealed	Flip sound fitting the animation	No
Claim tile	Clear <i>tadam</i>	Yes
Build or destroy infrastructure	Wood and stone construction noises	Yes
Score reveal at the end of the game	Firework sounds and trumpets	No
Hover a tile or a unit	Subtle <i>woosh</i> to accompany the highlight	Yes
Click on UI button	Simple <i>click</i>	Yes