

# COLDSNAP



## Table of Contents

Roster.....	3
High Concept.....	4
Summary.....	4
Target Audience.....	4
Platform.....	4
Engine.....	4
Gameplay Overview.....	5
Metrics.....	5
Gameplay Mechanics & Systems.....	6
Movement.....	6
Attacks.....	7
Combos.....	7
Attack List.....	8
Combo Tree.....	9
Damage.....	9
Attachable Upgrades.....	10
Generators.....	10
Drill.....	11
Heat.....	11
Enemy Types.....	11
Difficulty Scaling.....	12
Narrative Arc Overview.....	14
Progression.....	14
Maps.....	15
Permafrost Processing.....	17
Frozen Refinement.....	18
The Core.....	19

## Roster

First Name	Last Name	Role
Jayden	Currence	Producer
Garrett	Oliver	Creative Director
Christina	Lawson	Lead Artist
Alyssa	Aybar	3D Artist
Ash	Cho Chia Yuen	3D/2D Artist
Ethan	Ryno	Animator
Katherine	Quartana	2D Artist
Jake	Hitzges	Animator
Hannah	Geuss	3D Artist
Shyanne	Murdock	VFX Artist
Wyatt	Furnas	2D/Foley Artist
Jeffrey	Stevenson	Lead Programmer
Samuel	Drastal	Programmer
Sadie	Raghunand	Programmer
Tiffany	Skindell	Programmer
Timothy	Williams	Lead Designer
Mateo	Rios	Designer
Brody	Townsend	Designer
Jaheim	Clarke	Designer

## High Concept

Fighting through desolate layers of the planet's crust and reviving the core evokes feelings of isolation and determination.

## Summary

Coldsnap is a third-person, action roguelike. Players pilot a robot that has reactivated on a lonely and desolate planet known as Cadmus, home to the largest mining operations in the galaxy. Due to these mining operations, Cadmus has frozen over, and the core of the planet is all but dead. It is the robot's duty to restart the planet's frozen center and fight through the layers of the crust to save its dying home.

## Target Audience

Our target audience are players aged 16-28 who enjoy challenging, replayable roguelike experiences with scalable difficulty and fast-paced action. They value mechanical depth, progression systems, and a strong sense of discovery.

## Platform

PC – Mouse & keyboard with controller support.

## Engine

Unreal Engine 5.6.1

## Gameplay Overview

Coldsnap consists of three dimensional, third-person gameplay focused on mobility and combat. Starting on the surface of Cadmus, at the Subzero Sinkhole, players activate a series of generators. These generators power the drill that takes the player to the next level, where the process is repeated until the player has progressed to the fourth level: the core of the planet. The number of required generators increases as the layers get deeper.

While progressing deeper, players fight off various robotic enemies using Thermon, a melee weapon powered by a tremendous amount of heat. Enemies spawn individually or in small clusters throughout each environment, growing stronger as time goes on.

Players encounter upgrades throughout the descent that strengthen Thermon and the robot. These upgrades grant improved stats, additional effects, and new abilities that aid in traversal and combat. Amid traversing deeper into the planet, players fend off the increasing groups of enemies while collecting upgrades and clearing the path to progress to the next layer. If players die in combat before reaching the core, all progress and upgrades are lost, and the run restarts at the surface.

As players progress through the layers of the planet, game difficulty and intensity increases. Deeper levels of the planet contain more difficult enemies to fight, more objectives to progress between layers, and more powerful upgrades to collect. Players encounter slight differences between separate attempts to reach the core generators changing locations or different item drops.

## Metrics

- **Time:** Time is measured in seconds.
- **Speed:** Speed is measured in UU/s.
- **Health:** float value stored in players and enemies and is measured in the form of HP.
- **Damage:** is a float value stored in players and enemies and is used to measure the value subtracted from the health value when hit by an attack.
- **Attack Speed:** Attack speed is measured in the number of attacks that can be performed in one second.

# Gameplay Mechanics & Systems

## Movement

The player traverses 3D environments using bound movement inputs, which direct the player character along the appropriate axes. Holding the movement input causes the player character to swiftly accelerate, increasing both acceleration and velocity. The velocity continues to rise until the player reaches a max speed of 600 cm/s, which players can modify through statistical upgrades earned during gameplay. If the player releases the movement input, the character's velocity gradually decelerates to zero at a constant braking rate of 2048 cm/s<sup>2</sup>.

Tapping the corresponding input button makes the player character jump, moving upward with an initial vertical velocity of 420 cm/s. Holding the button increases jump height. Players also increase their jump height through statistical upgrades found during gameplay. These upgrades provide a percentage increase to both the minimum and maximum jump height. The jump retains horizontal momentum, allowing for consistent movement while ensuring that the path remains clear and predictable. The player cannot jump if they are not grounded when the input button is pressed.

Pressing the corresponding input button also triggers a forward slide in the direction of movement, greatly increasing velocity with a force of 2000 cm/s for a short duration. Once the speed boost ends, the player character retains the dash's momentum, allowing them to continue moving off environmental inclines and cover distances much farther than normal. Certain gameplay mechanics modify aspects of the dash, such as the duration of the speed boost. Additionally, certain upgrades can allow the player character to jump during the dash, extending the dash velocity into the air for a longer boost effect.

## Attacks

Players perform light and heavy melee attacks using the player character's melee weapon. These attacks are mapped to separate light and heavy attack buttons, with a single light or heavy attack being triggered by pressing the corresponding input. An attack contains at least one hit window. A hit window is defined as a series of frames within an attack in which one or more hitboxes are active. Each attack contains three stages: startup frames, active frames, and recovery frames. Startup frames are the animation frames of an attack before hitboxes become active. Active frames are all frames between the beginning of the attack's first hit window and the end of the attack's last hit window. Recovery frames are frames after all hits of an attack have occurred and all hitboxes are inactive, but the animation is still playing. All attacks in the game pierce, hitting all enemies within the attack's range when executed. Attacks are categorized into grounded and aerial attacks. Aerial attacks briefly pause gravity for the player upon hitting one or more enemies.

## Combos

Players execute attack combos by performing multiple attacks sequentially, with a depth of up to three attacks for a given combo. Combo trees describe how players perform combos and define all possible combos within the game. The combo tree defines which attacks can transition into which other attacks within a given combo. Each attack within the combo tree has its own animation, frame data, damage, stun time, and knockback. Attacks have a buffer window after their active frames have ended where another attack can be input. If an attack is input during this window, the game checks if a combo exists with the previous attack and the attempted next attack. If this combo route does exist, the new combo attack is performed. Otherwise, the player's combo state returns to the base of the combo tree. This also occurs after any three consecutive combo attacks within the tree have been performed. Players successfully execute combos by performing the first attack of the combo, then inputting a subsequent attack within the combo during the previous attack's buffer window. The buffer window of an attack starts once the attack's active frames begin, but the transition into the next attack does not start until the previous attack's recovery frames begin. Players can cancel attacks into further combo attacks early by performing a valid combo attack input during the recovery frames of an attack.

## Attack List

<b>Attack</b>	<b>Description</b>
Spark Swipe	A downwards cross-body slash in front of the player with low stun and damage.
Spark Hook	An upwards cross-body slash in front of the player with low stun and damage.
Heated smack	A large, sweeping horizontal slash with greater startup and recovery frames and higher damage and stun values than Spark Swipe and Spark Hook.
Siphon Spin	A horizontal spin attack around the player with two hit windows. The first hit has lower damage and pulls enemies towards the player, while the second hit deals greater damage and has high stun, but low outwards knockback.
Thermal Shatter	A quake attack where the player slams their weapon into the ground, hitting enemies on all sides and knocking them slightly into the air.
Heated Uplift	A strong uppercut in front of the player with high stun and vertical knockback.
Spark clip	A horizontal swipe in front of the player, applying lower knockback and stun in the direction the player is facing. Damage is low.
Spark Switch	A horizontal swipe in the opposite direction of Light 1A with similar knockback, stun, and damage.
Siphon Strike	A horizontal spin attack similar to Siphon Spin with two hit windows. The first hit window pulls enemies in towards the player with lower damage and stun, while the second hit window applies minimal knockback but higher stun and damage.
Thermal Slam	A strong, downwards slam where the player knocks enemies down into the ground at high speed with high damage, knockback, and stun.
Heated Swing	A vertical spin attack which knocks enemies higher into the air. The player spins backwards along their local left-and-right axis, causing the weapon to slice upwards in front of them. Damage and stun are high.

## Combo Tree

<b>Attack 1</b>	<b>Attack 2</b>	<b>Attack 3</b>
Spark Swipe	Spark Hook	Heated smack
Siphon Spin	Thermal Shatter	
Spark Swipe	Spark Hook	Thermal Shatter
Spark Swipe	Heated Uplift	
Spark clip	Spark Switch	Heated Swing
Spark Switch	Thermal Slam	
Spark clip	Thermal Slam	

<b>Attack Name</b>	<b>Damage</b>	<b>Stun Time</b>	<b>Active Frames</b>	<b>Attack Duration (frames)</b>	<b>Number of Total Hitboxes</b>
Thermal Slam	30	2.4	42-58	17	10
Siphon Spin	30	2.4	43-65	23	10
Heated Swing	20	3	8-46	9	2
Thermal Shatter	20	3	13-24	12	1
Heated Uplift	18	2	45-56	12	2
Spark Switch	8	1	11-15	5	3
Spark Swipe	8	1	12-14	3	2
Siphon Strike	8	1	7-14	8	3
Spark Hook	8	1	16-23	8	3
Heated Smack	14	2.5	14-19	6	3

## Damage

When an enemy collides with an active hitbox of an attack, the enemy takes damage and is stunned based on the hitbox's damage and stun values. Enemies may also receive knockback upon being hit based on their state and the type of attack they were hit by. Grounded enemies only receive knockback from heavy attacks, while airborne enemies receive knockback from both light and heavy attacks.

## Attachable Upgrades

Players enhance their piloted robot by collecting and attaching core upgrades dropped randomly from defeated enemies. These upgrades provide either permanent or temporary stat boosts, depending on the player's choice. Core upgrades influence player progression and improve combat effectiveness.

Defeated enemies randomly drop cores, which players can collect. Upon collection, players must choose to either attach the core or consume it for fuel. If the player attaches the core, an interface appears, allowing placement on the robot's body. Once placed, the corresponding gameplay benefit activates immediately.

Alternatively, if the player chooses to consume the core, it provides a large stat boost for the rest of the level, and a small permanent increase to the robot's overall heat meter. This temporary stat boost only persists on the current layer and is lost when progressing to the next layer. The specific stat percentage boost differs for each given upgrade core and its associated stat that increases when consumed.

Each core type provides a unique upgrade that modifies the robot's attributes. Once attached, a core upgrade grants a permanent effect for the remainder of the current run. Players can collect and attach multiple cores of the same type. However, each additional upgrade provides diminished returns along a logarithmic curve, causing the effect to plateau after a certain threshold.

## Generators

Players encounter a series of generators in each layer of the game. Each layer contains multiple potential generator locations, and generators are randomly placed every time a layer is entered. Players activate a generator by attacking it, but only once they have generated enough heat in the heat meter for the generator's activation heat cost. That heat is expended when the generator is hit, if the player has generated more than the required amount. When a generator is activated, it begins powering up. During this time, additional enemies spawn around the generator, increasing difficulty and danger to the player. The amount of required heat for these smaller thresholds is less than the initial heat requirement which begins the generator's power-up state. Players must stay near a generator while it is powering up and expend heat on it whenever heat thresholds are reached until the generator fully powers on.

## Drill

Once all generators have been activated, players navigate to the drill, which is the centerpiece of the level. The drill is only activated once all generators have been turned on. Players activate the drill by hitting it with a melee attack, similarly to how generators are activated but without any heat meter cost. Once activated, the drill begins boring a tunnel to the next layer of the planet over a set period of 90 seconds. This time is longer than the power-up phase for any single generator, as the drill is a larger and more central objective to game progression.

During this drilling process, enemies spawn at even higher frequencies than when a generator is being powered up. Players fend off enemies and survive until the drill is finished tunneling to the next layer.

## Heat

The player has a gauge labeled “Heat”. Heat is used to enhance normal combat abilities. With a defined max value of 100 and minimum value of 0, the value tied to this gauge is known as the “Heat value”. When the player lands an attack on an enemy, the Heat value increases by 10. Each ability has its own specific heat cost.

The player’s Light Attack, Heavy Attack, and Dash can be temporarily upgraded by expending Heat as well. Abilities are triggered by their bound input. Normal abilities are temporarily upgraded by holding down the dedicated “Heat” button.

## Enemy Types

The Sparkbots spawn most frequently and drop the greatest number of upgrades. Jumping is their core movement, and they execute attacks by maneuvering around the player, locking onto their location, and performing a leap attack. The smallest enemies have the least amount of health and deal the lowest amount of damage.

The Collector enemies consist of two variations, the standard melee Collector, and the ranged Torcher. These enemies drop upgrades at a lower rate and take more damage to destroy. The Torcher locks onto the player at a distance and shoots a projectile, forcing the player to evade and close the distance to destroy them. The standard Collector charges the player and delivers a punch attack. The Torcher does more damage per projectile and has a longer cooldown between attack phases. The

Collector does less damage per punch but attacks at a faster rate.

The Haulers spawn less frequently and drop stronger upgrades at a low rate. They require more damage to destroy and deal a high amount of damage to the player. They move slower and perform a heavy attack with a longer cooldown between each attack.

The Harvester has the lowest rate of spawning, the most health, and deals the greatest amount of damage to the player. The Harvester combines both range and melee attacks in their combat phase. The ranged attack does more damage and has a shorter cooldown while their melee consists of a powerful punch that does the most amount of damage to the player with a longer cooldown. The Harvester cannot be juggled and poses the greatest threat to the player, offering the highest drop rate for powerful upgrades.

## Difficulty Scaling

As time passes, the difficulty in the game increases. Enemy health and damage scales over time, making enemies stronger and harder to kill. The interval between enemy spawns also decreases as time passes, spawning more enemies around the player and their environment. Enemy health, damage, and spawn intervals all scale linearly with time.

$$h(t) = 0.1t + 1$$

$h(t)$  = scaled health

$t$  = time (in minutes)

Enemy health grows by 3% every minute. For example, at the twenty minute mark, enemies have 36 extra points of health added on to their base health of 100.

$$d(t) = 0.03t + 1$$

$d(t)$  = scaled damage

$t$  = time (in minutes)

Enemy damage grows by 1.5% every minute. For example, at the twenty minute mark, an enemy has 18 extra points of damage added onto their base damage.

$$s(t) = 0.01t + 1$$

s(t) = spawn rate

t = time (in minutes)

$$A = \frac{5}{M}$$

A = actual spawn rate

5 = initial spawn rate interval

M = multiplier

This formula calculates the multiplier that is used to calculate the actual enemy spawn interval. The multiplier increases by 2% every minute. For example, at the 20 minute mark, the multiplier amounts to 1.4 and enemies spawn every 3.57 seconds.

The Difficulty Manager controls what enemies spawn using a budget system. The Difficulty Manager has a set number of credits at its disposal that it spends per spawn wave. As the player kills enemies, the Manager gains credits. It has a pool of enemies to choose from to spawn in each level. Each enemy has a cost and weight of being picked. For each spawn wave, the manager uses the available budget to spawn in an appropriate amount of enemies at the right difficulty for the player. As the player moves throughout the levels and kill count milestones, the enemy pool adjusts, including stronger, larger enemies and excluding smaller, weaker enemies.

In the first layer, players start the game on the lowest difficulty, fighting off smaller, simple enemies and picking up common upgrades. Players best learn gameplay and mechanics in this layer. Players gain either permanent stat boosts or new abilities with the upgrades. Players apply the upgrades to different parts of their body, enhancing their capabilities. In the second layer, larger enemies are added to the spawn pool, dropping more uncommon upgrades. In the third layer, the larger enemies from layer two get a higher weight, increasing their chances of being picked by the manager, and mini boss-like enemies are added to the spawn pool, dropping the strongest upgrades in the game. In the fourth layer, players encounter a final boss enemy. Players use the accumulation of their upgrades, abilities, and learned skills in defeating the final boss. Difficulty in the fourth layer presents the toughest combat in the game at the highest difficulty, testing the players' skills and abilities learned from previous layers.



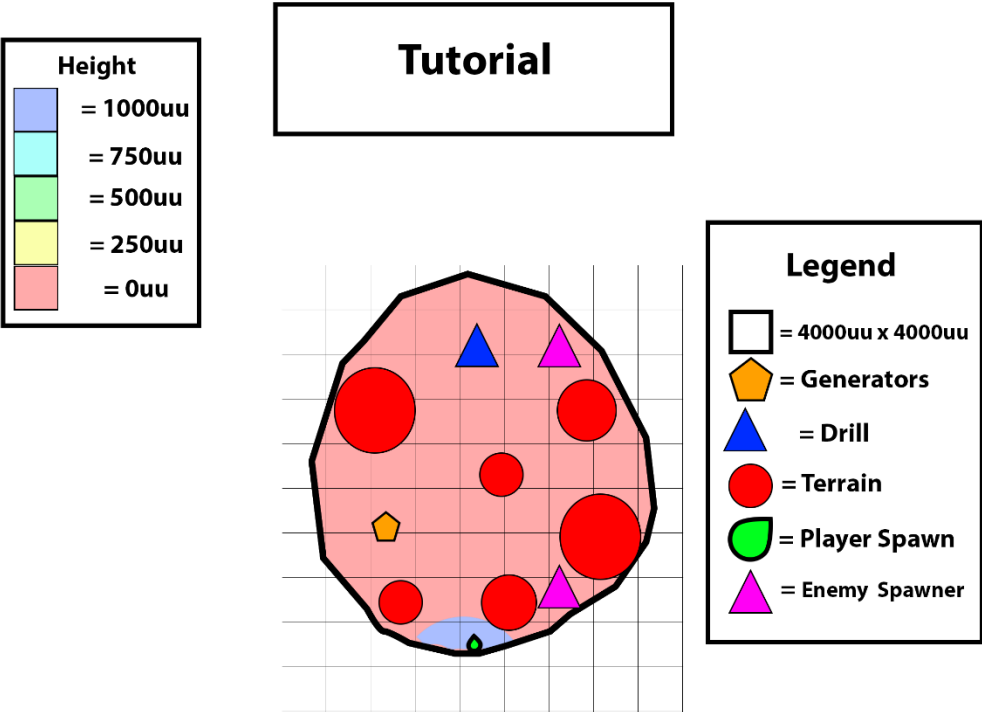
## Narrative Arc Overview

The player reactivates deep below ground level on Cadmus. Through each layer, the player uncovers fragments of Cadmus's history and the cause of its collapse, extensive mining operations. Each level reveals new environments, enemies, and gameplay opportunities.

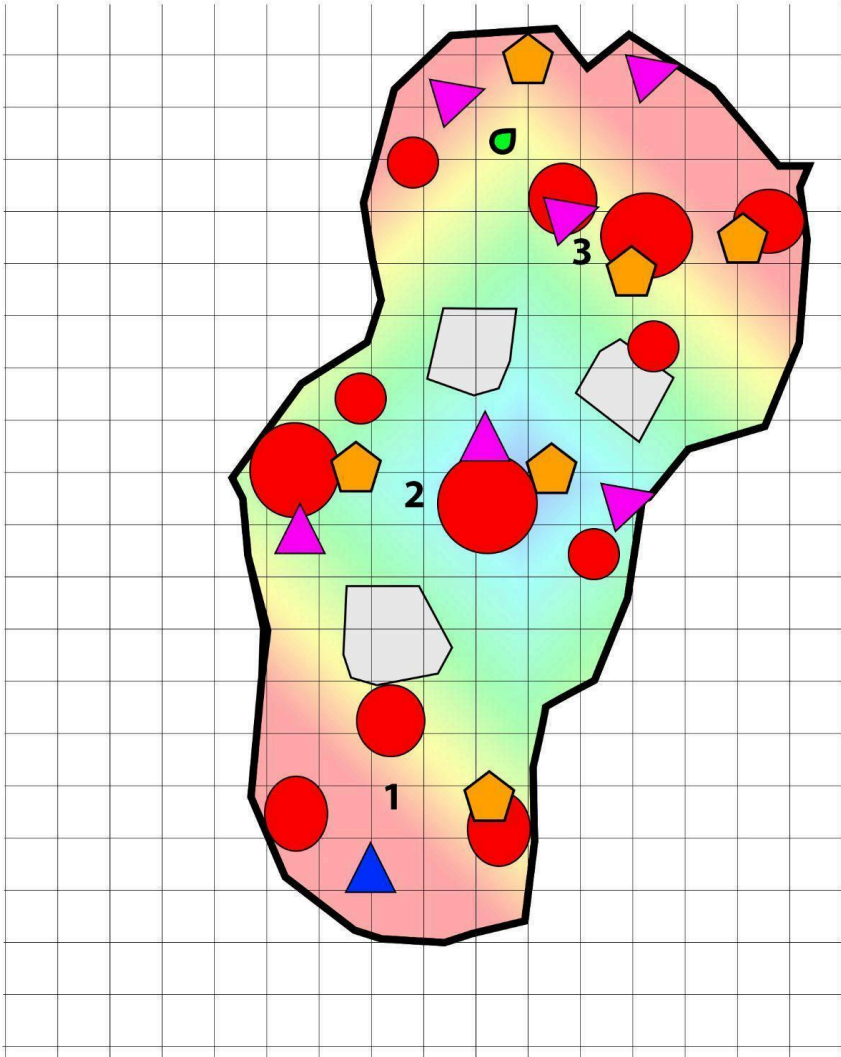
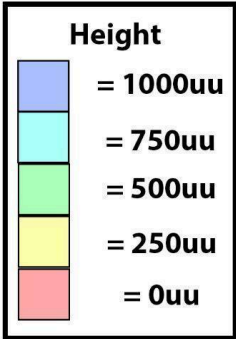
## Progression

1. Players encounter enemy spawners. These spawn enemies selected by random, in waves throughout the level.
2. Defeated enemies grant the player Heat and have a chance to drop an attachable upgrade.
3. Heat is used to activate generators around the area; generator spawns are randomly selected by a seed upon runtime.
4. Upon generator activation, enemies come in droves toward the activation location.
5. Once all inactive generators are powered on, the Drill arises from the ground, and the drill location is randomly selected upon runtime.
6. Players convene at the Drill location to defend it from taking damage by enemies.
7. Upon 90 seconds of Drill defense the player moves onto the next level.

# Maps

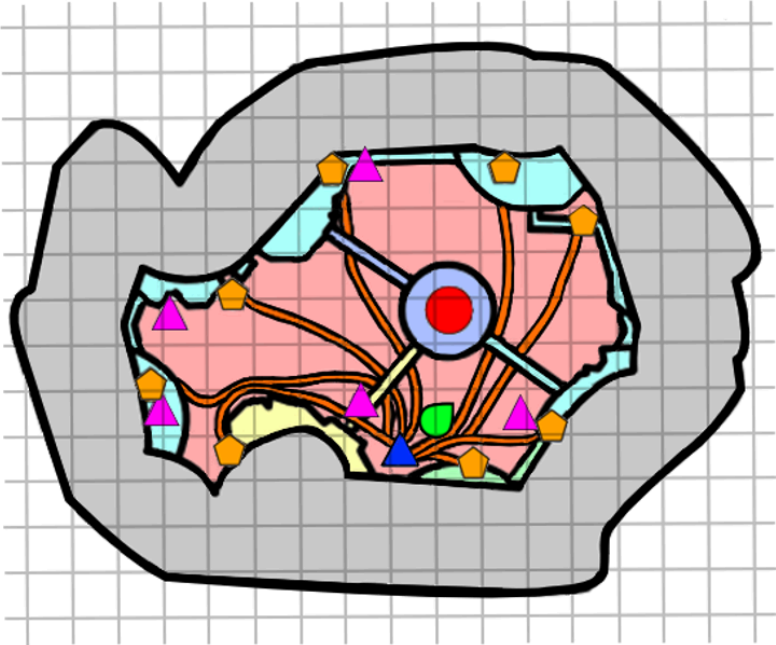
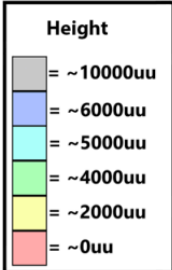


# Subzero Sinkhole



# Permafrost Processing

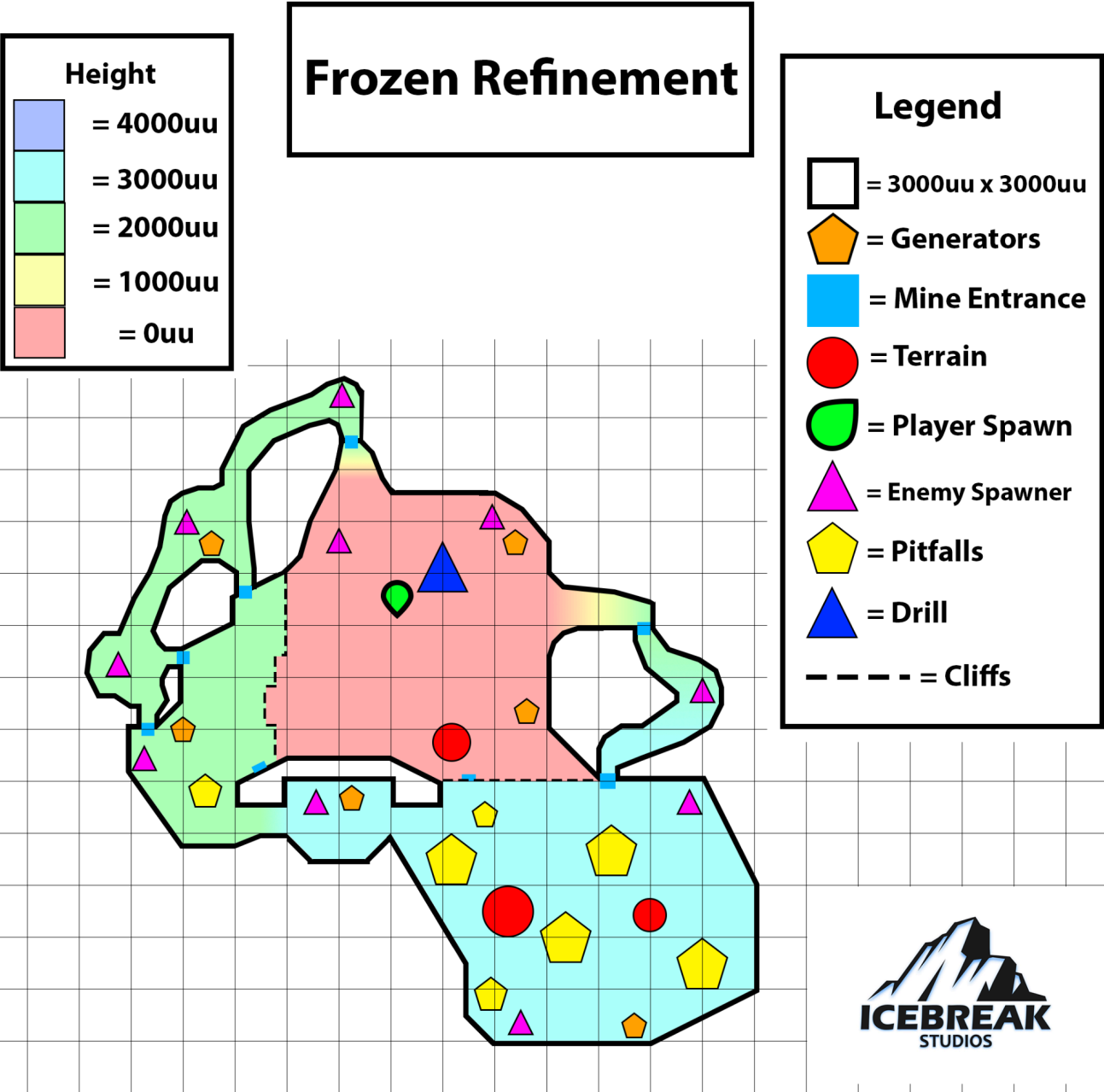
Permafrost Processing



The three layers of the tower

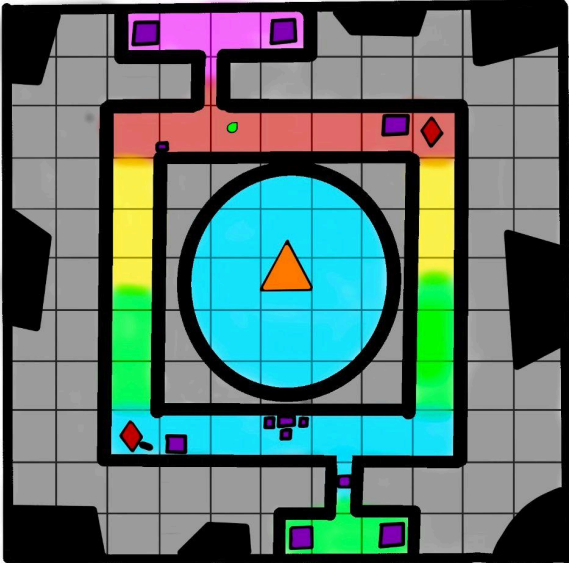


# Frozen Refinement



The Core

# The Core



**Height**

- = 9000 UU
- = 10000 UU
- = 11000 UU
- = 12000 UU
- = 13000 UU

**Legend**

- = 3000 UU
- = Spawn point
- ▲ = Corepiercer
- = Containers & Crates
- ◆ = Harvester