

Hypothesis

This project investigates the development of a Cyclical Resource Management Game through the implementation of the following mechanics: Farming, Crafting, and Combat.

Game Context

The thematic context of the game:

The player is placed in a dying world and must restore the health of the world. The nature of the world is dying and must be restored through the implementation of different biotechnologies that will heal the nature.

The player must develop and make use of skills in farming, crafting and combat to achieve this main goal.

The world is inhabited by dangerous creatures, that thrive in the current dead climate, and will attempt to damage and prohibit you from implementing restorations to the world. The player must set up defences to prevent enemy attacks and engage in melee combat when the defences fail.

Design Goals

- The player must be able to collect, “plant”, and farm different resources.
 - Resources must be used to craft biotechnologies, weapons and defences.
- The player must explore different areas to obtain and farm different resources.
- The player must have a home base for which they must use to implement the biotechnologies and also use for safety during night time.
- The world should run on a day/night cycle
 - Growth Rates of farmable resources will be affected by different times of the day
- Creatures must appear and attack at night in waves(groups of creatures that appear at different intervals)

Process

Core Game Design

The initial game design process to determine the design goals for the project was conducted in the following manner:

- Brainstorm
 - Group meetings and discussions were held to discuss ideas and interests
 - Initial ideas and concepts were determined - resource management and exploration
- Research
 - Research was conducted to gain insight on different implementations of the proposed concepts
 - Research was conducted by engaging with different media that explored the proposed concepts, such as movies, TV shows and video games.
- Inspirations
 - Based on the research, the team decided on the main inspirations and references to use to begin developing the game concepts.
 - Main Inspirations included:
 - Stardew Valley - Farming, Crafting, Resource Management, Time Cycles
 - Minecraft - Farming, Crafting, Enemy Mob System, Resource Management, Day/Night Cycles
 - Plants vs Zombies, Enemy Wave attacks, Resource Management, Farming
 - Bastion - The use of a home base location during exploration

Core Mechanics and Systems

- Daily Cycle
- Farming
- Crafting
- Restoration System
- Weapons
- Enemy Waves

System Interactions

Daily Cycle:

The game will run on a day cycle, with each day being split into 4 different phases.

- Phases 1-2: Morning - Afternoon
 - Player must explore, farm, craft and restore the world health in these phases
- Phase 3: Evening
 - Player should return to home base to prep defences for the night.
- Phase 4: Night
 - Creatures Attack
 - Player and Biotechnologies can be attacked and damaged
 - Creatures will only last in the night, they will die if they survive to Phase 1

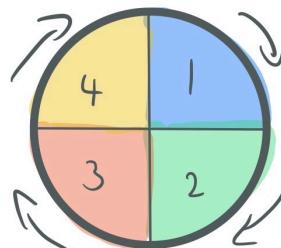


Figure 1: Daily Cycle and Phases

Farming:

The player must explore 3 different environments, each containing 1 farmable resource. The resources must be farmed in their designated areas, and their growth rate will be affected by the Day Phase State.

Farming process:

Explore an area -> Collect “wild” resources -> Plant “wild” resources -> Growth -> Collect grown resources

Planted resources and farms must be mended through the day in order to maximise growth, since growth is dependent on the day state.

For example, energy crystals grow by planting a crystal and connecting a solar panel to it to “charge”. So the growth is dependent on the amount of sunlight the panel receives. As the day progresses, the sunlight position changes. The solar panels can be moved around to be placed in the position with the most sunlight, which will increase the growth rate.

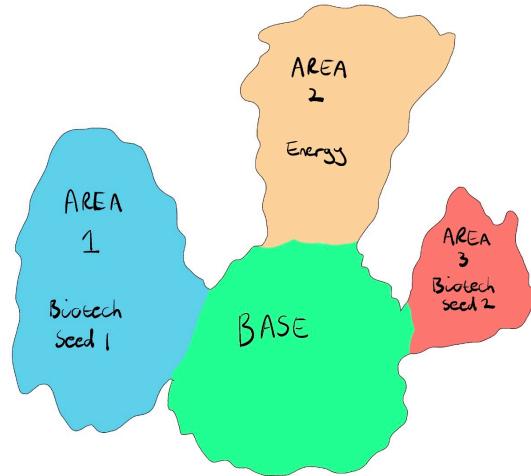


Figure 2: Explorable Area Concept Design

Crafting:

Collected Resources can be combined in different combinations to craft biotechnologies, weapons and defences.

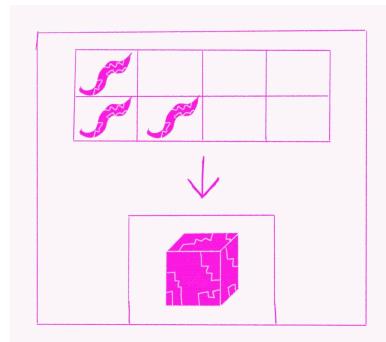


Figure 3: Crafting System Concept Design

Restoration System:

Crafted biotechnologies must be placed in required areas to restore world health.

For example, a Chlorophyll Machine must be placed next to dead plants to restore them.
Weapons and defences :

2 Weapons will be implemented, a Long Range Laser Turret and a Melee Staff. 1 defence item will be implemented, a force field fence that can be placed around the home base.

Note: The force field will break after it takes a certain amount of damage.

The laser turret will be used in conjunction with the force field. The laser will automatically shoot at enemies through the force field, however if the force field is broken by the enemies, then the player will also need to use the melee staff to fend against them.

Gameplay Loop

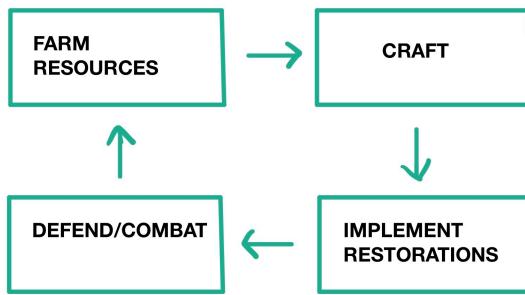


Figure 4: Gameplay Loop Diagram

The gameplay will follow the structure shown in the above diagram. This in conjunction with the progression loop will form the main gameplay.

Progression Loop

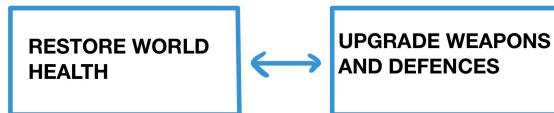


Figure 5: Progression Loop Diagram

Progression in the game will be based on the health restoration of the world. As the world health increases, the player's progression increases(as they are closer to achieving the main goal of full world health restoration).

Placement of biotechnology machines will increase progression, while damage to machines by enemies will decrease progression.

The game ends when the player has fully restored the world's health.

The progression will be represented through a progress bar.

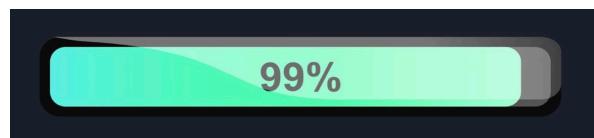
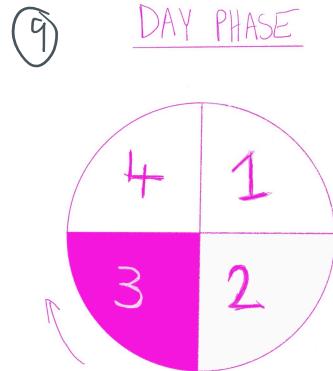
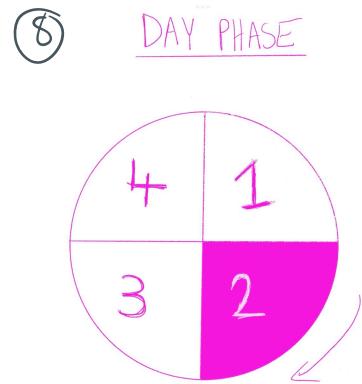
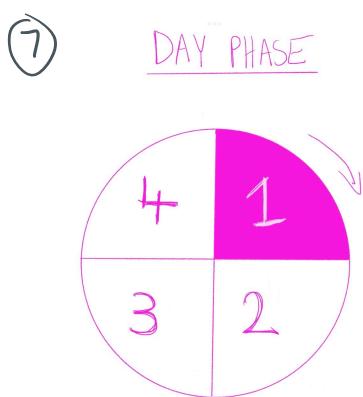
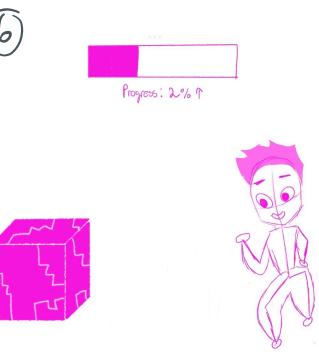
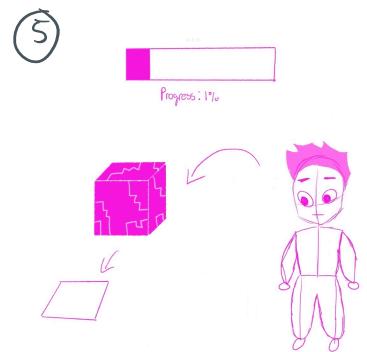
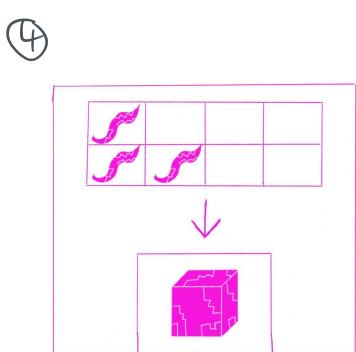
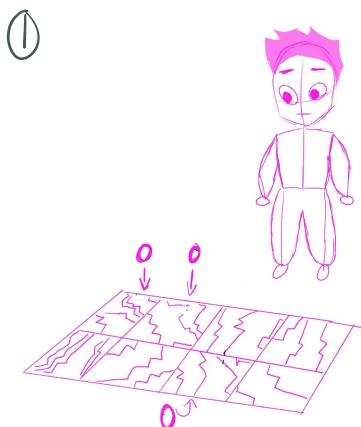


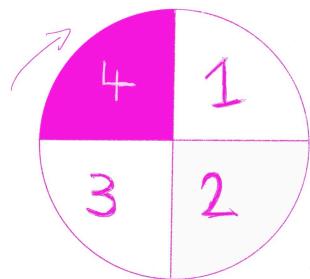
Figure 6: Progress Bar Diagram

Gameplay Demonstration: Story Boards



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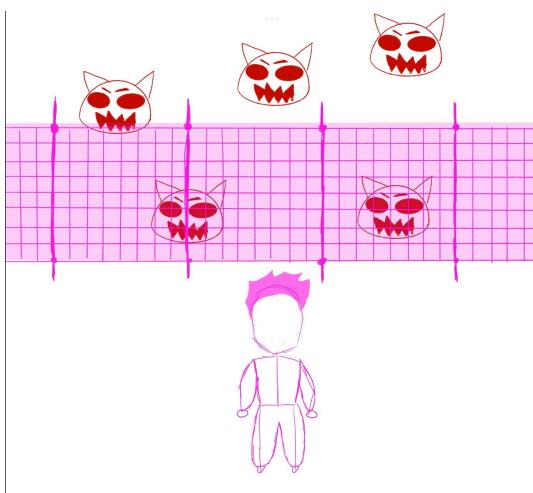
DAY PHASE



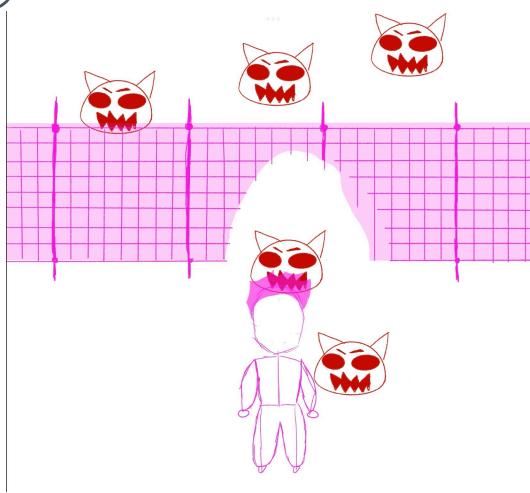
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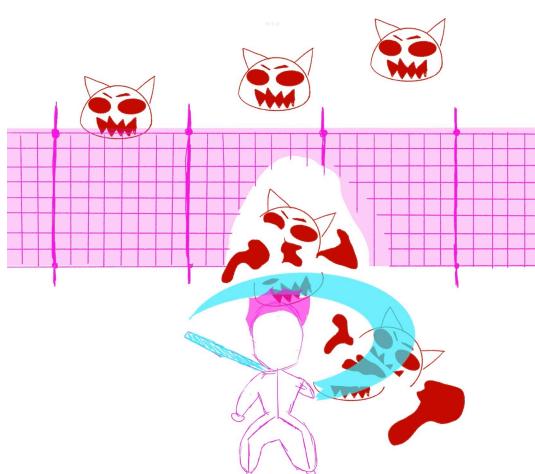
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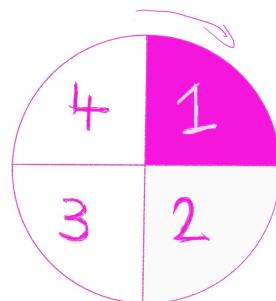


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DAY PHASE



Initial Prototype

The initial prototype has been built to demonstrate a basic implementation of the following:

- Timer-based Resource Growth
- Inventory/Collection System
- Character Controller
 - Basic Movement within the resource area

These systems and mechanics have been implemented to demonstrate a small scale version of the farming and daily cycle systems. Since all the systems in the game are reliant on these 2 systems, they need to be developed first.

The prototype allows the player to navigate the area, watch 2 resources grow, then collect the resources and add it to their inventory.

The prototype allows the player to choose which section of the game they wish to test, via the UI buttons. This allows the player to easily retest systems like the growth and inventory system to understand how it works.

This prototype, along with the story boards and concept art, act as a proof of concept for the game.

This prototype also acts as a starting point for the development of this project, and due to the small scope of mechanics implemented, it's effective in showcasing the large scale of development that will be required in order to achieve the set design goals. This also highlights the need for effective and realistic scoping as development continues so that the project can be completed within the allotted timeframe.

Prototype Play Instructions:

- In the Explore scene(the first scene), use WASD or the arrow keys to move around the environment.
 - This scene is meant to show a basic implementation of a Top-Down View for movement and navigation.
- Click the displayed UI buttons to go to the appropriate scene as desired.
- In the Farm scene(the second scene), use the mouse(left click) to collect the plants after they are grown.
 - The plant is grown when it reaches its 3rd size.
 - Plants cannot be collected until fully grown
 - Collected plants will be displayed in the inventory display
 - The timer indicates the time that has elapsed, to show the plants growth rate.
 - Only the 2 plants shown will grow, use the Reset button to watch them grow again
 - Use the Go Explore button to return to the Explore scene.

Reflections

The current prototype serves as an effective proof of concept for the project idea, however the development towards the project needs to increase in order to ensure that all systems can be developed and fully tested within the timeline goals established in the project roadmap in the project plan document.

Appendix

Art Concepts and References done by Caleb:

See page below.

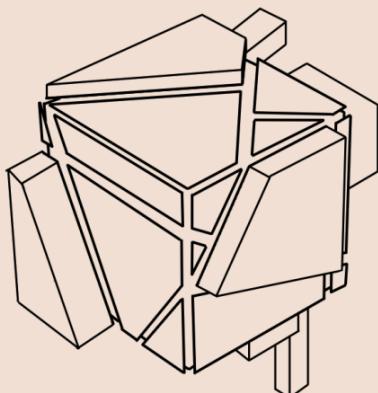
Concept Design (Seeds and Plants)

- ① The aim is to design “biotechnology” seeds which players will harvest for various reasons.
- ② To do this, I will need to design the seeds and plants that contain them.
- ③ I thought about the concept of making the plants organic (biology) while making the seeds technological (technology).

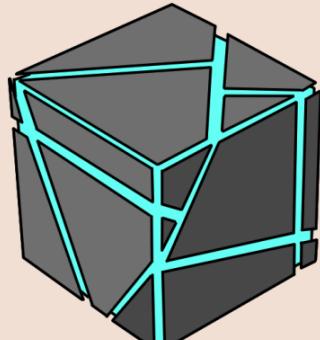
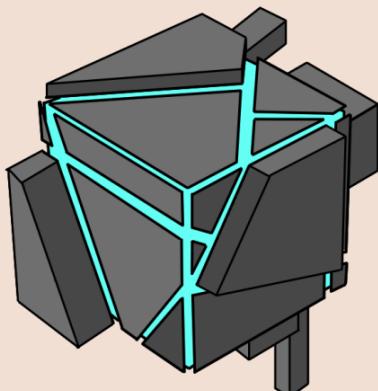
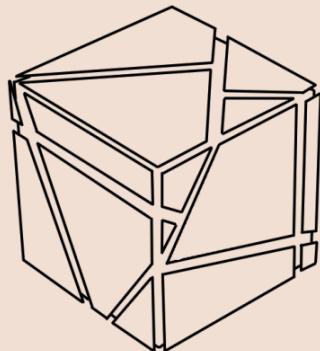
1. Seeds

- ④ For most of the seed concepts, I made two designs: a “bumpy” and a “flat” design.
- ⑤ **Bumpy** seeds have parts that are elevated above others, while **flat** seeds do not have any elevated parts.

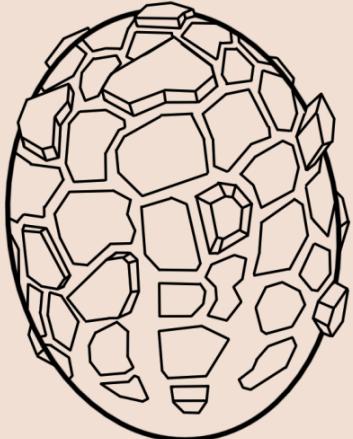
Concept #1 BUMPY



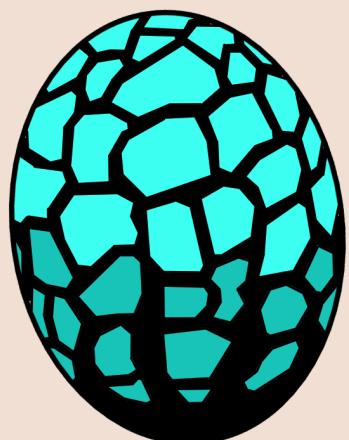
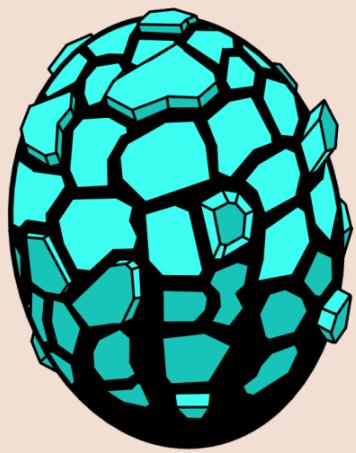
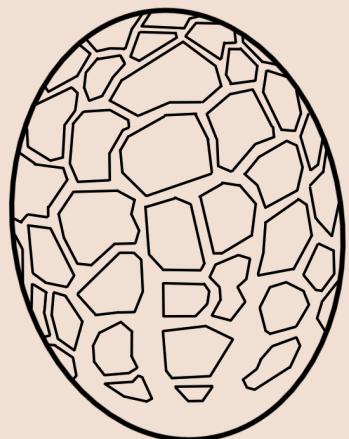
Concept #1 FLAT



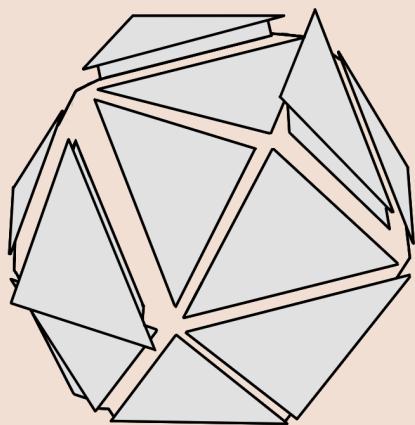
Concept #2 BUMPY



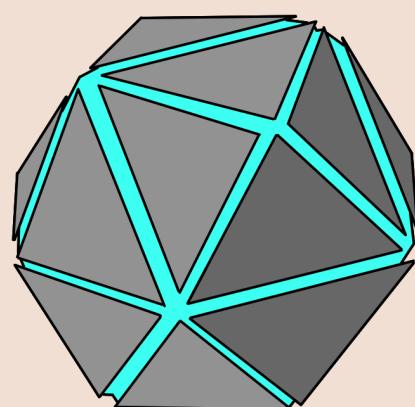
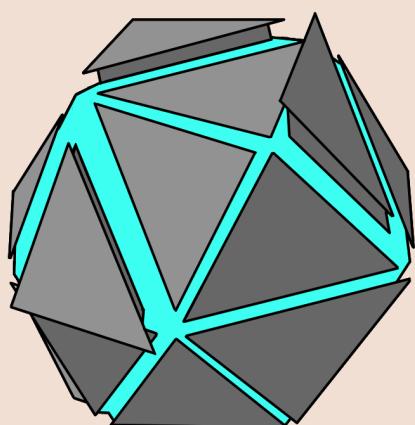
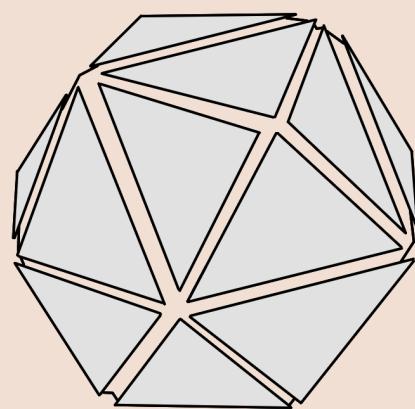
Concept #2 FLAT



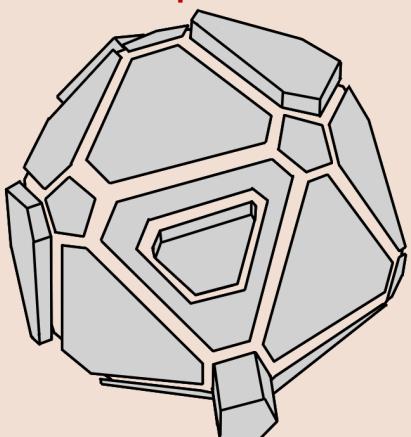
Concept #3 BUMPY



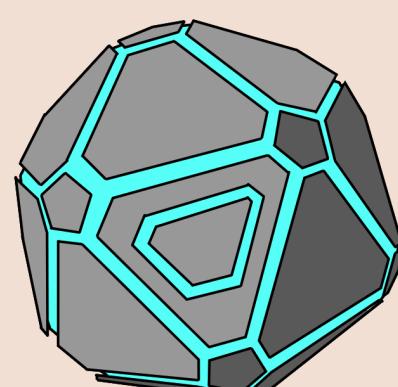
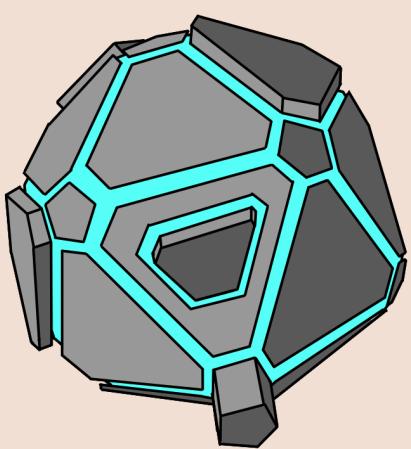
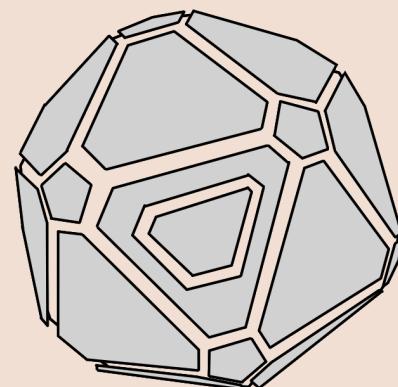
Concept #3 FLAT

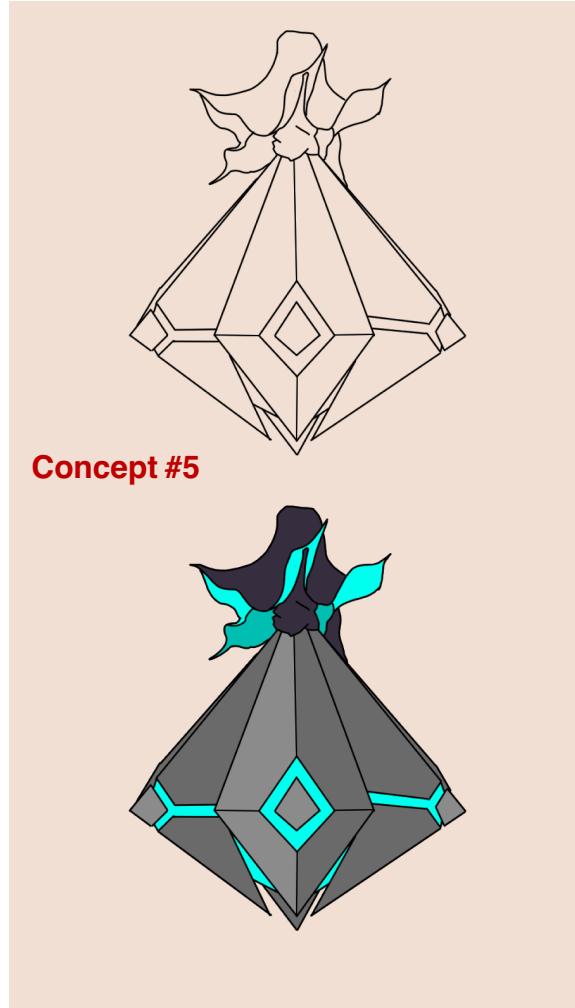


Concept #4 BUMPY



Concept #4 FLAT

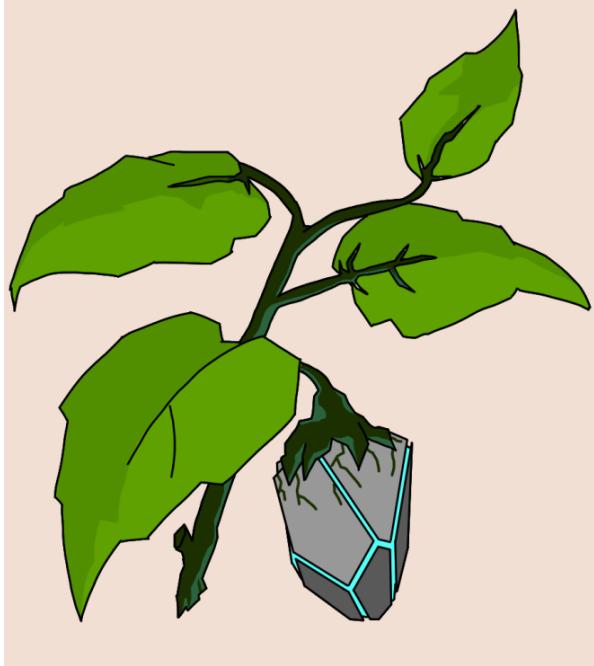




2. Plants

- For the plants, as mentioned earlier, I went for a more organic design.
- I added the seeds to see how the plants would look with the seeds in place.

Concept #1



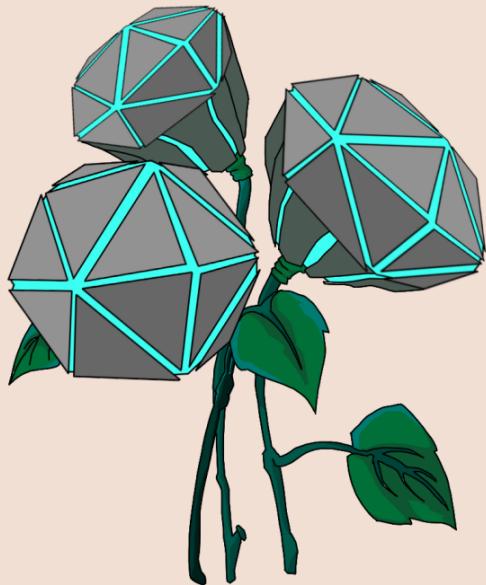
Concept #2



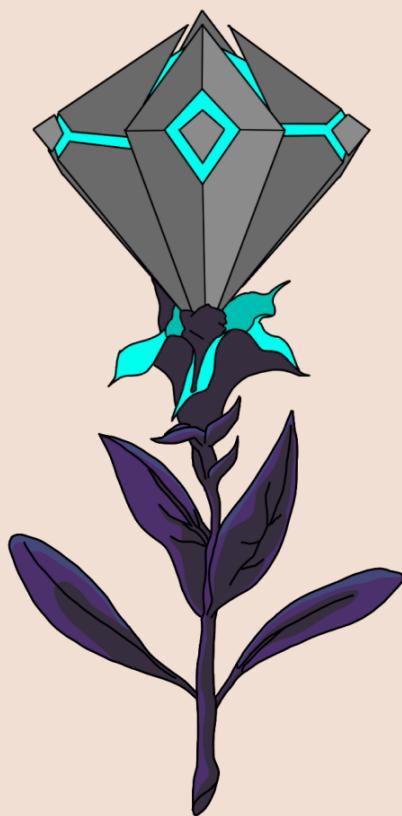
Concept #3



Concept #4



Concept #5

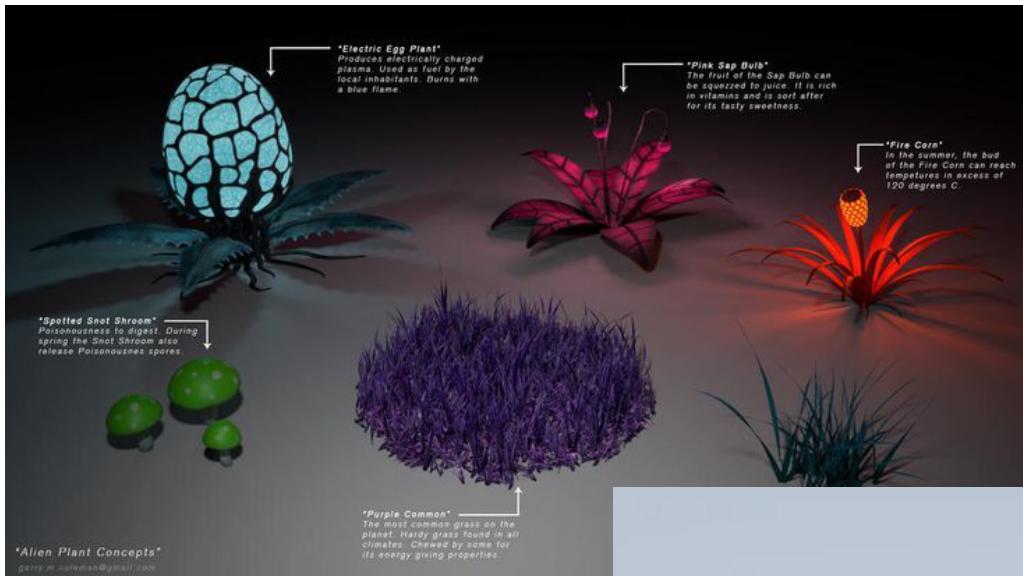


Concept #6



3. Reference

- ① References included three-dimensional shapes and plant designs.







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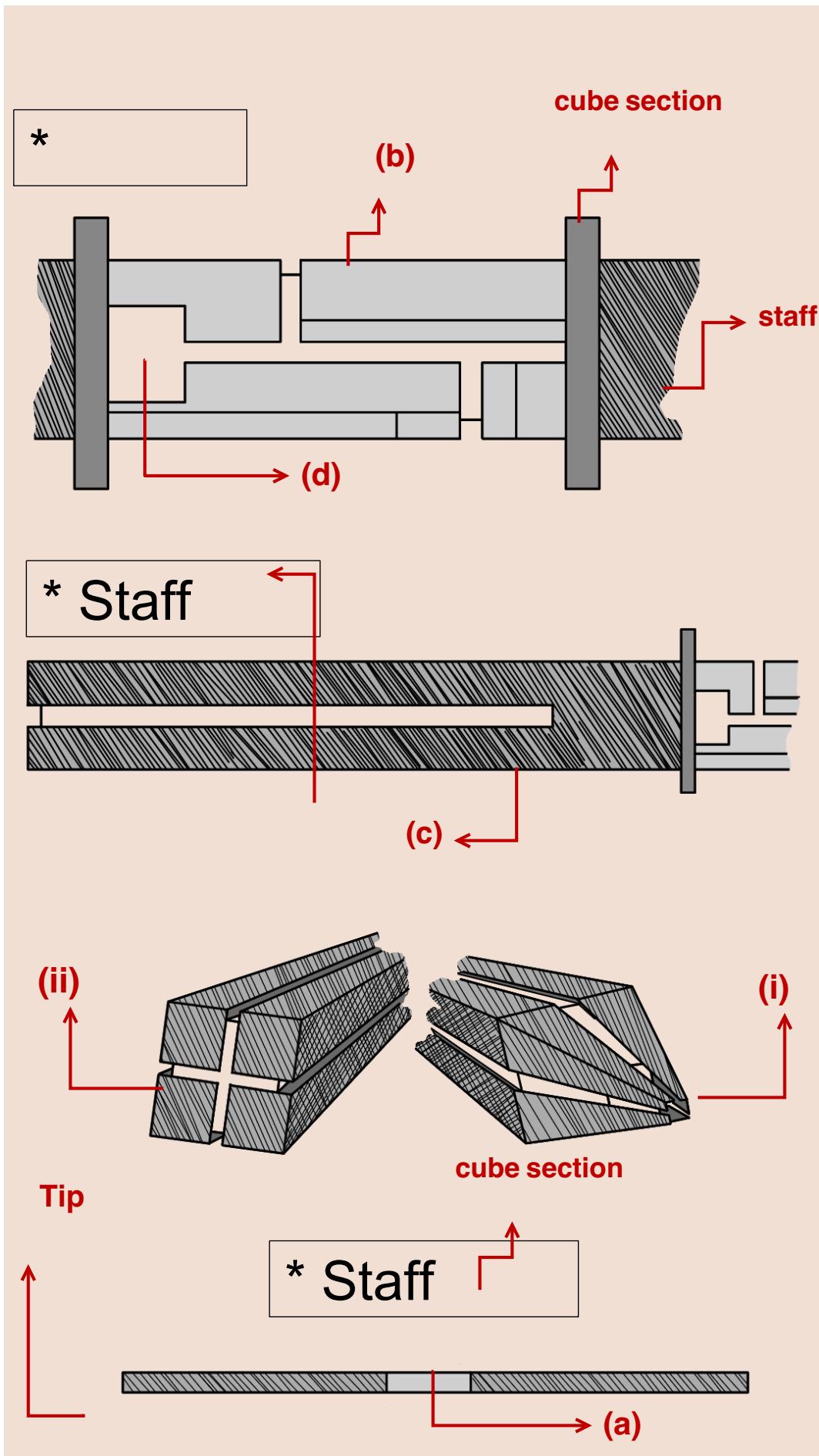
Concept Design (Staff)

- The Staff is the melee weapon that the player will use to attack enemies.
- For the design, I attempted to design a staff with a futuristic aesthetic.
- To do this, I used geometric shapes to add the details.

1. Concept #1

- The staff has a slim design similar to those found in karate.
- The staff has the following properties:
 - a) The handle for this staff is in the center of the object.
 - b) The handle has the form of a cylinder.
 - c) The rest of the staff has the form of a rectangular prism.
 - d) Parts of the staff will glow with a yellow light source.
 - e) I have designs two “tips” for the staff. The staff could have a tip in:
 - i. The form of a triangular prism or,
 - ii. A flat tip

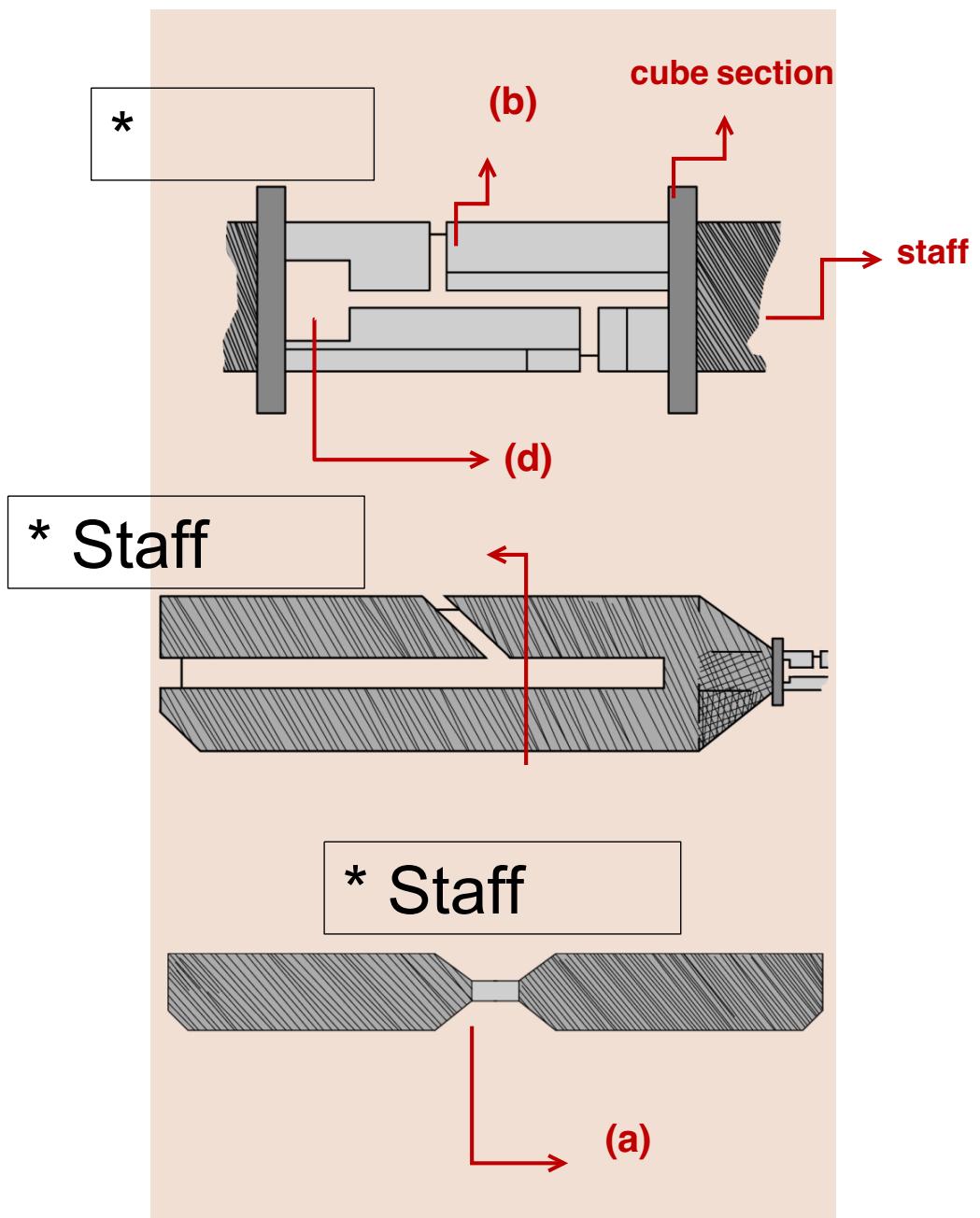
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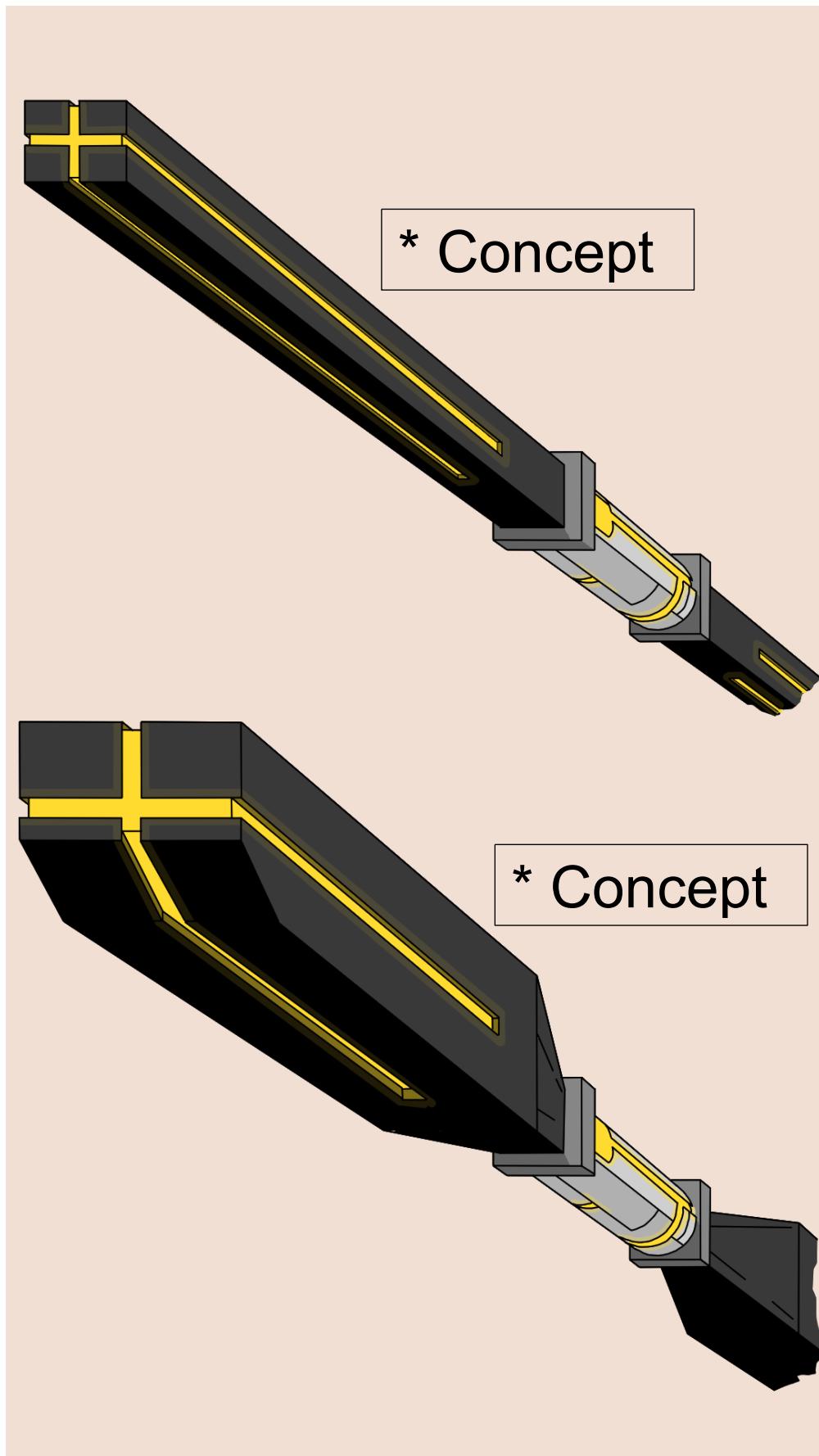
2. Concept #2

- The staff has a large, clucky design similar to the God Arc found in the *God Eater* anime.
- This staff has the following properties:
 - a) The handle for this staff is in the center of the object.
 - b) The handle has the form of a cylinder.
 - c) The rest of the staff has the form of a rectangular prism.
 - d) Parts of the staff will glow with a yellow light source.

See image below:



3. Artwork



4. Reference

