PSYCHE MISSION POSTER CONTENT

Team leader: Imane Lamine.
Team Memebers: Imane Lamine, Maxwell S. Wasserbauer, Hasan Hameed, Michael Berkley.
Industry sponsor: NASA Psyche Mission
Industry advisor: Dr. Cassie Bowman

Psyche Mission web based game 21-Q

Faculty advisor: Dr. Sanchita Mal-Sarkar
Department: Computer Science, Cleveland State University, Cleveland, OH 44108

Abstract

The NASA Psyche Mission Game is a 2D asteroid mining simulator created using the Godot Engine. It educates players on asteroid composition and far-future mining technologies through an engaging gameplay loop. Players mine resources, buy upgrades, and progress through 15 challenging days. The game features real-time UI, a dynamic item shop, animated backgrounds, and educational facts tied to real asteroid data. Built with open-source tools, it's optimized for performance and serves as a STEM outreach product.

Introduction and Background

Inspired by NASA's Psyche mission, our goal was to transform mining and space exploration into interactive mechanics accessible to students. Players operate a drone, mine resources, and learn facts about ores via an in-game encyclopedia.

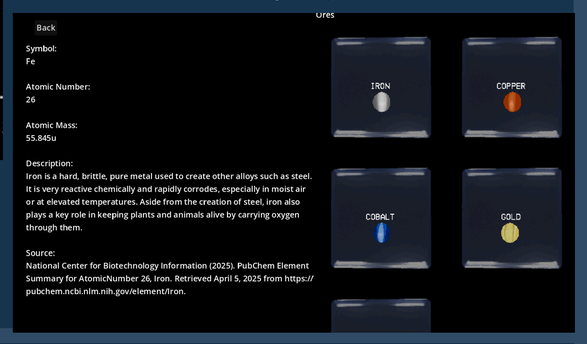
Figure: 1

System Design (and/or Algorithm)

- Shop System: Reroll items, purchase effects, currency display.
- CurrencyManager.gd: Singleton with add/spend logic and signal.
- DroneStats.gd: Keeps track of the drones various stats, allows for upgrades and updates.
- Parallax Background: Multiple layers with motion mirroring.
- Scene Navigation: Gamemaster.gd handles scene transitions
- Audio: AudioStreamPlayer loops ambient track on shop load.

Figure: 2

Figure: 3

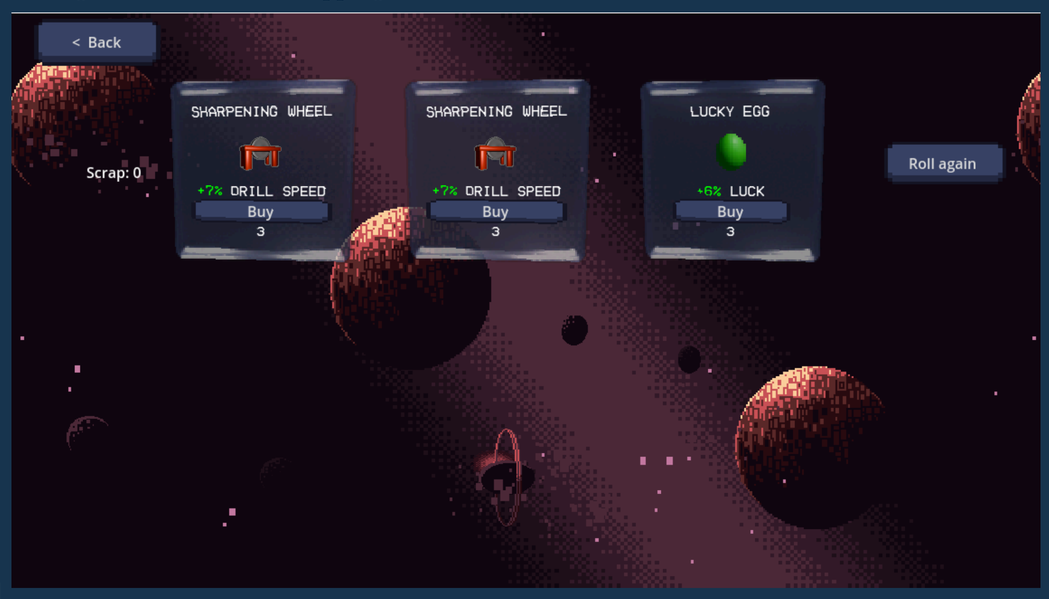


Experimental Results:

The game was tested by a small group of peers, and the feedback was highly positive. Test players appreciated the educational content, smooth UI, and loop of gameplay → upgrade → retry. The system's real-time responsiveness and feedback were noted as especially immersive.

Figure (5) shows how the game is played

Figure (4) shows the shopping cart.



Conclusion

The NASA Psyche game project succeeded in delivering an educational, entertaining, and technically functional product. The shop, mining system, and UI systems work cohesively, and the game can be used as a STEM engagement tool.
The core gameplay loop is fully functional, including mining, shop interactions, stat upgrades, and difficulty scaling through multiple stages. The remaining work primarily involves expanding the item database, implementing additional item effects, and refining game balance. A final win screen is also planned for implementation.

Future Recommendations:

- Begin implementation as early as possible to allow for iteration.
- Focus on communication using asynchronous tools like Discord.
- Maintain a consistent and clear Git workflow to avoid conflicts.
- Keep the design modular to allow changes without rewriting core logic.
- Consider expanding encyclopedia features or integrating multiplayer in the future.
- Continue user testing with diverse audiences to refine difficulty balance and feature discoverability.

References

- NASA Psyche Mission Official Site
- Godot Engine Docs
- Team GitHub Repository

Disclaimer:

This work was created in partial fulfillment of Cleveland State University Capstone Course CIS 494. The work is a result of the Psyche Student Collaborations component of NASA's Psyche Mission (https://psyche.asu.edu). "Psyche: A Journey to a Metal World" [Contract number NNM16AA09C] is part of the NASA Discovery Program mission to solar system targets. Trade names and trademarks of ASU and NASA are used in this work for identification only. Their usage does not constitute an official endorsement, either expressed or implied, by Arizona State University or National Aeronautics and Space Administration. The content is solely the responsibility of the authors and does not necessarily represent the official views of ASU or NASA.