Boreas
Isaac is defending!
Mia summons Boreas!
Learning geothermal energy basics with the serious game HotPipe

A game by:

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Convey the basic concepts of a geothermal system to the players
What is a geothermal system?
Main geothermal concepts

1. Water circulates in a geothermal well
2. Temperature increases with depth
3. Rock types influence drill speed
4. Sandstone is preferable rock type for a water reservoir
How?

- The player’s goal is to create a geothermal well
- Drill to the sandstone twice per level
- Teach through repetition
- A tile-based puzzle game
Goal - Water Circulation

- Repeated animation
- Character text
Goal - Deeper is hotter

- Steam shows heat
Goal - Deeper is hotter

- Character text reinforces mission statement

That last Geothermal well was perfect for my fish tank but I will need something hotter for my bubblebath.
Goal - Deeper is hotter

- Electricity generation needs hot water
Goal -
Rock type influences drill speed
Goal -
Rock type influences drill speed

Limestone  Shale  Granite  Rock Salt  Sandstone
Goal -
Rock type influences drill speed
Goal -
Rock type influences drill speed

Limestone  Shale  Granite  Rock Salt  Sandstone
Goal -
Rock type influences drill speed

Limestone  Shale  Granite  Rock Salt  Sandstone
Goal -
Rock type influences drill speed
Goal - Sandstone water reservoir
Goal -
Sandstone water reservoir
Goal - Sandstone water reservoir
Trailer video
Development

- PuzzleScript: fast & easy tile-based editor
- Unity: cross-platform game engine
Implementation

- Enhance the delivered knowledge
- More dynamic game feel
Implementation

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Implementation

- Enhance the delivered knowledge
- More dynamic game feel
Drills in games are often depicted with a cone shape. In reality however a drill will have a more rounded shape. For the sake of quickly understanding the role of the drill, this game also used a cone shape.
Results

- Pre-test Post-test
- 16 players
Conclusion

- HotPipe is an intuitive puzzle game, which focuses on teaching geothermal system fundamentals.

- Knowledge about geothermal concepts increased significantly.

- The game can be played through this link: [https://hotpipe.itch.io/hotpipe](https://hotpipe.itch.io/hotpipe)
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Thank you!
Link to game / Video
PuzzleScript

- Fast and easy tile-based editor
Tutorial

Your goal is to reach the Sandstone!

Use the mouse to drill

Right click to undo