

Sun Inside Parts - Interactive Learning in Three.js

Introduction

This document outlines the requirements for creating an interactive 3D visualization of the Sun's internal structure using Three.js. The goal is to provide an educational experience where users can explore different layers and components of the Sun with interactive elements.

Objectives

- Create an interactive 3D model of the Sun, showcasing its internal structure.
- Allow users to explore different layers with detailed information.
- Implement animations and effects to enhance learning.
- Enable interactivity through user clicks, hover effects, and tooltips.
- Provide scientific accuracy with easy-to-understand explanations.

Sun's Internal Structure

- Core - The Sun's core is the hottest part, where nuclear fusion occurs.
- Radiative Zone - Energy is transported outward through radiation.
- Convective Zone - Hot plasma rises and cooler plasma sinks in convection currents.
- Photosphere - The visible surface of the Sun, emitting light and heat.
- Chromosphere - A thin layer above the photosphere, visible in solar eclipses.
- Corona - The outermost layer, extending millions of kilometers into space.

Features & Functionalities

- 3D Interactive Model: Users can rotate, zoom, and explore different layers.
- Layer Selection: Clicking on a layer provides detailed information.
- Tooltip Popups: Hovering over layers displays key facts.
- Animations: Smooth transitions between layers and glowing effects.
- Layer Transparency: Users can toggle visibility of different parts.
- Informative UI: Side panel with explanations, diagrams, and real-time animations.
- Audio Narration: Optional voice-over describing each part.

Technical Requirements

- Three.js for 3D rendering.

- HTML, CSS, and JavaScript for UI and interactions.
- GLTF or OBJ models for realistic sun structure.
- Shaders for glowing effects and heat waves.
- Event Listeners for user interactions (click, hover, zoom).
- Responsive Design to work on mobile and desktop.

Deployment & Hosting

- GitHub Pages (for static hosting).
- Vercel/Netlify (for optimized performance).
- Custom Web Server (for advanced interactions).

Conclusion

This project aims to create an immersive and educational experience about the Sun's internal structure. By leveraging Three.js and interactive elements, users will gain a deeper understanding of the Sun's composition and functions.