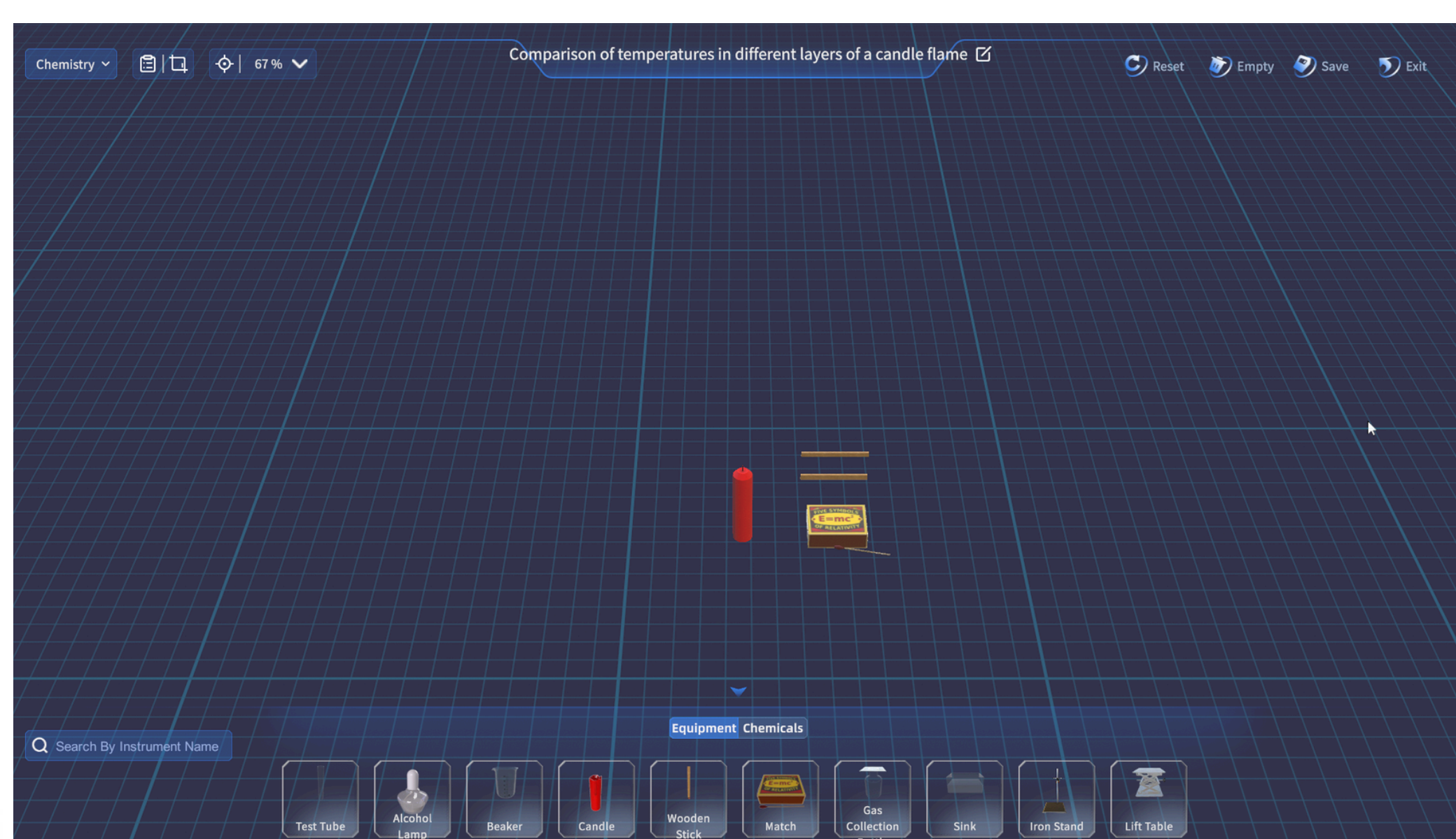
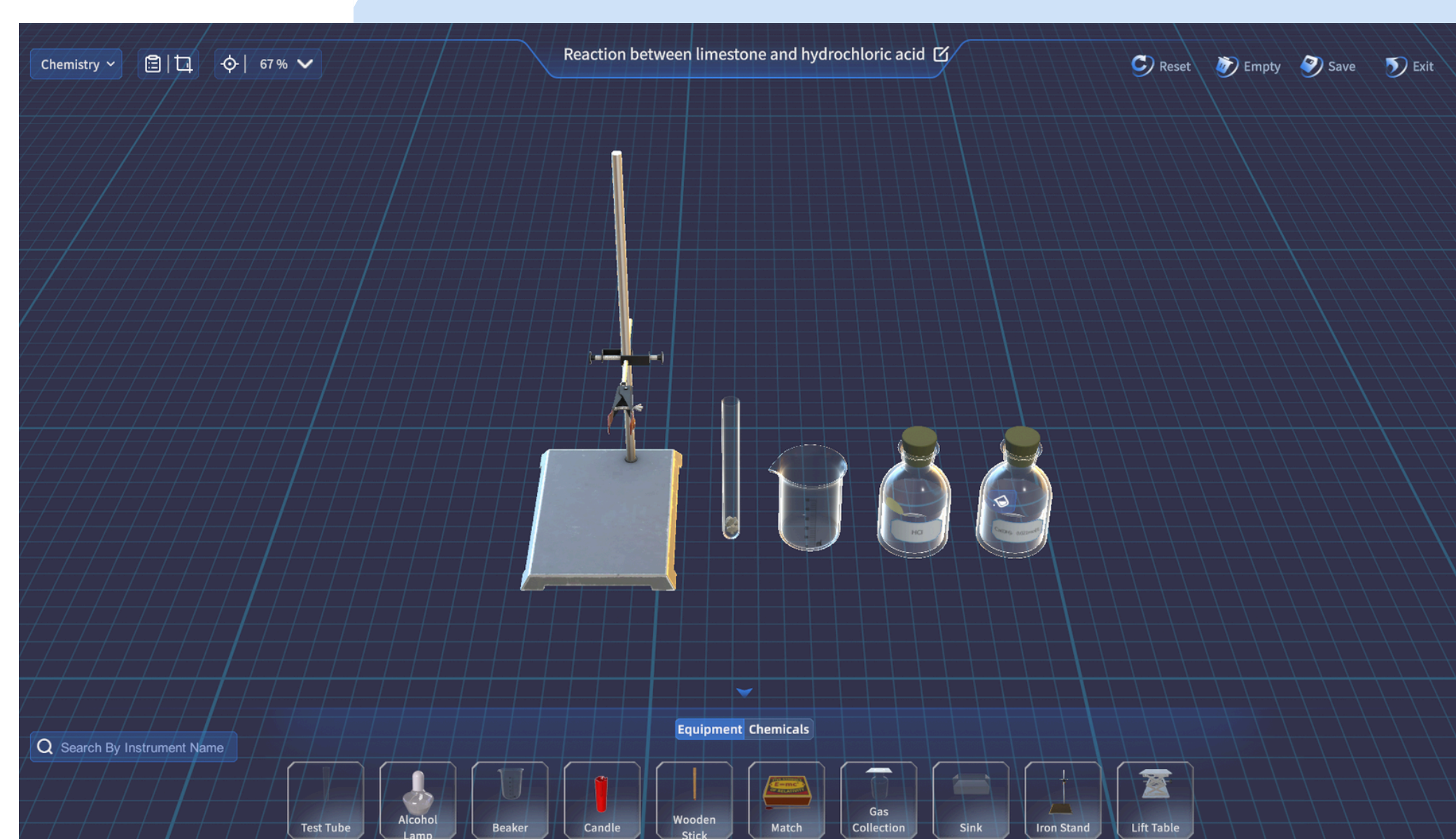


K12 Junior High School Chemistry Laboratory Editor

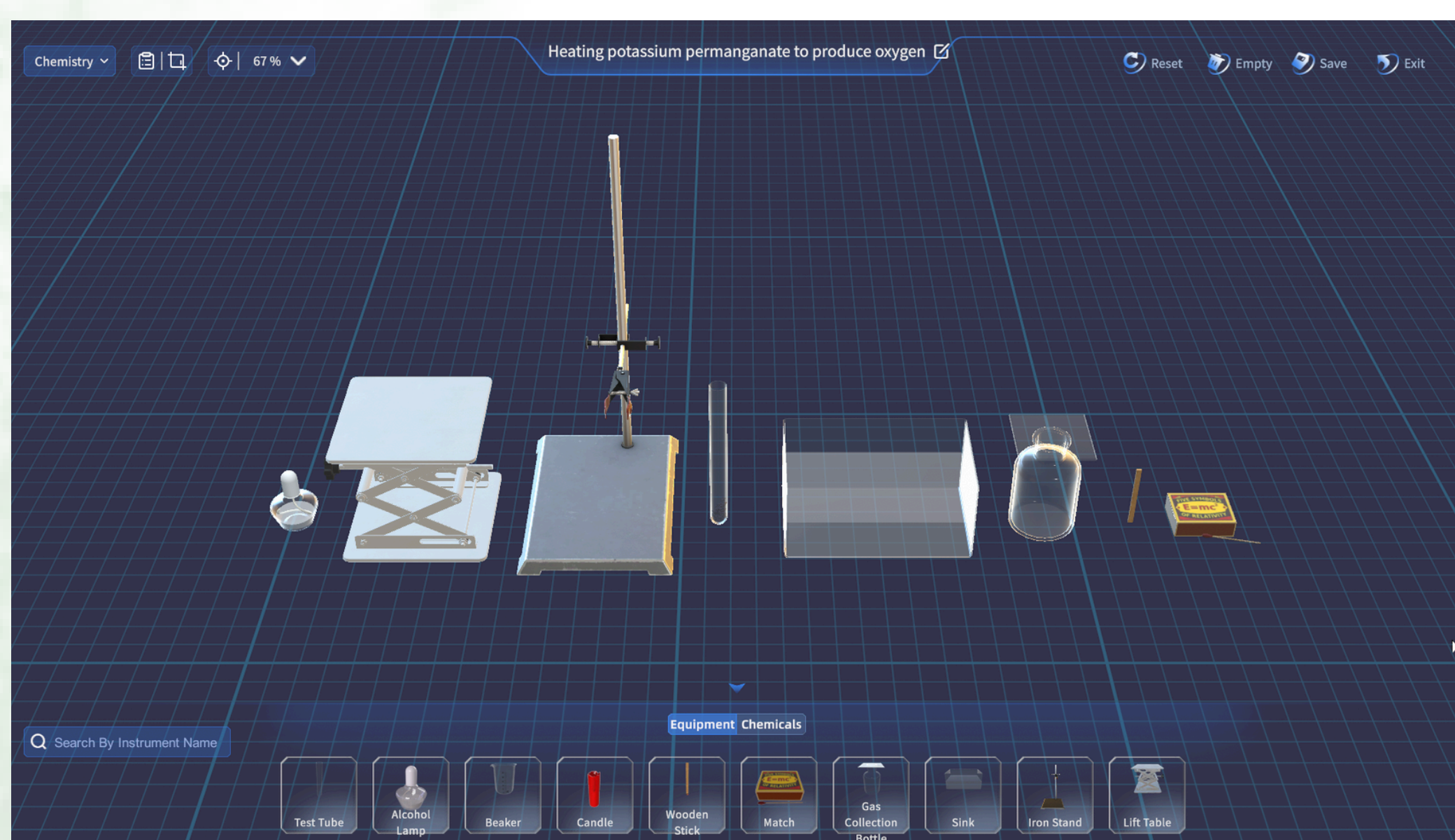
K12 Junior High School Chemistry Laboratory Editor is **an immersive virtual reality application for junior high school chemistry**. Equipped with **11 customized experiments**, it lets users **interact with hard-to-observe chemical processes** including mixing solutions and molecular reactions that are too small, fast, or dangerous to observe in traditional labs, all within a dynamic 3D environment. By **adjusting key variables (e.g., reagent concentration, temperature) in real time**, it **turns abstract chemistry concepts tangible** and **bridges theory and practice**, making complex chemistry **accessible and engaging for all learners**.



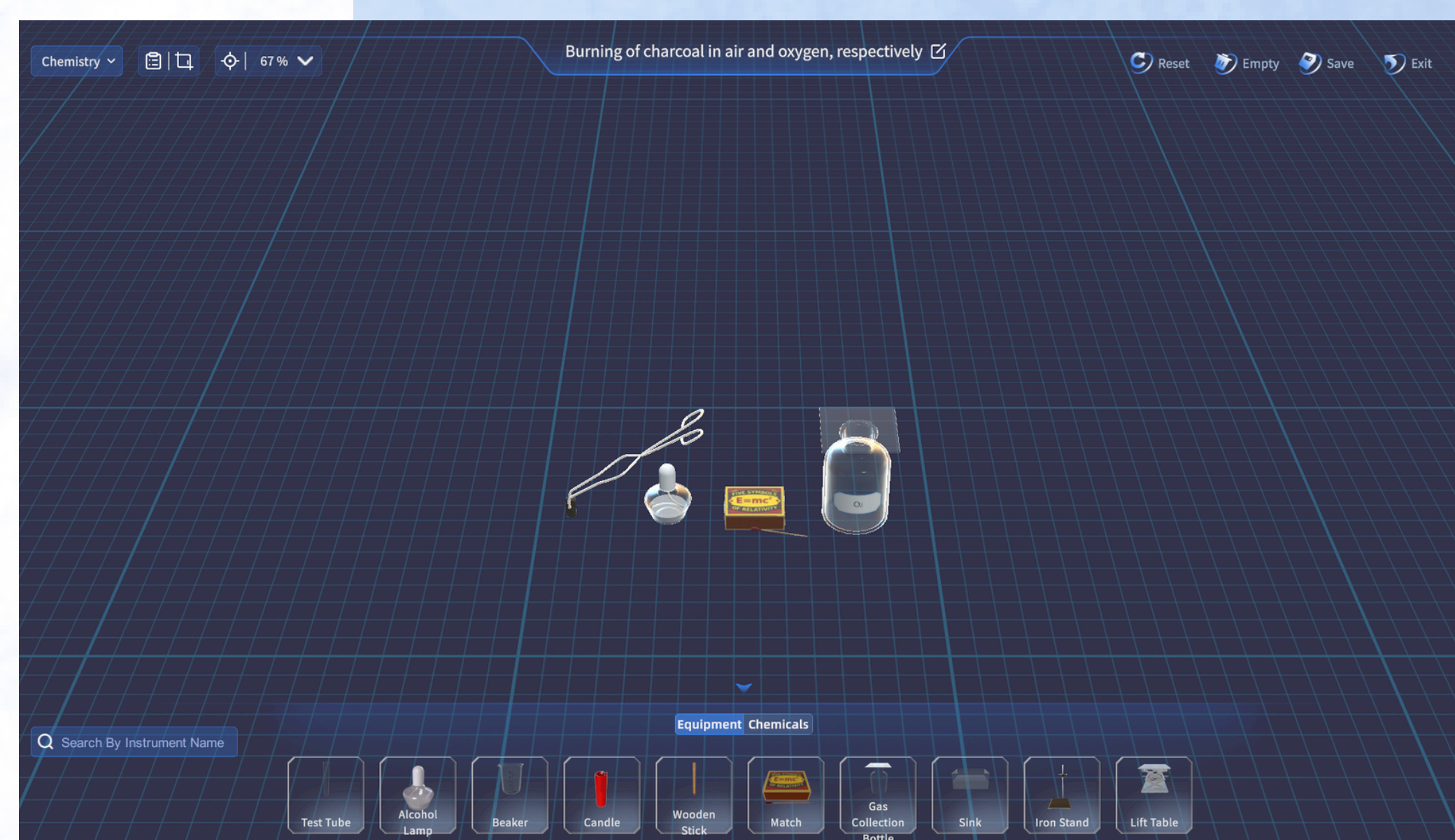
Experiment: Comparison of temperatures in different layers of a candle flame



Experiment: Reaction between limestone and hydrochloric acid



Experiment: Heating potassium permanganate to produce oxygen



Experiment: Burning of charcoal in air and oxygen, respectively

Highlights

- Covers **essential topics** including acid-base titration, electrolysis, precipitation reactions, organic synthesis basics, and gas generation, ensuring a **comprehensive overview of foundational chemistry**
- Enables **clear observation** of molecular structures, reaction pathways, and particle interactions, helping users grasp chemical processes at a **microscopic, tangible level**
- Allows **direct adjustment of experimental variables** with **instant feedback**, letting users test hypotheses **without safety risks** common in physical labs
- **Fits seamlessly into** classroom teaching, self-directed study, and research support, adapting to **diverse user needs**

Functionalities

Experiments

Burning of iron wire in air and oxygen, respectively

Burning produces carbon dioxide

Decomposition of hydrogen peroxide

Oxygen supports combustion

Production of carbon dioxide

The reaction between zinc and hydrochloric acid

White smoke upon extinguishing a lit candle

Content

Use virtual iron wire and two gas jars. One contains air, the other contains oxygen. Simulate the experiment by igniting the iron wire and placing it in each jar, presenting combustion differences to show oxygen's effect on burning.

Use virtual burning apparatus, gas jars and beakers to run the experiment. Start the combustion reaction, then show the reaction process and the product's interaction with detection reagents, restoring the experiment's key steps.

Use virtual test tubes, stand-mounted setups and gas jars to simulate the experiment. Add the reagent to the test tube, show the reaction progress and gas collection steps, making the process concrete.

Use virtual oxygen-filled gas jars and combustibles to run the experiment. Ignite the combustible and place it in the oxygen jar, showing combustion changes to demonstrate oxygen's combustion-supporting property.

Use virtual test tubes, stand setups and gas jars to simulate carbon dioxide production. Present reagent addition, device assembly and gas collection step by step, matching real experiment logic.

Use virtual zinc, test tubes and gas jars to run the experiment. Add zinc to hydrochloric acid in the test tube, show real-time gas generation and collection, making the reaction clear.

Use virtual candles to simulate the experiment. Light and extinguish the candle, then amplify the white smoke produced at extinguishing to let users observe the phenomenon clearly.