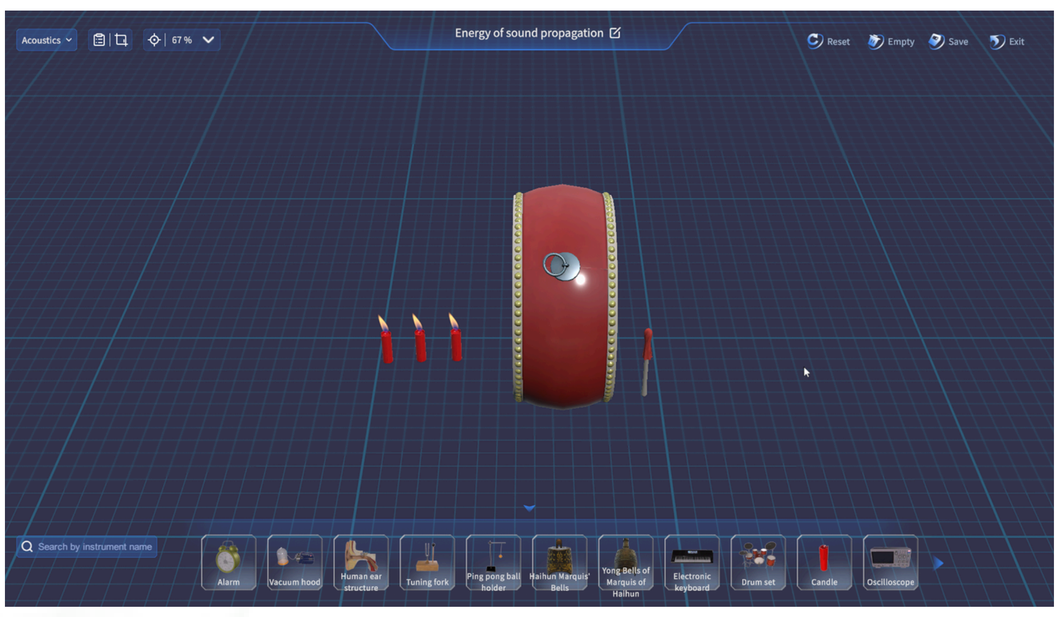
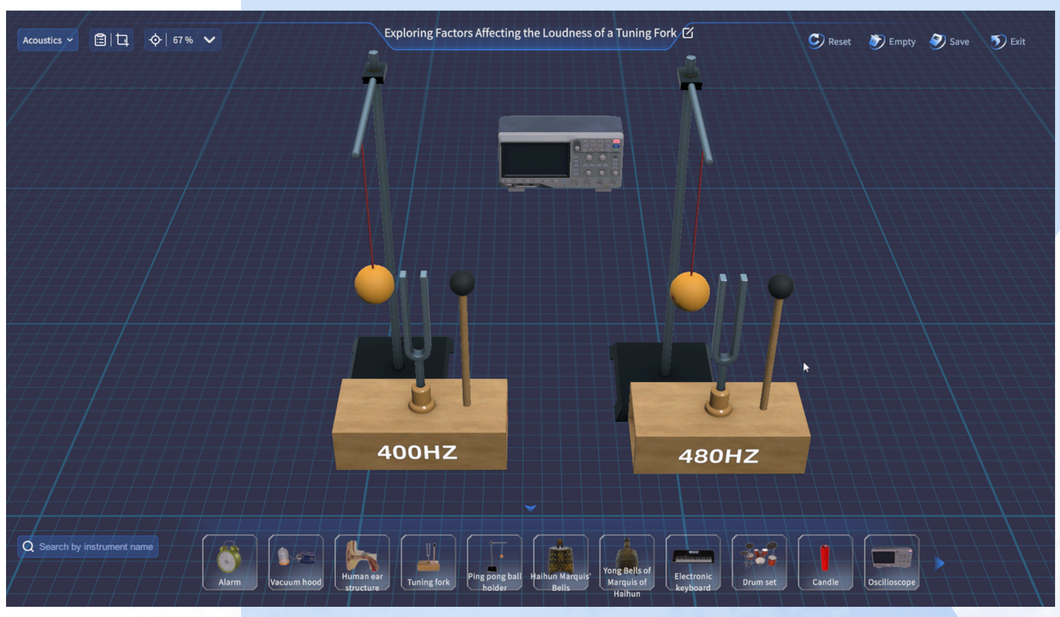
K12 Physical Acoustic Editor

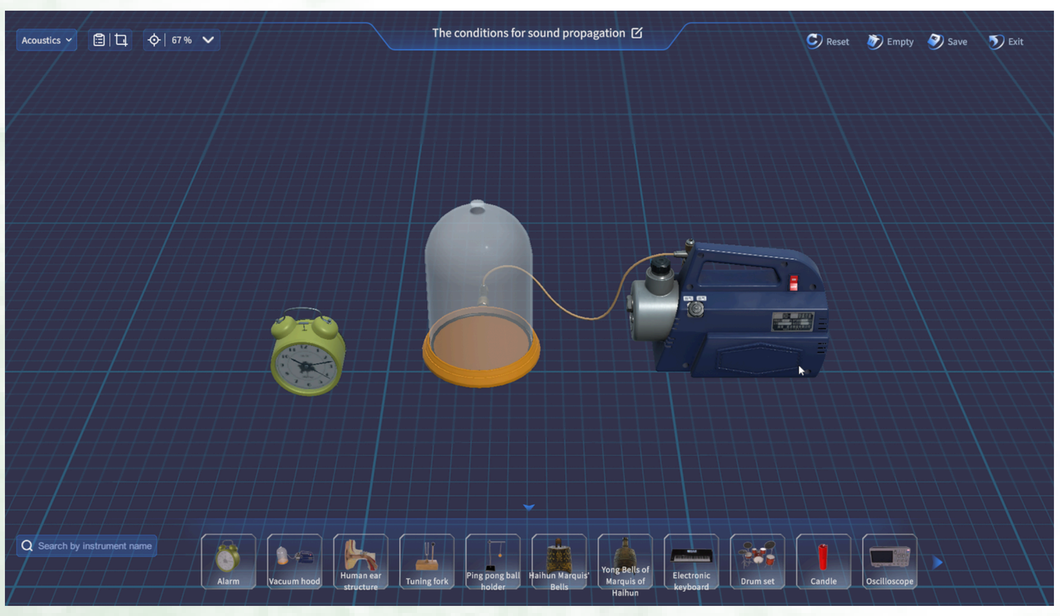
K12 Physical Acoustic Editor is **an immersive virtual reality application tailored to simplify and enliven the study of acoustics**. Equipped with **11 carefully designed experiments**, it lets users step into a dynamic 3D environment where they can **interact with normally invisible sound waves**. By adjusting key variables in real time, users can turn **abstract acoustics concepts into tangible, memorable learning experiences**. This tool **bridges the gap between theory and practice**, ideal for **educational institutions, research labs, and science enthusiasts**.



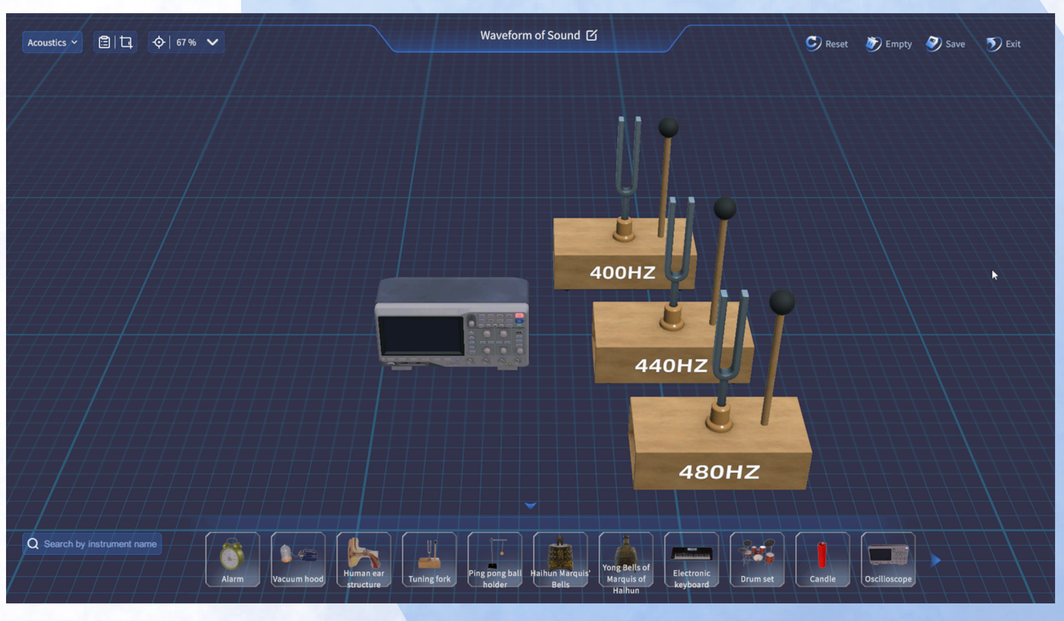
Experiment: Energy of sound propagation



Experiment: Exploring Factors Affecting the Loudness of a Tuning Fork



Experiment: The conditions for sound propagation



Experiment: Waveform of sound

Highlights

- Covers **essential topics** including sound propagation, resonance, pitch-frequency relationships, timbre variations, and noise analysis, ensuring a **comprehensive overview of foundational acoustics**
- Enables **clear observation** of sound wave forms, propagation paths, and interactions, helping users grasp how acoustic phenomena work in a **tangible, visual way**
- Allows **direct adjustment of experimental variables** with **instant effects**, letting users test hypotheses and deepen their understanding through **active exploration**
- **Fits seamlessly into** classroom teaching, self-directed study, and even research, adapting to **diverse user needs**

Functionalities

Experiments	Content
Generation of Sound	Simulate sound production mechanisms through virtual experimental instruments, intuitively demonstrate the physical principles of sound generation, and complement with real-time feedback to help understand the essence of sound production.
How We Hear Sound	With the help of a human ear structure model, restore the complete process from sound transmission to auditory perception, and visualize the working principle of the auditory system.
Resonance of a Tuning Fork	Use professional instruments such as tuning forks to simulate and observe resonance phenomena. Adjustable parameters allow in-depth exploration of the conditions and characteristics of resonance generation.
The Characteristics of Sound - Timbre	Combine real audio of various musical instruments such as electronic organs and Chinese drums to compare differences in timbre, with synchronized waveform display to assist in differentiation.
The Relationship Between Pitch and Frequency	Freely adjust frequency parameters to observe pitch changes in real time, and clarify the correlation between the two through data and auditory experiences.
The Waveform of Musical Sound	Convert musical sounds into real-time dynamic waveforms via an oscilloscope, intuitively present the waveform characteristics of musical sounds, and help understand the essence of musical sounds.
Understanding Noise	Simulate noise generation scenarios, analyze the characteristics and hazards of noise, and enhance the understanding of the differences between noise and musical sounds through comparative experiments.