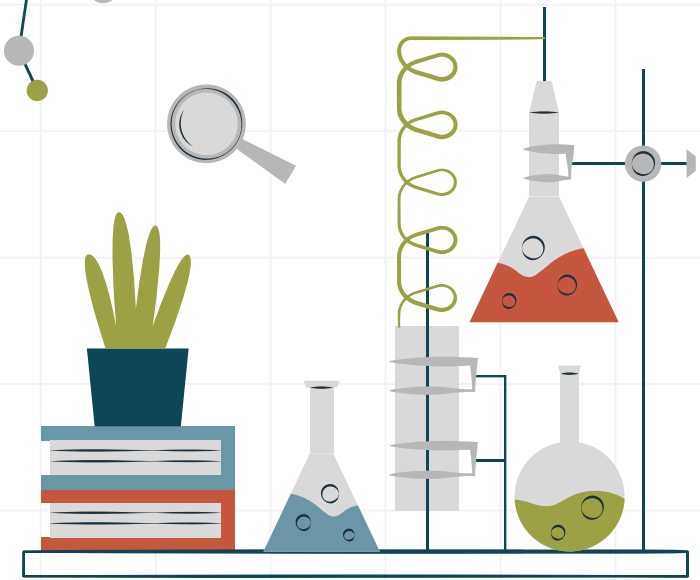


Experimenting with Chemical Reactions in Virtual Reality

Propusă de

Alina Duca

Coordonator științific

Prof. Dr. Adrian Iftene

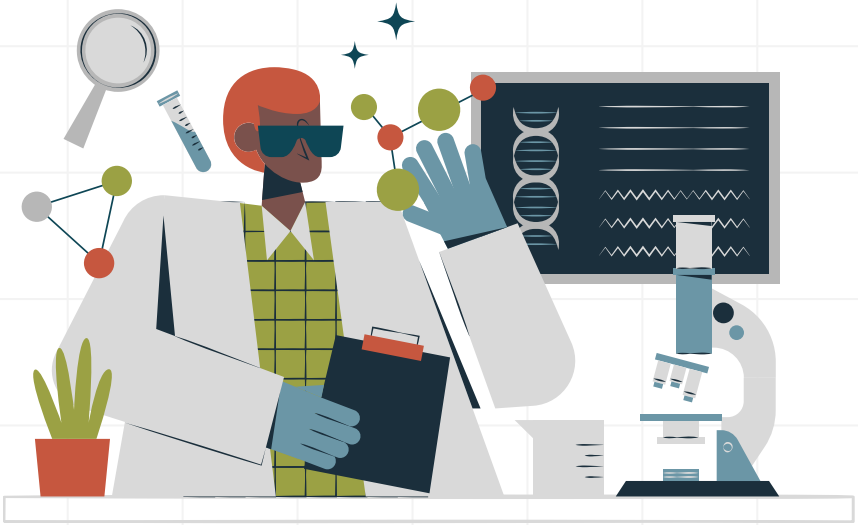
Colab. George-Gabriel Constantinescu

Cuprins

Motivație

Probleme existente

- Lipsa atractivității chimiei în rândul elevilor
- Numărul mic de ore de chimie practică în școli
- Pericolul la care sunt expuși elevii
- Imposibilitatea realizării experimentelor chimice în afara unui laborator
- Lipsa substanțelor și ustensilelor necesare

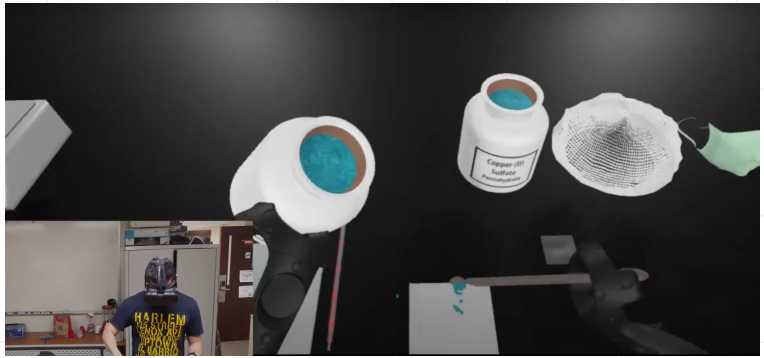


Motivație

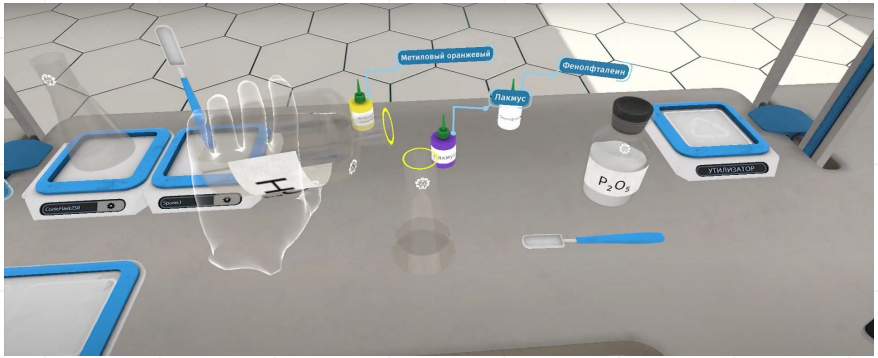
- Mediu sigur
  - protejat, izolat și inofensiv
- Fără restricționarea lucrului într-un laborator
- Oferă o modalitate interactivă, plăcută și ușor de utilizat de a facilita învățarea chimiei

Aplicații similare

The VR Chemistry Lab



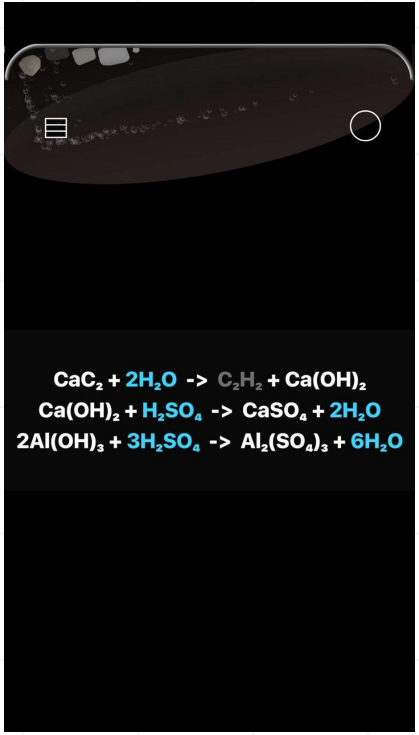
VR Chemistry Lab



Unreal Chemist - Chemistry Lab

Chemistry Lab

BEAKER - Mix Chemicals



Tehnologii utilizate

Unity

pentru crearea mediului virtual

Blender

pentru modele 3D

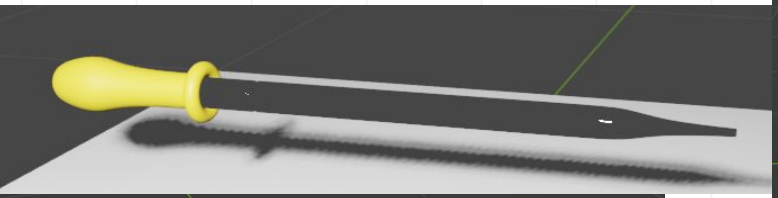
Visual Studio

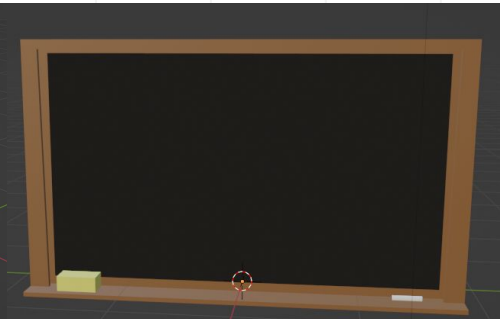
pentru scripturi C#

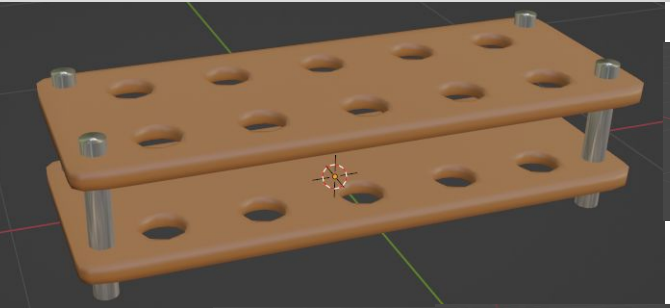
Meta Quest 2

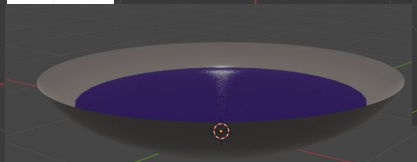
headset

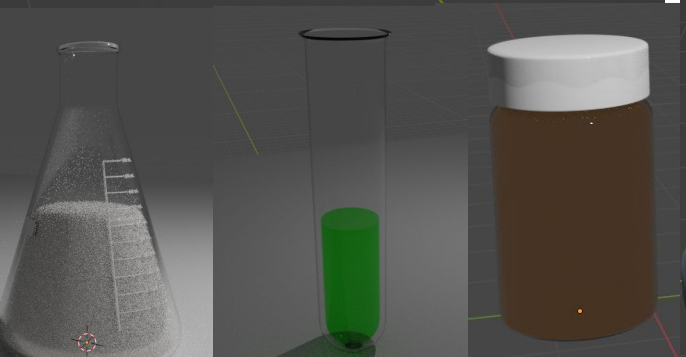
Modele 3D

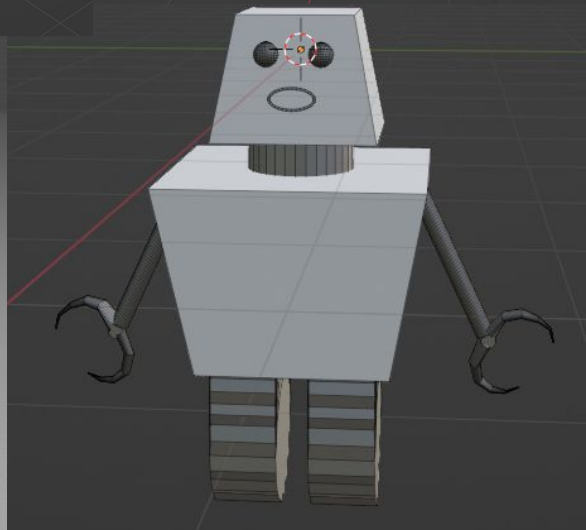










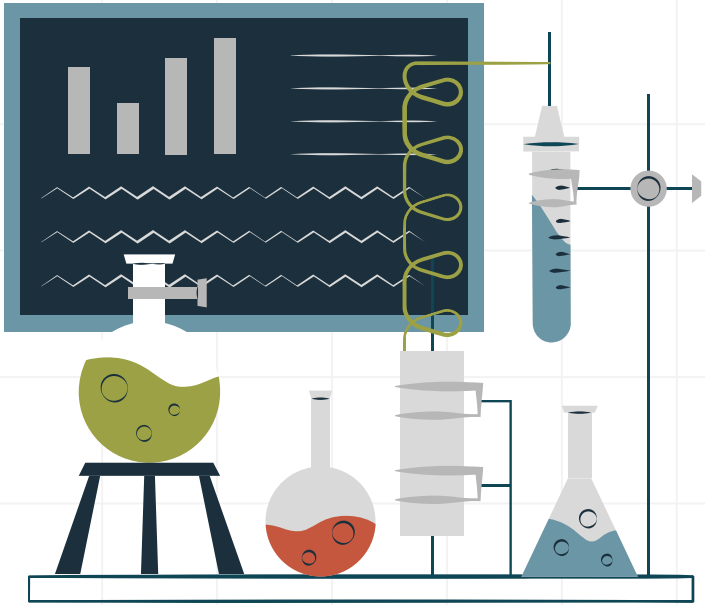


Modele 3D

Alternativele headset-ului

- HTC Vive Focus 3
- Google Cardboard
- Sony PlayStation VR
- Pico Neo 3 Pro
- Valve Index
- HP Reverb G2

Arhitectura și Scene Principale



Arhitectura

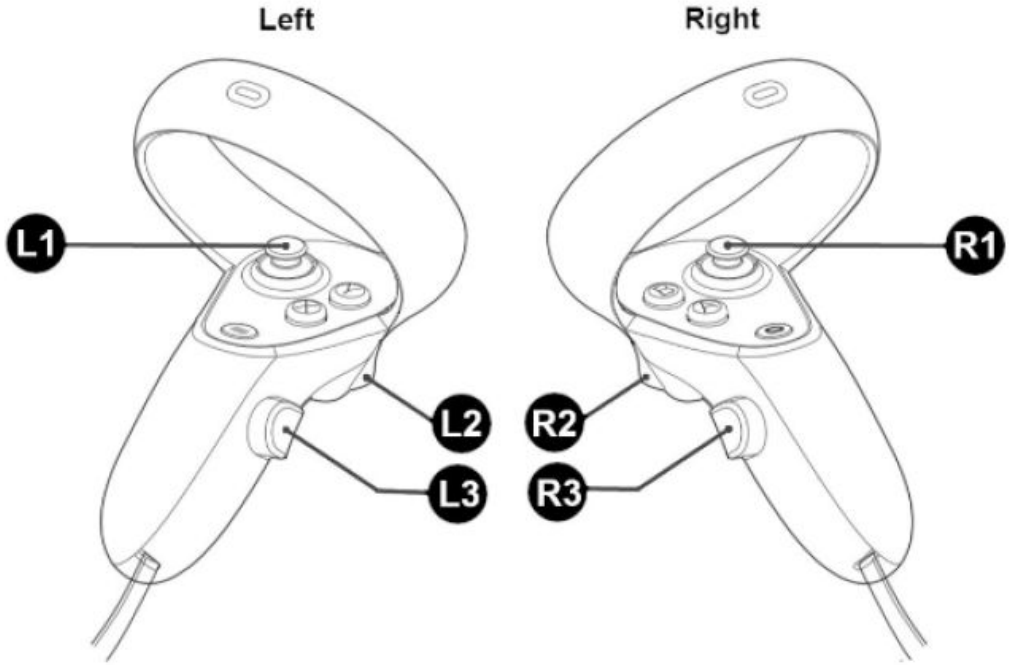
Arhitectura

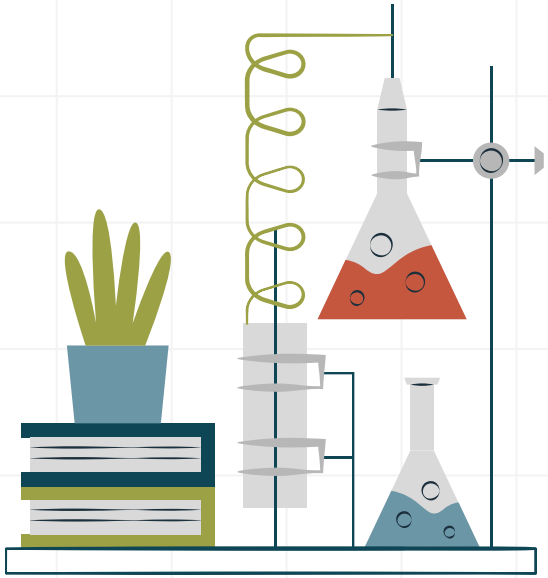
thumbstick stâng - Locomoție

thumbstick drept - schimbarea perspectivei

Trigger button - inițiere de acțiuni

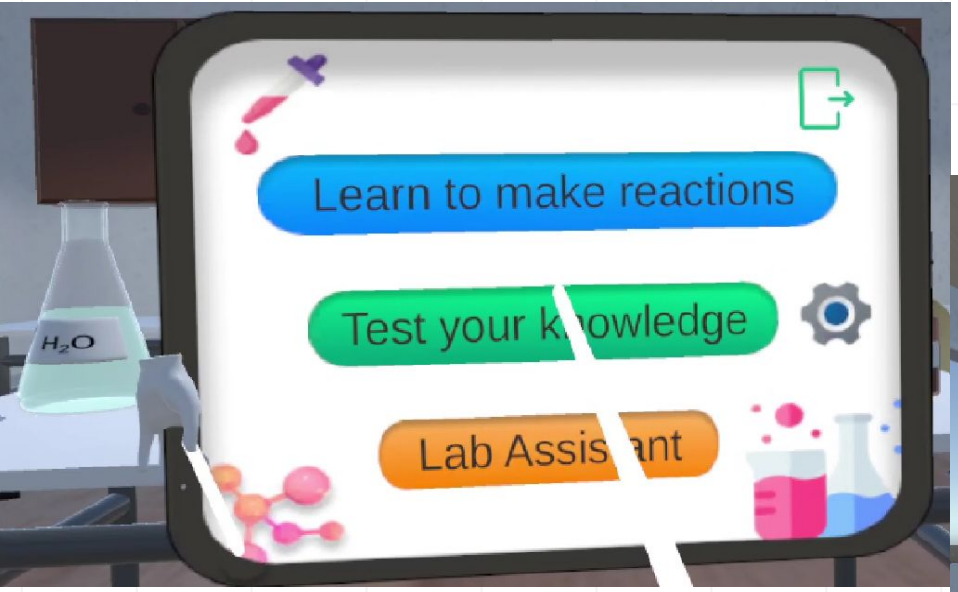
Grab button - prindere de obiecte

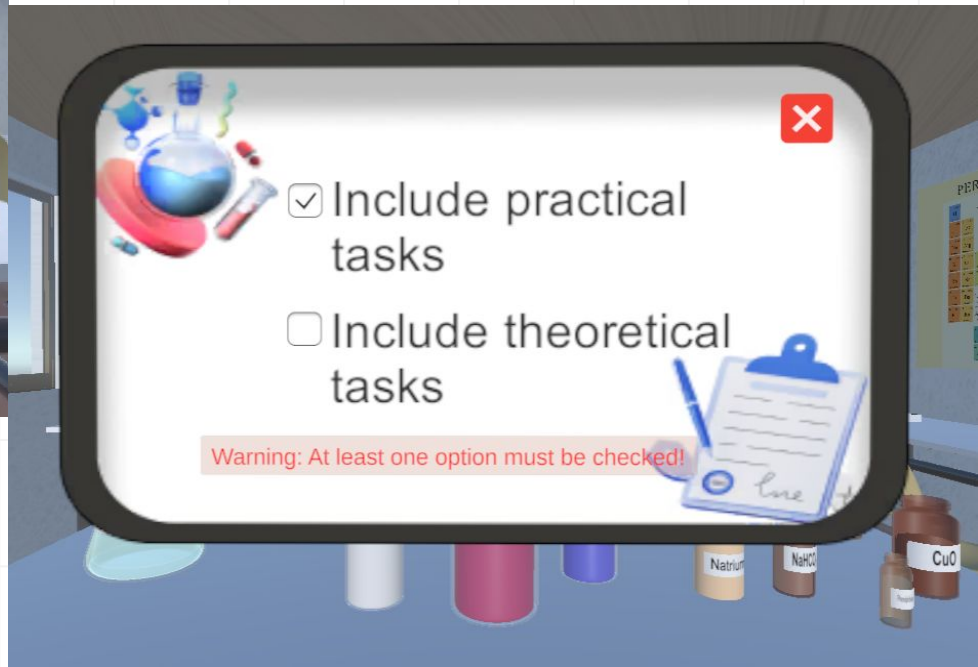




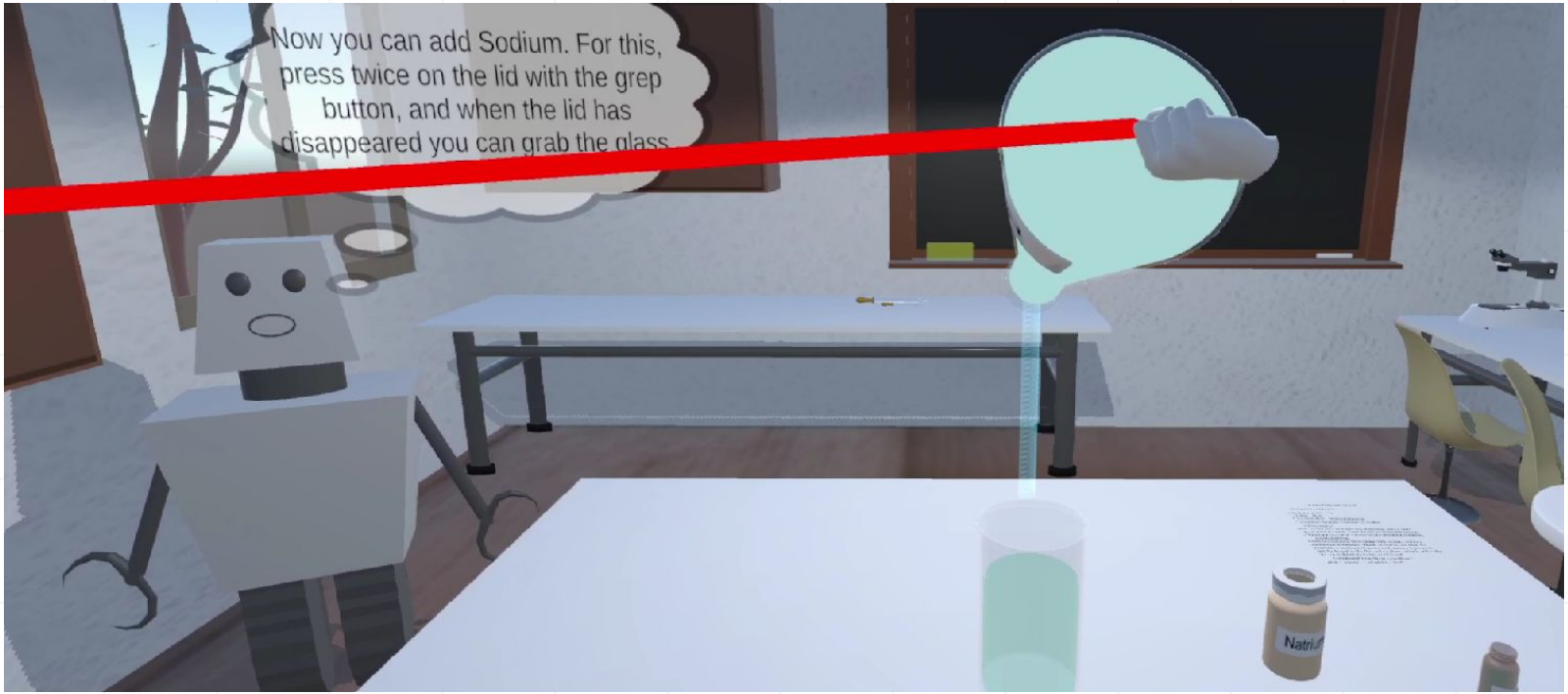
Funcționalități principale

Main Menu

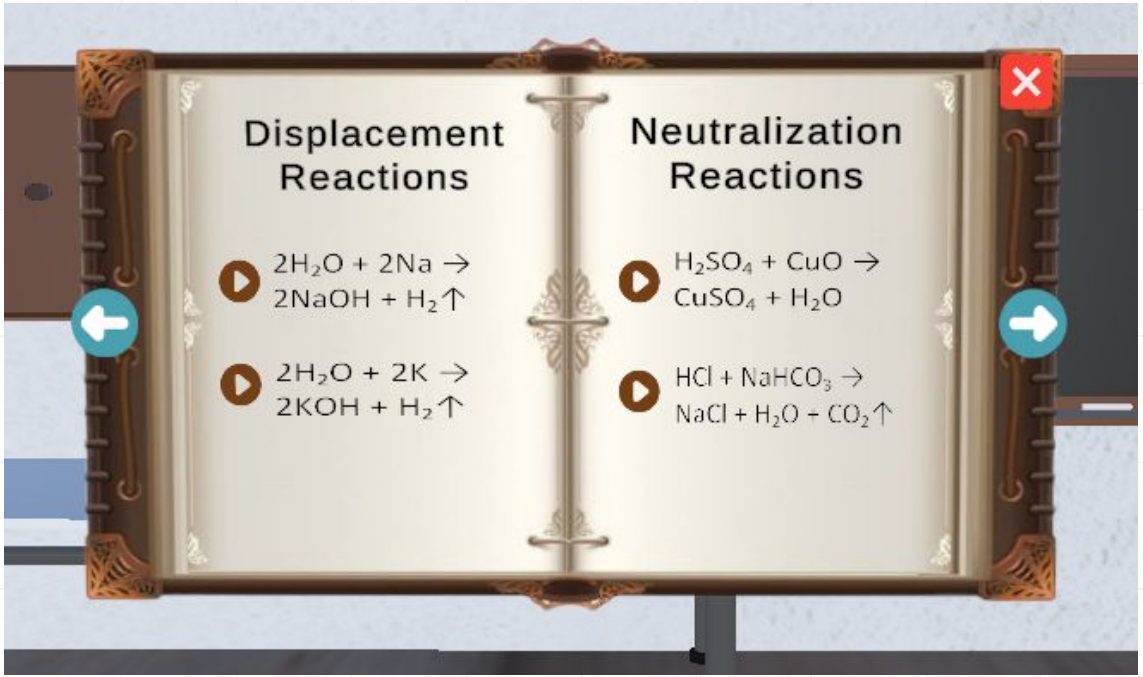

Learn to make reactions
Test your knowledge
Lab Assistant
H_2O

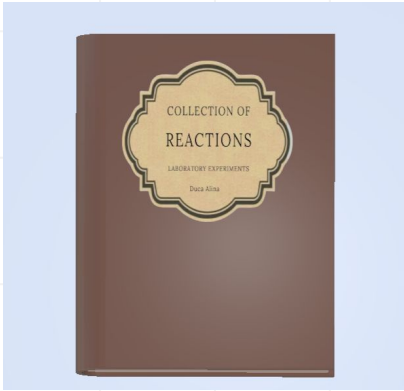

Include practical tasks
Include theoretical tasks
Warning: At least one option must be checked!
CuO

Learn to make reactions

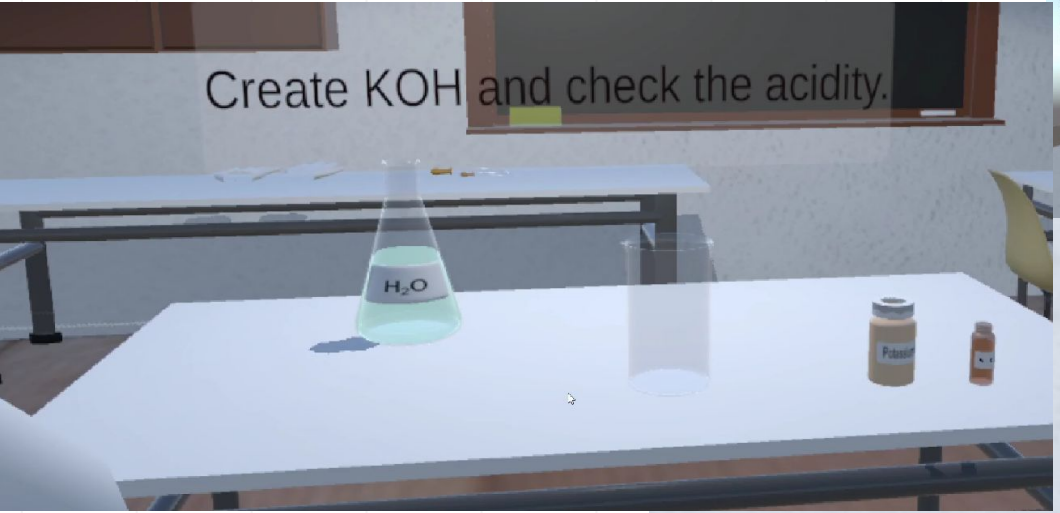


Learn to make reactions

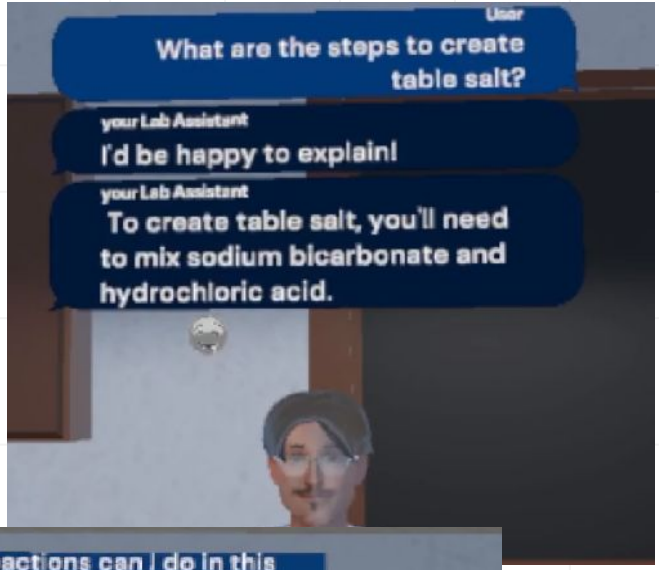


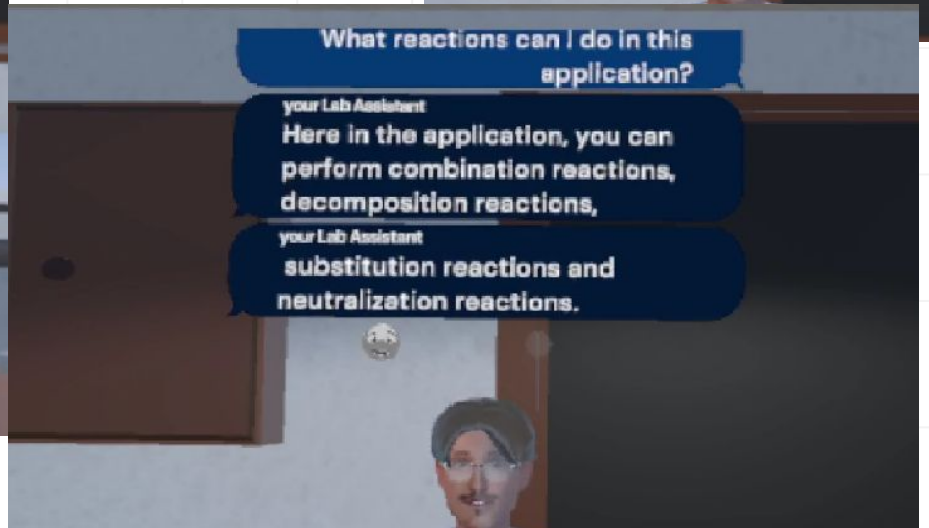


Test your knowledge



Lab Assistant



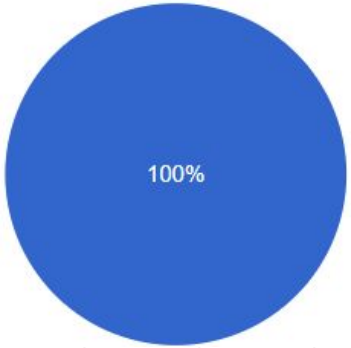


Teste de uzabilitate

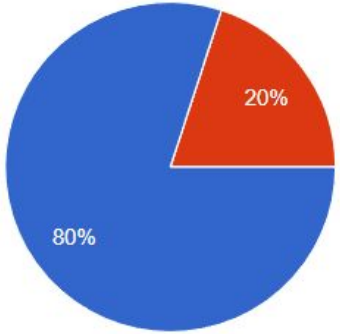
Teste de uzabilitate

- 10 persoane cu vârsta cuprinsă între 17 și 24 de ani
- 6 de gen masculin, 4 de gen feminin
- 5 persoane tehnice, 5 persoane netehnice

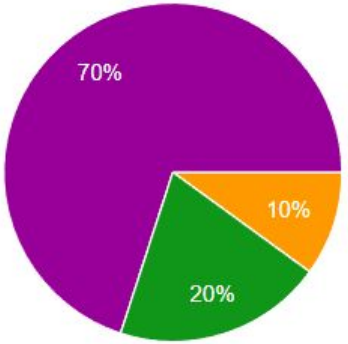
Experiența cu partea **Learn to make reactions**



Experiența cu partea **Test your knowledge**



Experiența cu partea **Lab Assistant**

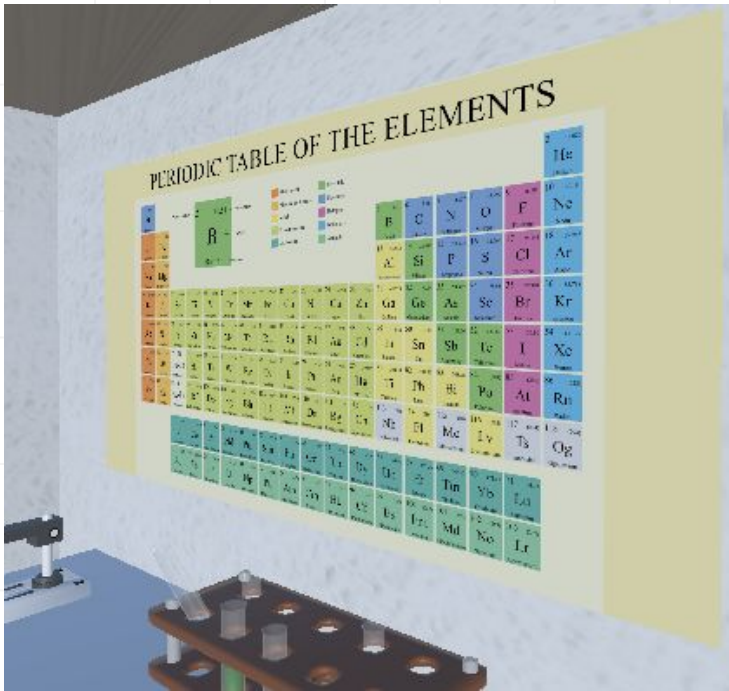


Cât de greu a fost să realizezi reacțiile chimice?
10% - neutru
20% - ușor
70% - foarte ușor

Direcții viitoare

- Implementarea unui Tabel Periodic interactiv care conține informații precum:
  - numărul atomic,
  - masa atomică,
  - numele elementului chimic,
  - simbolul chimic,
  - radioactivitatea elementului,
  - grupa de elemente la care aparține.

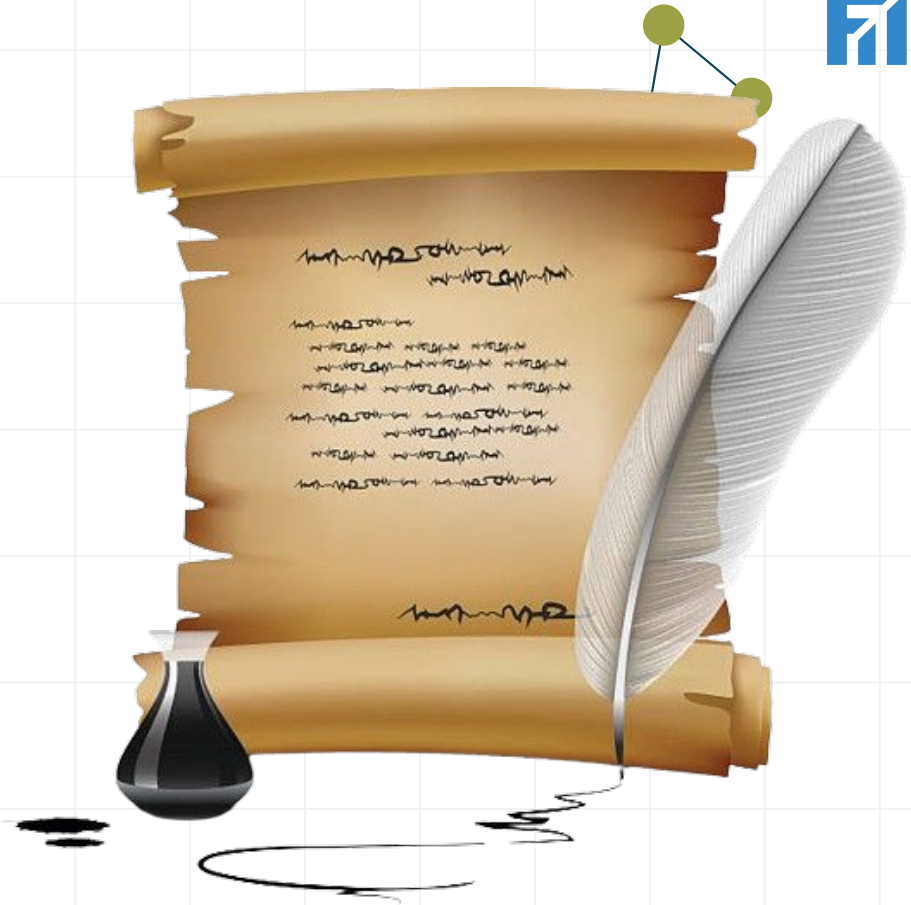
Când se interacționează cu un element al Tabelului Periodic, va fi afișat un atom modelat 3D al acelui element.



Imersivitate și metode folosite pentru îmbunătățirea experienței utilizatorului

- Sunete (turnarea lichidelor, sunet de fierbere, sunet pentru reacții efervescente, sunet pentru flacără)
- Efecte vizuale - folosind Shader Graphs și Particle System
- Testare urmată de optimizarea experienței utilizatorului

Conferințe



2024 EU-PAIR ANNUAL INTERNATIONAL CONFERENCE – 3rd EDITION

"Challenges and Dynamics of European Administrative Area"

PROJECT NO. ERASMUS-JMO-2021-HAI-TCH-RSCH-101047526

20th – 21st of June 2024, Iași, Romania

ALEXANDRU IOAN CUZA UNIVERSITY of IAȘI
FACULTY OF ECONOMICS AND BUSINESS ADMINISTRATION
Co-funded by the European Union

EU-PAIR

EU PUBLIC ADMINISTRATION INTEGRATION AND RESILIENCE STUDIES

Jean Monnet Chair, project no. ERASMUS-JMO-2021-HAI-TCH-RSCH-101047526

CERTIFICATE OF PARTICIPATION

This certificate is presented to

Duca Alina

for the participation in the
3rd Edition of the Annual International Conference
"Challenges and Dynamics of European Administrative Area"

organised on
20th - 21st of June, 2024
in
Iași, Romania
within the
EU-PAIR Jean Monnet Chair

Dean,
Cristina-Teodora ROMAN
PhD Professor

EU-PAIR Jean Monnet Chair Director,
Ana-Maria BERCU
PhD Professor

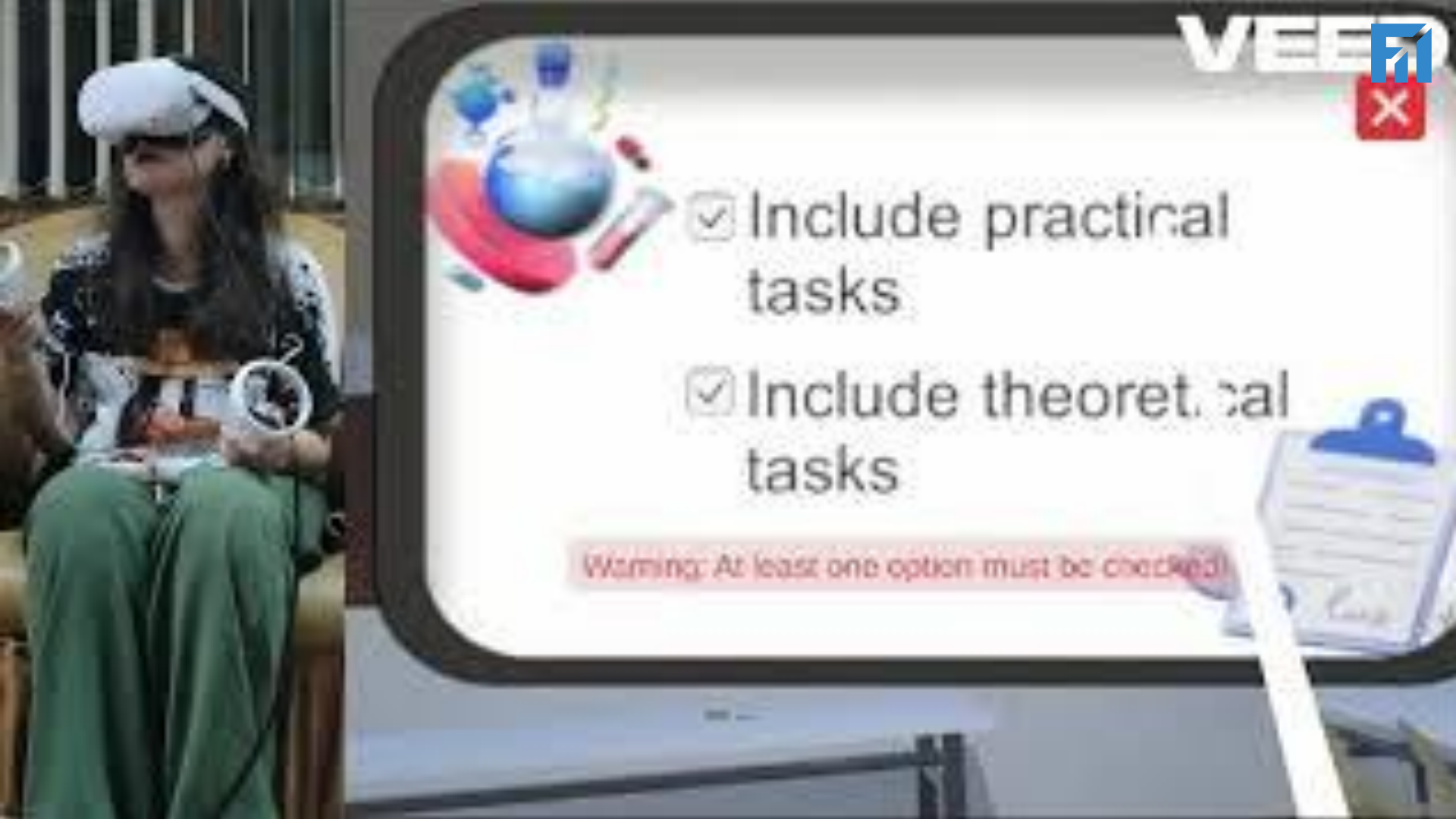
THE 18TH INTERNATIONAL CONFERENCE ON INNOVATIONS IN INTELLIGENT SYSTEMS AND APPLICATIONS

4-6 September 2024, Craiova, Romania

Ranked C (CORE)

IEEE Conference Record Number 62901

Demo


Include practical tasks
Include theoretical tasks
Warning: At least one option must be checked!


FeSO4

Bibliografie

[1] Macariu, C., Iftene, A., Gîfu, D. (2020) Learn Chemistry with Augmented Reality. In 24rd International Conference on Knowledge-Based and Intelligent Information & Engineering Systems. 16-18 September. Procedia Computer Science, vol. 176, pp.
2133-2142.

[2] Iftene, A., Trandabăț, D. (2018) Enhancing the Attractiveness of Learning through Augmented Reality. In Proceedings of International Conference on Knowledge Based and Intelligent Information and Engineering Systems, KES2018, 3-5 September 2018, Belgrade, Serbia. Procedia Computer Science Vol. 126, 2018, pp. 166-175.

[3] Iftene, A., Duca, A., Constantinescu, G.G. (2024) Future Education: Experimenting with Chemical Reactions in Virtual Reality. In 18th International Conference on Innovations in Intelligent Systems and Applications INISTA, 4-6 September 2024, Craiova, Romania

[4] Farabi, S., Noor, A., Anjum, N., Hossain, F., Jubair, A.A. (2024) Implementation
and Evaluation of Augmented Reality Technology in Chemistry for Secondary Education in Bangladesh: A Case Study. American Scientific Research Journal for Engineering, Technology, and Sciences. 97. 112-124.

[5] Rahman, H., AbdulWahid, S., Ahmad, F., Ali, N. (2024) Game-based learning in metaverse: Virtual chemistry classroom for chemical bonding for remote education. Education and Information Technologies. 1-25.

[6] Alrmuny, D. (2023) Middle School Students' Perceptions, Experiences, and Behaviors Towards Using a Virtual Reality Application to Build Molecules.

Mulțumesc!