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PAPER

THE IMPORTANCE OF VIRTUAL LABORATORIES IN TEACHING CHEMISTRY

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Abstract

This article cites data on the use of virtual laboratory work in the study of chemistry. The article cites a comparative analysis of the conduct of experiments in Chemistry Lessons in virtual mode and in traditional form. The possibilities of conducting virtual laboratory work in chemistry are considered, as well as the requirements for their implementation.

Key words: Unreal Chemist, Technology, Laboratory, virtual, online, chemical, application, ACIDS, SALTS, Water.

Mobile technology has been developing rapidly in the last decade due to the improvement of wireless communication, the expansion of the functional capabilities of mobile devices and the emergence of open-source mobile platforms. Currently, mobile devices can be used not only for communication, but also for educational and commercial purposes. Various mobile applications are being developed to enable these capabilities. Modern technologies have changed our lives and the way we communicate, and have also brought a revolution in education. Virtual laboratories have become a popular tool for studying various scientific disciplines, including chemistry.[1, 74]

The Virtual chemistry lab is an online application that mimics real-life laboratory conditions and allows students to experiment in chemistry in a virtual environment. It includes a wide variety of tools, equipment and chemical reactions necessary to learn different concepts and principles of chemistry in the comfort of your home or educational institution. The chemical experiment is a specific method of teaching, since it is he who distinguishes the process of learning from the science given to other subjects in the natural science cycle. The use of this form of work makes it possible to better remember the properties of the substances studied, as well as to clarify the essence of the processes that are occurring. But because of the lack of a laboratory, lack of reagents and instruments, laboratory work is very rare. An alternative to these works is the use of a virtual laboratory. Learning activities, in which students can transform their theoretical knowledge into practical ones, can be simulated using a virtual laboratory. Using a virtual lab enables students to repeat any wrong experiment and study it in more detail. The virtual laboratory, in our opinion, has a number of advantages in comparison with traditional laboratory experiments.[2, 26]

Unreal Chemist offers a practical and interesting study of chemical reactions for all chemistry and science enthusiasts. With the Unreal Chemist app, we can mix mixtures to see how chemicals react in an experiment or chemical reaction, change the amount, speed of reaction of chemicals, and experiment, burn salts to a colorful fire, heat elements to see how they emit color, and experiment with whole chemistry laboratory experiments.

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Through the Unreal Chemist application, we can generate concepts about the science of chemistry and increase our interest in the science of chemistry in students of the general education school. The application has more than 150 chemicals and more than 750 unique chemical experiment simulators for us to carry out chemical experiments. The Unreal Chemist virtual lab provides the following capabilities for users:

- Adjusting the concentration and quantity of reagents;
- Change the temperature in reactions that go with combustion and see the effect of temperature on solubility;
- Slow down or speed up the speed at which the reaction goes;
- Activate the combustible gases generated in the reaction process. [3, 20]

The superiority of the Virtual laboratory over the real one can be seen in the following.

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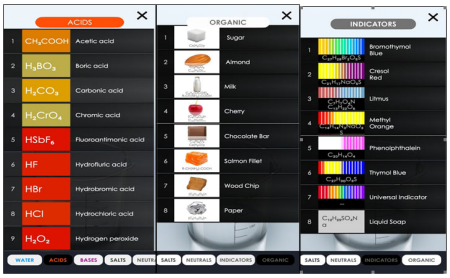

1-rasm. Department of acids, organic substances and indicators in the Unreal Chemist application

- Expensive jet and devices saving;
- Preventing students' safety;
- The prepared virtual laboratory can be used for a long time;
- It is possible to carry out very difficult experiments in laboratory conditions;
- In the virtual laboratory, the mechanism of chemical processes can be conveyed to students studying at the level of small particles;
- We have the ability to show the changes that happen in a short period of time slowly and vice versa;
- Security. Injuries due to poisoning or electric shock, broken glassware are prevented;
- Experiments can be seen quickly and severally in the virtual laboratory.

In conclusion, modern chemistry mobile applications for the requirements of schoolchildren and a higher educational institution, it is carried out to obtain information about the initial data on the study of chemistry and the use of virtual laboratories. [4, 34]

Foydalanilgan adabiyotlar

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