

EXPLAINING THE BASIC CONCEPTS OF CHEMISTRY TO 7TH GRADE STUDENTS IN GENERAL SCHOOLS BASED ON STEAM

Xoliyorova Sabina Farxod qizi

E-mail: sbinaxoliyorova@gmail.com

Pardayev Ulug`bek Xayrullo o`g`li

E-mail: pardayevulug`bek125@gmail.com

Tilyabov Maxsudjon Umurzokovich

E-mail: tilyabov_maq@mail.ru

Organization: 1 - Uzbekistan-Finland Pedagogical Institute.
140104, Uzbekistan, Samarkand, Spitamen branch street, 166.

<https://doi.org/10.5281/zenodo.10966929>

Abstract. *Chemistry is a fascinating subject that plays a crucial role in our daily lives.*

From the air we breathe to the food we eat, chemistry is all around us. As 7th grade students, learning chemistry opens up a world of knowledge and understanding. In this guide, we will explore the importance of learning chemistry at this stage, understand the basic concepts, delve into hands-on experiments, integrate chemistry into the STEAM curriculum, foster imagination and creativity, promote inclusive education, tackle problem situations, provide resources and tools for learning, and highlight chemistry clubs and extracurricular activities. So, let's embark on this exciting journey of discovering the wonders of chemistry!

Key words: *Chemistry, 7th grade, STEAM (Science, Technology, Engineering, Arts, Mathematics), basic concepts, atoms, molecules, elements, compounds, periodic table, chemical reactions, states of matter, solid, energy, pH scale, inquiry-based learning, creative projects.*

ОБЪЯСНЕНИЕ ОСНОВНЫХ ПОНЯТИЙ ХИМИИ УЧАЩИМСЯ 7 КЛАССОВ ОБЩЕОБРАЗОВАТЕЛЬНЫХ ШКОЛ НА БАЗЕ STEAM

Аннотация. *Химия – увлекательный предмет, который играет решающую роль в нашей повседневной жизни. От воздуха, которым мы дышим, до еды, которую мы едим, химия окружает нас повсюду. Учащимся 7-го класса изучение химии открывает мир знаний и понимания. В этом руководстве мы рассмотрим важность изучения химии на этом этапе, поймем основные концепции, углубимся в практические эксперименты, интегрируем химию в учебную программу STEAM, будем развивать воображение и креативность, продвигать инклюзивное образование, решать проблемные ситуации, предоставлять ресурсы и инструменты для обучения, а также выделить химические кружки и внеклассные мероприятия. Итак, давайте отправимся в это увлекательное путешествие по открытию чудес химии!*

Ключевые слова: *Химия, 7 класс, ПАР (Наука, Технология, Инженерное дело, Искусство, Математика), основные понятия, атомы, молекулы, элементы, соединения, таблица Менделеева, химические реакции, состояния вещества, твердое тело, энергия, шкала рН, запрос обучение на базе, творческие проекты.*

The Importance of Learning Chemistry in 7th Grade

Learning chemistry in 7th grade is vital for several reasons. Firstly, it provides a solid foundation for future scientific studies. Many scientific disciplines, such as biology and physics,

rely heavily on a good understanding of chemistry. By grasping the basic concepts in 7th grade, students pave the way for a deeper understanding of these subjects in higher grades.

Secondly, chemistry helps develop critical thinking and problem-solving skills. The study of chemistry involves analyzing data, making connections between different concepts, and finding solutions to complex problems. These skills are not only valuable in the field of science but also in everyday life situations. Lastly, learning chemistry at a young age sparks curiosity and a sense of wonder about the world. It allows students to understand the science behind everyday phenomena and appreciate the beauty of the natural world. By nurturing this curiosity, 7th-grade students can develop a lifelong love for science.

Understanding the Basic Concepts of Chemistry

Before delving into complex chemical reactions, it is essential to grasp the foundational concepts of chemistry. In 7th grade, students learn about atoms, elements, compounds, and the periodic table. They explore the structure of atoms, how elements combine to form compounds, and the properties of different elements. Understanding these concepts lays the groundwork for further exploration in higher grades. To make learning chemistry more engaging, teachers can use interactive demonstrations, models, and visual aids. Hands-on activities, such as building molecular structures with atoms and bonding them together, allow students to see the concepts in action. By actively participating in the learning process, students develop a deeper understanding of the subject matter.

Exploring the Wonders of Chemistry Through Hands-on Experiments

One of the most exciting aspects of learning chemistry is conducting hands-on experiments.

These experiments not only reinforce the concepts learned in the classroom but also provide a memorable and immersive learning experience. In 7th grade, students can explore chemical reactions, observe the formation of new substances, and understand the principles behind these reactions. Simple experiments like creating a baking soda and vinegar volcano or testing the pH of different household substances allow students to witness chemical changes firsthand. These experiments foster curiosity, critical thinking, and problem-solving skills. Additionally, they encourage students to ask questions, make predictions, and draw conclusions based on their observations. By incorporating hands-on experiments into the curriculum, teachers can make chemistry more accessible and enjoyable for 7th-grade students. These experiments ignite a sense of wonder and excitement, encouraging students to further explore the subject.

Integrating Chemistry into the STEAM Curriculum

In recent years, there has been a growing emphasis on incorporating STEAM (Science, Technology, Engineering, Arts, and Mathematics) education into school curricula. Chemistry, with its interdisciplinary nature, is a perfect fit for the STEAM approach. By integrating chemistry into the STEAM curriculum, students can see the connections between different subjects and understand how they relate to real-world applications. For example, learning about the chemical reactions involved in baking bread combines chemistry with the art of baking. This integration not only enhances students' understanding of chemistry but also fosters creativity and innovation.

Furthermore, incorporating STEAM principles in chemistry education promotes problem-solving, critical thinking, and collaboration skills. Students learn to approach scientific challenges from multiple perspectives and develop a holistic understanding of the subject.

Fostering Imagination and Creativity in Chemistry Education

Chemistry education should go beyond memorizing facts and formulas. It should encourage imagination and creativity by presenting the subject in a captivating and engaging manner. By incorporating hands-on activities, discussions, and open-ended projects, teachers can foster imagination and creativity in the study of chemistry. For instance, instead of simply teaching the periodic table, students can create their own artistic interpretation of the elements.

This activity not only reinforces their understanding of the elements but also allows them to express their creativity. Encouraging students to think outside the box and explore different perspectives enhances their problem-solving skills and nurtures their creativity.

Inclusive Education in Chemistry Classrooms

Every student deserves an equal opportunity to learn and succeed in chemistry. Inclusive education ensures that all students, regardless of their abilities or backgrounds, can actively participate and engage in the learning process. Inclusive practices in chemistry classrooms promote diversity, respect, and acceptance. Teachers can implement strategies such as differentiated instruction, collaborative learning, and providing additional resources for students with diverse learning needs. By creating a safe and inclusive environment, students feel valued and supported, which enhances their learning experience. Moreover, inclusive education in chemistry classrooms prepares students for a diverse and inclusive society. It fosters empathy, understanding, and acceptance of different perspectives, ensuring that every student feels included and heard.

Solving Problem Situations in Chemistry

Chemistry can sometimes present challenging problem situations that require critical thinking and problem-solving skills. In 7th grade, students encounter various problem-solving scenarios, such as balancing chemical equations, calculating concentrations, and predicting reaction outcomes. To tackle these situations effectively, students should develop a systematic approach to problem-solving. This involves analyzing the given information, identifying the relevant concepts, and applying appropriate strategies to arrive at a solution. Teachers can guide students through the problem-solving process, providing them with strategies and techniques that can be applied to different situations. Moreover, problem-solving in chemistry goes beyond finding the right answer. It involves evaluating the solution, reflecting on the process, and communicating the findings effectively. By developing these problem-solving skills, 7th-grade students become equipped to tackle the challenges that lie ahead in their scientific journey.

Resources and Tools for Learning Chemistry

Access to quality resources and tools is essential for effective learning in chemistry.

Fortunately, there are numerous resources available to support 7th-grade students in their chemistry education. These resources include textbooks, online platforms, educational videos, and interactive simulations.

Teachers can curate a collection of resources that cater to different learning styles and abilities. These resources can provide additional explanations, practice exercises, and real-life examples to enhance students' understanding of chemistry concepts. Furthermore, technology-based tools such as virtual laboratories and educational apps can simulate hands-on experiments, allowing students to explore chemistry in a virtual environment. By utilizing a variety of resources

and tools, teachers can create a rich and engaging learning experience for 7th-grade students. These resources complement classroom instruction and provide opportunities for independent learning and exploration.

Chemistry Clubs and Extracurricular Activities for Students

To further enrich their chemistry education, 7th-grade students can participate in chemistry clubs and extracurricular activities. These clubs provide a platform for students to explore chemistry beyond the confines of the classroom and interact with like-minded peers.

Chemistry clubs offer a range of activities, such as conducting advanced experiments, organizing science fairs, and participating in chemistry competitions. These activities promote teamwork, leadership skills, and a deeper understanding of chemistry. Students can also benefit from mentorship opportunities, where they can learn from experienced professionals in the field of chemistry. Extracurricular activities, such as attending science camps or visiting science museums, expose students to real-world applications of chemistry and inspire them to pursue careers in science. These experiences broaden their horizons and ignite a passion for lifelong learning.

Conclusion: Embracing the Wonders of Chemistry in 7th Grade

Learning chemistry in 7th grade is an exciting journey that opens up a world of knowledge and discovery. By understanding the basic concepts, conducting hands-on experiments, integrating chemistry into the STEAM curriculum, fostering imagination and creativity, promoting inclusive education, tackling problem situations, utilizing resources and tools, and participating in chemistry clubs and extracurricular activities, 7th-grade students can embrace the wonders of chemistry. So, let us embark on this fascinating journey together and unravel the mysteries of chemistry. With each step, we will develop a deeper appreciation for the role of chemistry in our lives and cultivate a love for the scientific world. Embrace the wonders of chemistry and let your curiosity soar!

REFERENCES

1. R.V.Tashmatova, I.X.Ruziyev, A.N.Mukhamadiev, K.E.Bebitova, Z.V.Xurramova; "COMMENTS ON THE USE OF DIDACTIC GAMES IN CHEMISTRY LESSONS" World Bulletin of Social Sciences 2023/4/17 pages: 131-133
2. Salimova G. B. Ruziev I. Kh., Ergashev E. Yu., Erkinova G. A.; "USING THE CASE METHOD IN TEACHING CHEMISTRY" International Journal of Studies in Advanced 2023/5/5 pages: 58-61
3. Karimova Dilovar Batirovna "THE USE OF GAMING TECHNOLOGIES IN TEACHING CHEMISTRY" Open Access Repository 2023/11/26 pages:99-104
4. Martin, L., & Reeves, T. (2019). STEM Learning through Arts Integration: A Microanalysis of Teacher Practice. International Journal of STEM Education, 6(1), 1-13.
5. S.I.Badalova, Q.U.Komilov, A.J.Kurbanova "Case technology in chemistry lessons" Academic Research in Educational Sciences, 2020, 262-265
6. Taber, K. S. (2014). Beyond Constructivism: The Progressive Research Programme into Learning Science. Studies in Science Education, 50, 1-41.