



**ORIGINAL RESEARCH PAPER**

**Pedagogical Science**

**FORMATION OF CHEMICAL THINKING IN STUDENTS THROUGH SOLVING OF CREATIVE PROBLEMS DURING EXTRACURRICULAR WORK**

**KEY WORDS:** extracurricular, competition, creative, curious problems, questioning.

**Lida Sahakyan**

Full Doctor of Pedagogical Sciences, professor, Head of the Department of Chemistry, Faculty of Pharmacy, Yerevan State Medical University named after M. Heratsi, P.O. Box 0025, Koryuna str., No. 2, Yerevan, Armenia,

**Naira Manvelyan\***

Director of Yerevan school № 155, chemistry teacher, Ajapnyak community, Bahsindjakhyan 2-nd lane, Yerevan, Armenia, \*Corresponding Author

**ABSTRACT**

The presented extracurricular work in chemistry is devoted to the formation of communication competence of students and the development of interest in the subject of chemistry by solving creative problems.. Learning to solve creative problems is considered an important area of formation of natural science thinking of students:

The main difficulty of civilization itself is that it is ahead of culture. Today civilization does what it wants. That is, what is easier to sell and brings income. And more that in the future the situation will only worsen. Therefore, today it is necessary to restore the culture in their rights. So – to enlighten, enlighten and enlighten [1].

It is obvious that the current change of priorities and social values requires continuous improvement of the educational process. In the context of changing socio-economic situation was realized and accepted the social order of the formation of personality, able to infiltrate such a society, which is characterized by the joint existence of different social groups and economic systems. There are changes in the paradigm of learning and the transition from the so-called model of adaptive subject learning to developing educational technologies.

The current state of training requires a fundamental change in both the strategy of the learning process and the way of action. In this regard, in the study of subjects the emphasis is shifted to the cognitive process, the effectiveness of which is entirely due to the recognition activity of the student. Success in achieving this goal depends not only on what is assimilated, but how the material is assimilated[2]. Extracurricular work in chemistry has always been the object of close attention and study by scientists, methodologists and teachers. However, currently extracurricular activities in chemistry is given undeservedly little attention.

The purpose of our research is the development and implementation of methods of extracurricular work in chemistry, aimed at the formation of communicative competence of students, to interest and cultivate love for the subject, to organize basic and in-depth knowledge, to develop the ability to apply the knowledge gained in practice. With the help of extracurricular activities to promote the development of cognitive interest, information, communication and General educational competencies of students.

The article presents an example of the organization of extracurricular activities in primary school – the solution of creative problems. Teaching students to solve creative problems in chemistry is an important area of formation natural science thinking.

It should be noted that great opportunities for creativity in the formation of students' personality, in the development of their cognitive abilities, as well as in the acquisition of knowledge on the subject at a new qualitative level in the methodology of

teaching chemistry are not yet used. This is largely due to the preservation of "effective" approach to creativity, according to which, the creativity of students is considered only in connection with obtaining a new result. The internal features of creativity remain outside the field of view of the Methodists [3]. In this regard, the activity of the teacher in the organization of the creative process is associated not so much with the development of students as with the provision of funds to help them get the final result.

Extracurricular activities are understood as non-compulsory, systematic extracurricular activities. These works are designed to deepen the chemical knowledge of students who have already identified the main range of their educational interests. At the lessons of chemistry there are many opportunities to interest students in the content of this science. However, the main purpose of classes is still to teach a certain set of procedures of a chemical nature, entertaining presentation subordinated to this goal, the development of students' abilities occurs within the framework of the study of compulsory material.

We investigated the issue of formation of positive personal attitude of students to educational activities in our country. One of the most important goals of extracurricular work in chemistry is:

1. Stimulating interest in chemistry.
2. Promoting the development of logical thinking, the ability to make the right decision.
3. Development of intelligence, attention.

Conducting extracurricular work in chemistry is an excellent way to improve the skills of teachers. The expansion of the studied material of the chemistry course, sometimes goes beyond the mandatory program. Consideration of such issues in additional classes inevitably leads the teacher to the need for a thorough acquaintance with this material and the method of its.

From the existing forms of extracurricular activities we have chosen competition – one of the most effective and efficient forms of extracurricular activities. This is a simple approach to working with schoolchildren: first, a group of students consisting of students of approximately the same level of knowledge and cognitive activity is created, then certain tasks are set for them [3]. 60 ninth-graders of 181st school of Yerevan participated in the competition. 7 creative tasks were proposed:

1. At one time, the clergy used one reaction to force the criminal to admit his guilt. To do this, the left hand was smeared with substance A, and the right-with substance B

and declared that if he is guilty, then blood will flow from them when the palms touch. Thus the criminal pleaded guilty. Give the reaction equation of the interaction of the above substances. Name these substances and explain the phenomenon.

- Over time, silver icons in churches turned black. But after treatment with certain substances, they again became bright. The priests tied it with the supernatural. How do you explain this phenomenon? Give the equation of the above reactions and call these 'magic' substances.
- The lead punishing the invaders.

Not far from Kutaisi is a monument of medieval Georgian architecture, the famous Gelati monastery, where before the attack of the Mongol barbarians kept manuscripts, ornaments and frescoes. Having seized the state, barbarians turned a monastery into a stable, burned there fires and had fun. However, the fun was short-lived. Suddenly from the dome of the monastery poured on them a rain of fire. Abandoning all, the Mongols in horror left the monastery, thinking that God had punished them. Can you explain what happened? What caused the rain of fire?

- Map of the world has repeatedly contributed to the choice of the name of the next chemical element: Germany, France, scandium, ruthenium, etc. It was common. In the history of chemistry recorded the case when the river and the state were named after the metal. What is this "happy metal"? Tell the background/ La Plata and Argentina/.
- Sodium is a silvery metal. Soft as wax, oxidized in air, is widespread in nature in the form of salts (sulfates, chlorides, silicates). One of its compounds is used on submarines and spacecraft to restore oxygen. Name the formula of the compound and write down the equation of the chemical reaction.
- The famous Swedish chemist of the eighteenth century, Bergman somehow expressed dissatisfaction with the pharmacist who sold him poor quality sodium nitrate (by heating saltpeter with sulfuric acid, formed pairs brown colors). These strange properties of nitrate pharmacist couldn't explain. Explained this phenomenon to his student Carl Scheele, the future great chemist. How did Scheele explain this phenomenon?
- In nature, there are no deposits of sulfuric acid. But it turned out that there are so-called "natural factory" that produce sulfuric acid. This happens in the Karakum desert. Describe the mechanism of formation of sulfuric acid.

The choice of research methods is not an arbitrary act in the activity of the scientist, but is determined by the peculiarities of the problems to be solved, the specific content of the problems and the capabilities of the researcher himself. From the methods of pedagogical research, we chose a closed form of questioning. In a closed survey, the participant must choose an answer from among the proposed: qualitative characteristics, intensity, satisfaction or a combination of these variations [4].

For example: how do you feel about different events? The answers to this question are presented in the table.

	Positive %	Negative %	Neutral %
Cool hours	45	35	20
Extracurricular activities	90	0	10

What attracted you more in this task?

- Novelty of the material.
- Interesting.
- Connection with life.
- Difficulty.

Since questionnaires can be used to collect a lot of material, it requires both quantitative processing and thorough qualitative analysis.

Quantitative processing can give, first of all, General data on the number of affirmative and negative answers received for each question of the questionnaire. (If you have a large number of answers, you can convert this data into percentages) (Fig.1).

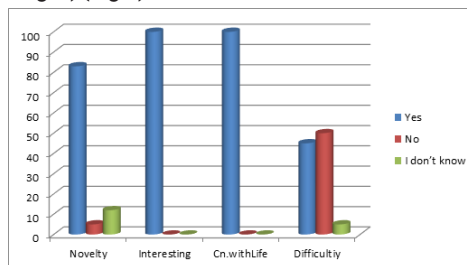


Fig.1 student survey Results

In the end, we organized an intensive discussion of ways to solve the proposed problems, and adopted the method of conversation. Methods of pedagogical research are selected taking into account the specifics of the tasks set by the scientist. The method of conversation in scientific research gives the greatest efficiency in the case when the researcher clearly outlines the questions. For conversation the following questions are accurately put.

Of the proposed tasks which is the most.

- interesting,
- difficult
- chemical

90 % of students considered the first and third problems interesting. According to all participants in the difficult are the second and the seventh problems. All participants considered the second, fifth and sixth problems to be chemical. The technology of conversation is quite complex. Join the conversation, you should be able to engage in dialogue – ask questions politely to listen, to argue, to question, to prove, even in silence. The effectiveness of the conversation largely depends on the ability to create a favorable moral and psychological atmosphere in communication, to observe the behavior of the interlocutor, his facial expressions, emotional reactions, the desire to answer or evade answers.

CONCLUSION

On the basis of the analysis of results of experimental research it is proved that the organization of extracurricular work in chemistry provides formation of communicative competence of pupils that is expressed in rather high level of mastering of chemical knowledge, and also in high level of formation of information and communicative, subject abilities.

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