



**THE USE OF INTERNATIONAL ASSESSMENT RESEARCH  
COMPETENCIES IN THE FORMATION OF THE LITERACY OF FUTURE  
CHEMISTRY TEACHERS**

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**Annotation**

The article provides for the formation of skills to perform tasks aimed at the formation of global, financial, mathematical literacy in the preparation of future chemistry teachers for international assessment studies and the preparation of contextual tasks related to them. At the same time, the formation of creative thinking competencies and the analysis of the content of tasks are given

**Key word:** global literacy, financial literacy, creative thinking, PISA

**ИСПОЛЬЗОВАНИЕ МЕЖДУНАРОДНЫХ КОМПЕТЕНЦИЙ ПО  
ИССЛЕДОВАНИЮ ОЦЕНКИ В ФОРМИРОВАНИИ ГРАМОТНОСТИ  
БУДУЩИХ УЧИТЕЛЕЙ ХИМИИ**

**Аннотация**

В статье предусмотрено формирование навыков выполнения заданий, направленных на формирование глобальной, финансовой, математической грамотности при подготовке будущих учителей химии к международным оценочным исследованиям и подготовке контекстуальных заданий, связанных с ними. При этом дается формирование компетенций творческого мышления и анализ содержания заданий

**Ключевое слово:** глобальная грамотность, финансовая грамотность, творческое мышление, PISA

**Introduction**

Global competence is the skills, values, and behaviors that prepare young people to develop in a more diverse and interconnected world. Citizens who are ready to work





in a rapidly changing world and are able to solve joint problems are very important. In the XXI century and after it, all people need it [1].

### **Material and Methods**

Skills and abilities are formed to global competence:

he explores the world by formulating questions, analyzing and synthesizing relevant evidence and making reasonable conclusions that lead to further investigation;

selects and applies appropriate tools and strategies for effective communication and collaboration;

actively listens and participates in inclusive communication;

He is well versed in the digital technologies of the XXI century;

demonstrates resilience in new situations;

uses critical, comparative and creative thinking and problem solving.

Creating a global competence is a journey, not an end point. This is not a checklist or an appeal, but an evolving, continuous process that takes place throughout our lives. These basic concepts form our understanding and assumptions about what the world is and what it will be like [2].

In 2018, an assessment of the global competence of 15-year-olds was conducted for the first time as part of the PISA International Student Assessment Program [3].

What is "Global Competence"? - this is a new component of functional literacy. Global competencies are not specific skills, but a combination of knowledge, skills, attitudes and values that are used in personal or virtual interactions with people from other cultural environments and are involved in solving global problems that do not have national borders and are affected. The life of present and future generations [4]. According to the OECD, educational systems that take into account the need for such knowledge, skills and relationships really prepare schoolchildren for life in the modern world. In order to form the following skills in schoolchildren, future chemistry teachers should know these skills themselves and have the skills to form these skills:

willingness to successfully interact with the changing world around us;

ability to solve various (including non-standard) educational and life tasks;

ability to build social relationships;

a set of reflexive skills that provide an assessment of one's own literacy, the desire for further education [5].

Future chemistry teachers should have the scientific potential to be able to answer the questions posed when preparing students for an international assessment study. For example.





Why has the concept of global competencies become relevant for a modern school?  
Can schools contribute to the development of global competencies?

The school plays a crucial role in the development of global competencies of students, can give students the opportunity to explore the events of the modern world that affect both the world community and themselves. Teachers can teach children to use digital information resources and mass media more critically, efficiently and responsibly [6]. The "global competence" is studied as a special component in the structure of functional literacy.

Integral components (accompany any component of functional literacy).

Subject components (the content reflects and is reflected in the content of academic subjects) [7].

The value of global competence is integral (a component with meta-subject content).

## Results

Future chemistry teachers should also learn how to compose assignments according to their age and prepare them in advance in order to teach "intercultural interaction" from the point of view of the dynamic composition of global competence. For example.

### For grades 5-6

1. Man and nature: nature protection, responsible attitude to wildlife.
2. Health as a value.
3. Human rights as a value

### For 7th grade

1. The main causes of global problems. Local manifestations of global problems.
2. Man and nature: ecological crisis and its causes.
3. Health: global challenges and the foundations of a healthy lifestyle.
4. Human rights: resistance to equality, political, racial, gender, religious and other types of inequality.
5. Education as a value and a right.

### For grades 8-9

1. Causes and solutions to global problems.
2. Interrelation of global problems. The manifestation of global problems in local situations.
3. Global problems in accordance with the UN list [8].





It is necessary to make assignments in accordance with the above topics and prepare them for students until they take part in international boho programs.

Financial literacy, its importance, problems and ways to solve them.

Financial literacy is an important issue in developing countries in the quest for a more transparent, healthy and sustainable economy [9].

Financial literacy is the ability to understand and effectively use various financial skills, including personal finance management, budgeting (input and output) and investments.

In order to achieve the desired financial goals, it is important that the population has a high level of literacy in terms of income, expenses, savings, debt and investments.

As a result of the low level of financial literacy of people, they may not be lucky in entrepreneurship, they will not be able to properly allocate their financial resources.

As a result of the inability to use existing financial market instruments for their intended purpose, poverty or average status is complicated by the fact that they reach the top of the standard of living.

One of the priorities is to increase the financial literacy of people in society. Especially in the conditions of a developing modern market economy, an increase in the volume of financial services requires a high level of literacy of the population.

Why is this important? A high level of financial literacy in a person provides eventful behavior with intelligence so that he can invest correctly, form a permanent source of income and cover his material needs in old age [10].

Financial illiteracy of the population has a negative impact not only on personal well-being, but also on the entire financial sphere.

Education is the most important system in a person's acquisition of knowledge and understanding in a certain area. The gradual increase in financial literacy of young people during the training period is an effective result.

To do this, it is necessary to organize trainings with the involvement of experts on improving financial literacy in each area and in the workplace.

In the formation of financial literacy among students, the role of parents from among the first-born family members is very great. From an early age, students can improve them with the help of tasks that form their financial literacy (for example: buying the products they eat and teaching market relations, calculating expenses, how to allocate funds) [11].

Future chemistry teachers are expressed on the basis of an integrative approach to chemistry issues in the formation of financial literacy of students and mathematical literacy in their calculation. For example:



Task 6: Determine the mass of metallic sodium that you will need to take to get 100 grams of consumed table salt. You can get table salt by acting with acid on an alkali solution during a laboratory process. You need to determine the mass of metallic sodium according to the state of the substance. Table salt, which is taken for consumption, is sold at a price of 1 kilogram of 2000 soums, if it is iodized, and 1800 soums, if it is not iodized. Try to get married, calculate how much in 100 grams of table salt you get chemically [12].

Solving the problem in cooperation - students will have to find a solution to the tasks set, working together with the team. For example: when performing project work on chemistry, we use exactly the method of joint problem solving.

Task 7: This task requires collaboration with the team, when students are given the task to create a model of  $H_2SO_4$  production in industry and animatedly explain this process using audio-visual demonstrations. The first group, dividing the students in the class into 3 groups, is given the task to create a model for the production of sulfuric acid in industry, the second group is given the task to create an animation model for these processes, and the third team is given the task to prepare an audio-visual demonstration. By itself, it seems that all three of these groups can only do the work of this project when they work together as a team [13].

To what extent should future chemistry teachers themselves be able to do the work of this particular project and have a good command of its mechanisms. The reason is that the project should teach students to give advice and eliminate their shortcomings when doing work [4].

Creative thinking is innovation (new, innovator, original, non-standard, unusual and hokoso..), and effective (practical, consistent, economical, optimal and hokoso ..) is the ability to find solutions, acquire new knowledge, develop ideas aimed at impressive expression of taste.

Creative thinking helps us find unusual solutions to problems. However, we should not confuse this with critical thinking, but rather look at the "brothers" who help us find solutions that complement each other in solving impossible problems.

In PISA studies, a student is required to solve scientific problems or social problems, express their ideas in writing or visually, in accordance with the creative thinking assessment model [7].

When evaluating creative thinking, attention is paid to competence in developing various ideas, developing creative ideas, as well as evaluating and improving ideas.





Study the cover of the book. What the hell is this book about?

Suggest some ideas and describe them.

Example of a task: solving scientific problems [8].

For the purity of water, the water supply network of country houses takes water from underground. In August, clean and clean water was taken from the tap. However, by September, the homeowner noticed that the cold water still smells fresh, and the heated water smells muddy. When he gave the water for analysis, the analysis showed that the water contained a large amount of hydrogen sulfide.

### Conclusion

Hydrogen sulfide is a gas formed as a result of the active process of bacteria in various organic residues. How do you explain to homeowners the causes of water pollution and the solution to this problem? Show imagination and express your opinion.

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