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# INTEGRATED LEARNING IN THE STUDY OF CHEMISTRY COURSE

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## ABSTRACT

*The article defines integration and integrated learning, outlines the basic principles of integrated learning, methodological features of integrated lessons. The features of the structure of integrated lessons are explained, as well as the main purpose of integration.*

**KEYWORDS:** *Integration, Interdisciplinary Connections, Intra-Subject Communication, Interrelation Of Phenomena, In-Depth Study, Formation Of Worldview*

## INTRODUCTION

Integrated learning is one of the innovations of modern methodology. This technology boldly invades unshakable school curricula and connects seemingly incompatible subjects. Chemistry is no exception. As a result of the expansion of chemical research and the growth of chemical knowledge, new interdisciplinary fields of research have emerged. Chemistry interacts with a large number of disciplines, such as pharmacy, physics, ecology, geography and others. All these innovations are also deeply and interconnected covered by teachers in the study of chemistry **[1, p.77]**. The school subject "Chemistry" is integrated. It is connected with many other subjects and offers students knowledge of many fields of science, art, culture, as well as real everyday life. Integration in teaching involves, first of all, the essential development and deepening of interdisciplinary connections, which are analogous to the links between sciences, the transition from the coordination of teaching different subjects to their deep interaction.

Integration is a deep interpenetration, merging, as far as possible, generalized knowledge in a particular field in one educational material [**2, p.134].**

Integrated lessons give the student a fairly broad and vivid idea of the world in which he lives, about the relationship of phenomena and objects, about mutual assistance, about the existence of a diverse world of material and artistic culture.

The main emphasis is not so much on the assimilation of certain knowledge, as on the development of imaginative thinking. Integrated lessons also involve the mandatory development of creative activity of students. This allows you to use the content of all academic subjects, to attract information from various fields of science, culture, art, referring to the phenomena and events of the surrounding life.

The principles of integrated learning are designed to fully work towards achieving the main goal of integrated learning – the development of students' thinking.

1. Synthesized knowledge. A holistic, synthesized, systematized perception of the issues studied on a particular topic contributes to the development of breadth of thinking. The formulation of the problem investigated by integration methods develops purposefulness and activity of thinking.

2. Depth of study. Deeper insight into the essence of the topic under study contributes to the development of depth of thinking.

3. The relevance of the problem, or the practical significance of the problem. The mandatory implementation of the problem under consideration in some practical situation strengthens the practical orientation of learning, which develops critical thinking, the ability to compare theory with practice.

4. Alternative solutions. New approaches to a known situation, non-standard ways of solving a problem, the possibility of choosing a solution to this problem contribute to the development of flexibility of thinking, develop originality of thinking. Comparison of solutions develops activity, criticality, organization of thinking. Due to the desire to make a reasonable choice of actions, to find the shortest way to achieve the goal, purposefulness, rationality, economy of thinking develops.

5. Evidence of the decision. Evidence-based problem solving develops evidence-based thinking.

Methodological features of integrated lessons.

1. In an integrated lesson, blocks of knowledge of two or three different subjects are combined, so it is extremely important to correctly determine the main purpose of the integrated lesson. If the overall goal is defined, then only the information that is necessary for its implementation is taken from the content of the items.

2. Integration helps to relieve tension, overload, fatigue of students by switching them to a variety of activities during the lesson. When planning, careful determination of the optimal load by various types of student activities in the classroom is required.

3. When conducting an integrated lesson by teachers (leading different subjects), careful coordination of actions is required.

4. In the form of integrated lessons, it is advisable to conduct generalizing lessons, which will reveal the problems most important for two or more subjects, but an integrated lesson can be any lesson with its own structure, if knowledge, skills and results of analysis of the studied material by methods of other sciences, other academic subjects are involved in its implementation.

5. In an integrated lesson of several subjects, one is the leader. Most often, integrated lessons are paired and conducted by teachers together. Various integration of academic subjects is possible.

The structure of integrated lessons differs from regular lessons in the following features:

- Extreme clarity, compactness, of educational material;

- Logical interdependence, interconnectedness of the material of the integrated subjects at each stage of the lesson;

- Large informative capacity of the educational material used in the lesson.

In the form of integrated lessons, it is advisable to conduct generalizing lessons, which will reveal the problems most important for two or more subjects.

In high school, integrated lessons are an essential part of the system of interdisciplinary communication. The material of such lessons shows the unity of the processes taking place in the world around us, allows students to see the interdependence of various sciences.

The main goal of integration is to create a holistic view of the world around the student, the formation of his worldview. There are some opportunities in the integrated construction of the educational process that allow us to qualitatively solve the tasks of teaching and educating students:

1. The transition from intra-subject connections to intersubject ones allows the student to transfer methods of action from one object to another, which facilitates learning and forms an idea of the integrity of the world. At the same time, it should be remembered that such a transition is possible only if there is a certain knowledge base of intra-subject connections, otherwise the transfer may be superficial and mechanical.

2. An increase in the share of problematic situations in the structure of integration of subjects activates the mental activity of the student, makes him look for new ways of learning educational material, forms a research type of personality.

3. Integration leads to an increase in the share of generalizing knowledge, allowing students to simultaneously trace the entire process of performing actions from the goal to the result, to perceive each stage of work meaningfully.

4. Integration increases the informative capacity of the lesson.

5. Integration allows you to find new factors that confirm or deepen certain observations, conclusions of students when studying various subjects.

6. Integration is a means of motivating learning among students, helps to activate the educational and cognitive activity of students, helps to relieve overstrain and fatigue.

7. The integration of educational material contributes to the development of creative thinking of students, allows them to apply their knowledge in real conditions, is one of the essential factors of culture education, an important means of forming personal qualities aimed at a kind attitude to nature, to people, to life.

8. Integrated lessons differ from regular lessons in great informativeness and therefore require a clear organization of cognitive activity. Such lessons should be extremely clear, compact, thought out at all stages. Such lessons reduce the fatigue of the brain, create comfortable conditions for the student as a person, increase the success of learning, and avoid a situation when a particular subject falls into the category of not loved ones.

Any components of the pedagogical process can be integrated in the lesson: goals, principles, content, methods and means of teaching. When, for example, the content is taken, any of its components can be distinguished for integration in it: concepts, laws, principles, definitions, signs, phenomena, hypotheses, events, facts, ideas, problems, etc.

It is also possible to integrate such components of the content as intellectual and practical skills and abilities. These components from different disciplines combined in one lesson become system-forming, educational material is collected around them and brought into a new system.

When teaching chemistry, one of the forms of knowledge integration is the implementation of interdisciplinary connections with related disciplines - biology and physics. In recent years, interesting works have appeared on the integration of chemical knowledge and knowledge from the humanities - literature and fine arts. In foreign publications, attempts are being made to conduct integrated lessons on the material of chemistry and English **[3, p.93].**

Any language is a sign system, behind each sign of which there must be a concept, a form that serves to express the content, and does not make sense if it is not filled with content. The study of language as a form of information transmission allows for interdisciplinary integration, combining the form given by linguistic material with the subject content, in our case, chemical **[4, p.204].**

In this regard, we will give an example of an integrated, "chemistry - English" task.

**TOPIC 2 [5, p.12]**

***I. Read and translate this text.***

MENDELEYEV

Dmitry Ivanovich Mendeleyev, the greatest Russian scientist, the father of the Periodic Table of Elements, was born in Tobolsk in 1834 inthe family of director of the town gymnasium. He received a secondaryeducation at Tobolskgymnasium. At the age of 16 he finished school andwent to Petersburg where he entered the Pedagogical Institute and graduatedfrom it with gold medal in 1855.

After graduation Mendeleyev worked as a teacher for two years,first in Simferopol and Odessa gymnasiums. In 1859 Mendeleyev receivedhis Master's Degree and went abroad on two-year scientific commission.

In 1860 he took part in the World Chemical Congress inKarlsruhe, Germany.

When Mendeleyev returned to Russia he was elected professor ofthe Petersburg University, where he carried on scientific and pedagogicalactivities, for twenty years. His lectures on chemistry were always interestingand the students of that time listened to them with great interestand attention. Besides lectures Mendeleyev made a lot of experimentsand later analyzed them.

Mendeleyev described more than 60 elements and found that allthe elements could be divided into nine groups. Each of these groupsmay be divided into five rows. The elements of one group possess moreor less similar properties. In 1869 Mendeleyev published his PeriodicTable of Elements which began a new era in chemical thought.

Mendeleyev paid much attention to many other objects. He was thefirst to put forward the idea of studying the upper layers of the atmosphere.Mendeleyev always combined theory and practice. He gave agreat deal of attention throughout his life to the development of the industryin Russia. He wrote: "Science and industry – there lie mydreams!"

In 1893 Mendeleyev was appointed director of the Bureau ofWeights and Measures. He was elected member of many academiesabroad. He died in 1907.

***II. Answer these questions.***

1. How many elements did Mendeleyev describe?
2. When did Mendeleyev publish his Periodic Table?
3. When did Mendeleyev finish school?
4. Where was World Chemical Congress in 1860?
5. When did Mendeleyev receive Master degree?

***III. Retell the text.***

Integration today is a pattern of development of social systems. Culture and production, politics and economics – all spheres of social existence are permeated with integration processes. Pedagogy is no exception. Intensive work is being carried out here on the development of integrative programs, courses, technologies of education and training. Efforts are being made to integrate pedagogical concepts and pedagogical approaches [**6, p.323].**

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