On the Implementation of Interdisciplinary Relationships in Classes in Chemistry with Disciplines of the Professional Cycle

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ABSTRACT

This article describes the methodology and tasks of developing the structure of practical and experimental classes in chemistry based on interdisciplinarity .

Keywords: interdisciplinarity , systematization, integration, analysis, algorithm, experiment, technological map, nitrogen and its compounds, atom, Rutherfrod

The problem of choosing and typifying teaching methods is one of the main problems of science, and the experience gained in solving it forms the basis for building a system of methods for interdisciplinary integrative-methodical training of students.

A special place is given to the chemical experiment, which is for the future teacher a source of indispensable professional and methodological knowledge, skills and values, and at the same time a means of mastering them. At the same time, experience is important for students' knowledge of the basics of chemistry, especially when the teacher works in the main direction of interdisciplinary integrative learning. In this case, experience serves as a teaching method, a means of creating problem situations, solving problems and proving their truth. In addition, the experiment is an important factor in the formation of students' motivation to study chemistry, their attitude to the acquired knowledge and skills [1].

Given the above, considering the experimental and methodological training of students as an integral part of training at a university, providing the formation of an indispensable set of knowledge on the technique and methodology of chemical experiments, as well as constructive, organizational, managerial and other experimental skills, it is desirable to develop integrative experimental guides that teach the formation of skills and application them in activity. This determines the importance of considering the possibilities of including techniques and methods of conducting an experiment in the content of interdisciplinary integrative-methodical training of a future teacher [2]. Experimental and methodological training of students is carried out in practical classes. Therefore, their content, the logic of organization and transmission, first of all, should be reconstructed on the principles of an interdisciplinary integrative approach. At the same time, one of the goals of experimental and methodological training is to reveal the integrative and developing potential of the experiment and acquire knowledge, skills and experience in applying it in professional activities.

At the same time, in addition to the logic of setting and solving educational problems as structural units of the content of a chemistry

lesson, mastering the technique and methodology for conducting experiments on an interdisciplinary integrative basis is a complex process. Only when considering the experiment as a component of the development process, carrying out the experiment as a method and means of teaching, can one understand the educational and creative value of experience, determine its impact on the student, and therefore achieve conscious application in further professional activity.[3]

In this regard, an algorithm for organizing practical classes was developed and tested. This allows us to effectively reconstruct the current practice of experimental and methodological training of students according to the principles of an interdisciplinary integrative approach. According to this algorithm, it is required to prepare for the lesson and determine its goals and objectives, as well as observe the following rules:

1. Drawing up a thematic plan for studying the topic of the chemistry course, which will be discussed in the lesson. The definition of interdisciplinary integrative classes, identifying problematic elements, referring to visual materials.

2. Determining the logic of conducting interdisciplinary integrative lessons through: the learning objectives of the lessons, their hierarchy and cause-and-effect relationships, the place of problems in the structure of the lesson content, internal and interdisciplinary connections necessary to solve them. , determine the types of experiments corresponding to the content of the tasks from the list of related scientific experiments.

3. Determine the place and role of experiments in identifying and solving educational problems, as well as the best methods and methods for their implementation.

4. Separately design the process of interdisciplinarity and problem solving for each lesson, observing the following main steps: updating the basic knowledge and methods of action of students, creating an integrative statement of the problem, setting a learning problem, eliminating problems, proof . found solution and application

5. Refinement of the logic of conducting interdisciplinary integrative classes, taking into account the developed technological and methodological projects for the formation and solution of their integrative educational tasks.

6. The distribution of experiments from the general list of experiments related to related sciences into the corresponding sections of chemistry, taking into account the characteristics of their goals and content. Consideration of the role of experiments in the structure and content of lessons, techniques and ways of conducting them.

7. Draw up a final lesson plan, taking into account the methodology for conducting lessons developed on the topic.

8. Determine the methods and forms of involving students in the preparation of technological and methodological projects of their lessons, while simultaneously implementing all the experiments provided for in the lesson.

9. Determination of the quality of the educational process, activities and achievements of students, criteria and indicators.[4,5]

Thus, the proposed algorithm is aimed at the assimilation by students of an interdisciplinary integrative methodology for teaching chemistry in active cognitive activity. This will be helped by the solution of educational and methodological problems and the development of technological and methodological projects as a result of an appropriate experiment. In addition, the algorithm works first as an object of special education, and then as a means of self-organization and self-control of students' activities, a means of self-realization of their creative potential.

The experience of using the considered algorithm allows us to speak about its advantages. By ensuring that students master the techniques and methods of conducting experiments, you can also achieve the following:

- a comprehensive understanding of the process and methods of development of teaching chemistry;

- formation and development of skills to design different types of lessons, plan the process of setting and solving educational problems;

-understanding the role of the experiment as the leading integrative-developing method and means of teaching chemistry, stimulating the activity of students and forming their value attitudes towards chemical knowledge and skills, as a factor in the conscious assimilation of program material;

- formation of skills of choice and complex inclusion in the process of formation and solution of problems in an expedient and rational combination of various means, methods and forms of training;

- acquisition of experience in professional and methodological activities.

Technological map of the lesson on the topic:

The methodology for studying the topic "Nitrogen and its compounds" is based on interdisciplinary integration.

The purpose of the lesson: to acquaint students with the content of the course of inorganic chemistry, its features and interdisciplinary interactive teaching methods; mastering the technique and methodology of conducting a chemical experiment in the learning process.

List of suggested experiences for the lesson

1) Obtaining nitrogen in the laboratory (decomposition of ammonium nitrite).

2) Obtaining nitrogen from sodium or potassium nitrite and ammonium chloride.

3) Removal of nitrogen from the air

4) Obtaining nitrogen by decomposition of ammonium dichromate (volcano on the table).

5) Obtaining and properties of ammonia in the laboratory.

6) Qualitative reactions characteristic of the ammonium ion.

7) properties of nitric acid

8) Qualitative reactions characteristic of the nitrate ion

A fragment of the technological map of the lesson on the development of teaching methods on the topic "Nitrogen and its compounds".

Distribution of experiments at interdisciplinary integrative lessons of the subject

Theme "Nitrogen and its compounds"		
Educational Problems lesson	Stages of formation and solution of educational tasks of the lesson	List of experience and information used in the process of solving educational problems
1) What methods of collecting nitrogen and ammonia are accepted in the laboratory? Which one can be harvested based on the water extraction method? 2) To study the composition of air, Rutherford conducts the following experiment: a mouse, which is kept in a closed vessel for a certain time, dies, then a lighted candle is inserted into the	1) actualization of basic knowledge, skills, use of interdisciplinary information; 2) creation of an interdisciplinary integrative situation; 3) setting a learning task; 4) solution of the educational problem; 5) proof and application of the found solution. 3) description of the learning problem; 4) solution of the educational problem; 5) proof and application	a) obtaining nitrogen by decomposition of ammonium nitrite in the laboratory. NH4NO2 = 2H2O+N2 Or NH4Cl+NaNO2==NaCl+2H2O+N2 b) checking the properties of the collected nitrogen c) obtaining ammonia and testing its properties Physics Information Two nitrogen atoms are connected by three strong bonds, forming a molecule. Nitrogen is poorly soluble in water, it is a colorless gas with a density slightly lower than that of air. 700 volumes of ammonia dissolve in 1 volume of water.

vessel and held until it goes out, then, when the phosphorus has burned out in the container, it becomes very flashy for a short time. After passing the residual gas through lime water, a non-flammable, non-flammable, non-respirable, chemically stable gas remains. Explain experimental procedures. 3) Pour copper powder on one side of a two-bottom test tube, and a piece of lithium on the other, and close the neck with a stopper. Heat the copper side of the test tube first, and when the copper powder turns dark, heat the lithium side a little. Drop water on the lithium side and notice the smell of ammonia. Explain the processes step by step, write the reaction equations. 4) What is the reason for the transition to natural gas raw materials instead of water as a source of hydrogen for the production of ammonia at the Chirchik Electrochemical Plant? Try water electrolysis in the lab to get hydrogen. 5) What qualitative reaction can be carried out on the ammonium	of the found solution. 3) description of the learning problem; 4) solution of the educational problem; 5) proof and application of the found solution. 3) description of the learning problem; 4) solution of the educational problem; 5) proof and application of the found solution. 3) description of the learning problem; 4) solution of the educational problem; 5) proof and application of the found solution. 3) description of the learning problem; 4) solution of the educational problem; 5) proof and application of the found solution.	Information about biology Atmospheric air is 78% nitrogen, and blue-green algae, nodule bacteria living in the roots of legumes, convert free nitrogen into nitrates (nitrification). Some bacteria can break down nitrates to nitrogen (dinitrification). At high pressure, the nitrogen supplied with air dissolves in the blood, if the pressure decreases rapidly, the dissolved nitrogen forms bubbles and remains in the veins, which is called decompression sickness (observed with a rapid rise from under the water). Under the influence of lightning, nitrogen in the atmosphere is oxidized and forms nitric oxide (NO 2). It dissolves in water to form nitrites and nitric acid. Nitrite and nitrate ions are absorbed by plants. Nodule bacteria convert nitrogen into ammonium salts. Ammonium salts are absorbed by plants in ionic form and synthesize proteins. Animals eat plants and turn plant protein into animal protein. When animals and plants die, putrefactive bacteria decompose proteins, urea and nucleic acids to ammonia (ammonification). Ammonia is oxidized to nitrite and nitrate (nitrification). Nitrates are taken up by plants . Geographic information At the Chirchik Electrochemical Plant, ammonia is initially produced from atmospheric nitrogen using electricity. After natural gas was delivered from the Bukhara region through the pipeline, natural gas was used as a feedstock (as a source of hydrogen). Plants for the production of nitrogen fertilizers and chemical fiber from natural gas are also located in the cities of Fergana and Navoi. NaNO 3 is found in Chile (hence the name chili nitrate). Increasing the amount of greenhouse gases, carbon dioxide, sulfur oxides and nitrogen dioxide (NO) in the atmosphere causes the problem of the

ion and nitrate ion? 6. How to distinguish ammonium nitrate, sodium nitrate, ammonium phosphate fertilizers given in the laboratory?		"greenhouse effect", i.e. an increase in the average annual temperature.

A chemical experiment fixes students' attention to methodological preparation for the integration, synthesis and multilateral application of knowledge, skills and values, the formation of experience in their application in activities, as well as methods and means of organizing and managing the educational process. , serves.

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