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**METHODICAL PREPARATION OF TEACHERS TO USE
INFORMATION AND COMMUNICATION TECHNOLOGIES
IN TEACHING CHEMISTRY WHILE THE SYSTEM TRAINING**

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The actuality of the course of the system training "Methodical preparation of teachers to use information and communication technologies " is determined by the need to equip teachers working at schools with modern information and communicative chemistry technologies which are means of effective development of creative and independently thinking of pupils in conditions of intensive increase in information flow.

The program of the system training includes three sections: 1) Normative legal support of the use of ICT in teaching chemistry; 2) Software tools of the use of ICT in teaching chemistry; 3) organizational and methodological support of the use of ICT in teaching chemistry.

Let consider the content of the program in details.

1. Normative legal support of the use of ICT in teaching chemistry.

1.1. Informatization of education as one of the main directions of modernization of education in the Republic of Belarus

Normative legal support of informatization of education. The concept of informatization of education system of the Republic of Belarus for the period up to 2020. The main directions of informatization of education. The role of ICT, distance and e-learning in chemical education. Key words of the course ("IT", "distance learning", "media education", "e-learning", "Information and substantive competence" and others.).

1.2. ICT in chemical education

Didactic functions of ICT in teaching chemistry.

The specificity of chemical information. Types of visual supports used in teaching chemistry. Multimedia: basic concepts and characteristics (technical, technological, pedagogical). The multimedia opportunities of personal computers and their use in teaching chemistry.

1.3. Methodical analysis of electronic learning tools of teaching chemistry

E-learning tools, their classification and didactic functions. The problem of their developing in chemistry for the general secondary schools. Evaluation of the quality of e-learning tools in chemistry: didactic, ergonomic and methodological requirements e-learning tools in chemistry.

2 Software tools of the use of ICT in teaching chemistry

2.1. Specialized add-ons to work with chemical information in MS Word text editor

Using a text editor MS Word in creation of chemical texts. Special chemical add-ons in MS Word (EquPixy, FX Chem, ChFormulas, Chemistry & Word).

2.2. Use if software tools for creation chemical images

Computer visualization of chemical information as didactic mean of activization of thinking pupils' activity. Computer graphics and its types (vector and raster). Special and no special graphics editors. Paint possibilities in creation of chemical images.

2.3. Modeling of chemical entities using specialized software

Modeling as an important method of learning in chemistry. Material and ideal models used in teaching chemistry. The concept of structurally and functionally similar chemical models. Iconic, graphical models and model concepts. The modeling process and its stages. Didactic possibilities of interactive computer models. Specialized in chemistry software ChemOffice and MDL ISIS / Draw and the possibility of their use for modeling the spatial molecule models.

2.4. Modeling of chemical processes in the open modular systems

Computer modeling of chemical processes with using of application software packages. Specialized software "Open Chemistry", "1C tutor. Chemistry », ChemLand, « Chemistry for all », "Collect molecule », Organic Reaction Animations, ChemOffice etc.

The concept of open modular systems (OMS). Modeling of chemical processes in the open modular systems. Types of the OMS modules: information, practice and control.

3. Organizational and methodological support of the use of ICT in teaching chemistry

3.1. Creating and processing video sequences demonstrating chemical processes

Instructional videos and didactic possibilities of its use in teaching chemistry. Software for creating and processing videos (Windows Movie Maker). The technique of using instructional video in teaching chemistry.

3.2. Virtual chemistry experiment: preparation and methods of use

The virtual chemistry experiment and its place in the educational system of chemical experiment. Types of virtual chemical experiment: a virtual demonstration and virtual labs. Classification of virtual laboratories according to the degree of their interactivity.

Software to support virtual chemical experiment. The problem of the combination of virtual and real chemical experiments.

3.3. Creating educational multimedia presentations for chemistry lessons

Computer presentations as a mean of teaching chemistry. Didactic possibilities of computer presentations for teaching chemistry.

Types of presentations according to the main didactic purposes: introductory, motivational, informative, summarizing, controlling. Computer presentations Editors Microsoft PowerPoint and Prezi.

3.4. Development of Internet projects in chemistry with the use of Web 2.0 services

The main types of educational Internet projects (electronic publications, information exchange, virtual visits, etc.).

Wiki technology and the possibility of its use in the creation of educational Internet projects in chemistry.

Organization of project learning chemistry on the basis of Web 2.0 services. Main Services Web 2.0: Google documents, multimedia presentations, blogs, virtual whiteboard, mental maps, the time tape, the server collective storing of computer tabs, word cloud (tag cloud).

3.5. Creating a professional community of teachers of chemistry in social networks

The classification of social networks in the context of their use by teachers of chemistry. A professionally oriented social network. Pedagogical community ("Open Class", "Network of creative teachers," "Metodisty.ru", "The Social Network of educators", "Dnevnik.ru"). Network Community of Belarusian teachers' Supolka".

Professional online communities of teachers of chemistry. Classification of chemical communities in the social network "VKontakte" according to their targets and electronic content.

3.6. The development and use of electronic teaching materials in chemistry

The concept of electronic teaching materials and the advantages of their use in teaching chemistry. Cognitive tasks in chemistry and their classification.

Web service LearningApps.org and its opportunities for the creation of electronic didactic materials in chemistry through the use of interactive applications.

3.7. The creation of electronic control materials in chemistry

Monitoring teaching materials of educational publications. Special features of the construction tasks in the test form. Using test systems tasks to control. Computer testing.

The software platform Moodle and the possibility of its use in a computer control of the results of teaching chemistry.

3.8. The use of electronic medias in teaching students to solve computational problems in chemistry

Methods of teaching students solving chemical problems using information technology. Using specialized computer software for calculations in solving chemical problems. Developing training with the electronic publication "Chemistry for all XXI – Problem Solving. Tutorial." Special Software for solving chemical problems – chemical calculators (BestChem etc.).

3.9. The use of the interactive whiteboard in chemistry classes

Place of an interactive whiteboard in the computer equipment of Chemistry cabinets. Organization of training with the use of an interactive whiteboard. Notes on the interactive whiteboard as a kind of demonstration. Equipment of the interactive whiteboard in the chemistry cabinet. Methodical requirements for notes on the interactive whiteboard.

3.10. Methods of use of electronic tools of teaching chemistry at lessons of various types

The requirements to a lesson of chemistry using ICT. Preparation of the teacher for the lesson with the use of electronic tools of teaching chemistry. Work on the content and structure of a certain lesson. Analysis of chemistry lesson with electronic tools of teaching. Ways to improve the chemistry lesson using information and communications technologies.

3.11. Methods of use of electronic tools of teaching chemistry in extra school activities

Types of extra school activities in chemistry. Planning extra school work using a computer. Methods of use of ICT in class work in chemistry. Computer game methods in teaching chemistry. Computer game as an activity, a way of organizing activities and teaching method. The value and functions of educational computer games. This program has been prepared for realization on the basis of the state educational adult institution "Vitebsk Regional Institute of Education Development".