**ГУ «Гимназия № 3 для одаренных детей города Павлодара»**

**ПРОГРАММА**

**спецкурса «химия на английском языке»**

**для учащихся 7- х  классов.**

**PROGRAMM**

**Special course "Сhemistry in English"**

**for pupils of 7th grades**

**Составитель**

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**Explanatory note**

The special course "chemistry in English" is intended for pupils of 7 classes.

The proposed program of this course of chemistry promotes the development of skills to use a foreign language for obtaining additional information from various areas of its functioning, forms a bilingual vocabulary on the subject, contributes to the education of the need to use foreign language as a means of deepening the subject knowledge, forms and develops communicative competence of students, intercultural competence and Culture of interethnic communication.

         The purpose of this course is to help students develop linguistic and communicative competences in the process of studying chemical terminology in English, memorize and apply the proposed terminology.

         For modern students it is especially important to know a foreign language, to use it for obtaining various information, including chemical information, from various sources: scientific literature, the media and especially Internet resources, since schoolchildren have widely used them in recent years. By the 7th grade their language training is sufficient to obtain chemical knowledge in chemistry in a foreign language. English was chosen as a foreign language in bilingual education. This is due, first, to his growing role in society, especially in the computer field, which is of great interest to the modern student. Currently, students with the purpose of communication, searching for the necessary information spend a lot of time on the Internet, including on foreign-language sites. Secondly, English is widely studied at school.

The course is designed for one lesson per week. Only 34 hours.

**Main part.** The course consists of four sections.  
 **The first section is "Chemistry at the Center of Natural Science"**solves the following tasks:  
- allows to actualize the chemical knowledge of students obtained in the lessons of natural history, biology, geography, physics, which reduces the psychological burden on students with the advent of a new subject.  
- contributes to the formation of the integrating role of chemistry in the system of natural sciences, the importance of this subject for the successful development of natural science disciplines in English.  
 **The second section - "Substances and their transformations"**solves the following tasks:  
- complements students' knowledge of simple and complex substances, physical and chemical phenomena;  
-helps the development of chemical terminology in English  
     **The third section is "Chemistry + Mathematics"**  
solves the following tasks:  
- Calculation of relative atomic and molecular masses.  
- determination of the relative atomic mass of chemical elements according to the table of DI Mendeleyev.  
- finding the relative molecular mass from the formula of the substance as the sum of the relative atomic masses.  
- mass fraction of an element in a complex substance. The concept of the mass fraction of a chemical element (w) in a complex substance and its calculation by the formula of a substance.  
-calculation of the mass of the solute by the weight of the solution and the mass fraction of the dissolved substance.  
**The fourth section - "Scientists Chemists"**  
-formation of scientific ideas about chemists, an amazing world of chemistry, discoveries, reactions and substances,  
-helps to master chemical terminology on this topic in English.  
- improve the ability to work with information.

**Contents of the course program.**

**Section I. Chemistry at the center of natural science (11 hours).**

Chemistry as a part of natural science. The subject of chemistry. Chemistry is part of the natural sciences. The relationship between man and the world. The subject of chemistry. Physical bodies and substances. Properties of substances. The use of substances on the basis of their properties. Observation and experimentation as methods for studying the natural sciences and the chemistry of the surrounding world. Observation conditions. Experiment. Conclusion. Study of chemical terminology on this topic in English.

*Laboratory and equipment*. Model, modeling. Chemical models: object models (models of atom, molecules, chemical and industrial productions), symbolic, or symbolic (symbols of elements, formulas of substances, reaction equations).

Chemical signs and formulas. Chemical element. Chemical signs. Their designation, pronunciation. Chemical formulas of substances.

Simple and complex substances. Indices and Coefficients. Qualitative and quantitative composition of matter. Study of chemical terminology on this topic in English. *Chemistry and Physics*. The concepts of "atom", "molecule", ion. " The structure of matter. Crystalline state of matter. Substances of molecular and non-molecular structure. Aggregate states of substances. Understanding of the aggregate state of matter. Physical and chemical phenomena. Gaseous, liquid and solid substances. Amorphous substances.

*Chemistry and geography* ("Earth structure: core, mantle, bark, lithosphere, minerals and rocks, magmatic and sedimentary (inorganic and organic, including combustible) rocks." *Chemistry and Biology* The chemical composition of a living cell: inorganic (water and mineral salts) and organic substances (proteins, fats, carbohydrates, vitamins) substances Qualitative reactions in chemistry Qualitative reactions Recognition of substances by means of qualitative reactions The substance to be determined and its reagent. Learn the chemical terminology on the subject in English.

Demonstrations

• A collection of various objects or photographs of objects from aluminum to illustrate the idea of ​​"property application".

• Physical and chemical models of atoms, molecules of substances and crystal lattices.

• Volumetric and spherical models of water, carbon dioxide and sulfur dioxide.

• Samples of solids of crystalline structure.

• Water in three aggregate states.

• A collection of minerals (lapis lazuli, corundum, chalcopyrite, fluorite, halite).

• A collection of rocks (granite, various forms of calcite - chalk, marble, limestone).

• A collection of fossil fuels (oil, coal, slates,)

Demonstration experiments.

• Scientific observation and its description. Study of the structure of the flame.

• Qualitative reaction to oxygen. A qualitative reaction to carbon dioxide.

*Laboratory experiments*.

• Spread the smell of cologne, perfume or deodorant as a diffusion process.

• Detection of starch in wheat flour.

• Interaction of ascorbic acid with iodine (determination of vitamin C in various juices

*Home Experiences:*

• Production of models of molecules of chemical substances from plasticine.

• Diffusion of sugar in water.

• Detection of starch in food; apples

*Practical work No.1.* Familiarity with laboratory equipment. Safety regulations.

**Section II. Substances and their transformations (11 hours).**

Study of chemical terminology on this topic in English.

Pure substances and mixtures. Pure substances. Mixtures. Heterogeneous and homogeneous mixtures. Gaseous (air, natural gas), liquid (oil), solid mixtures (rocks, culinary mixtures and synthetic detergents).

Separation of mixtures. Methods for separation of mixtures and purification of substances. Some of the simplest methods of separation of mixtures: sieving, separation of mixtures of iron and sulfur powders, settling, separation by means of a separatory funnel, filtration.

 Filtering in the laboratory, everyday life and pa production. The concept of filtrate. Adsorption. The concept of adsorption and adsorbents. Activated charcoal as the most important adsorbent.

Distillation, or distillation. Distillation (distillation) as the process of separating a substance from a liquid mixture. Crystallization or evaporation.

Crystallization and evaporation in the laboratory (crystallizers and porcelain cups for evaporation) and nature. Chemical reactions. Conditions for the flow and termination of chemical reactions. Chemical reactions as a process of transformation of some substances into others. Contact of substances, heating. Catalyst. Inhibitor. Signs of chemical reactions: discoloration, sedimentation, dissolution of the resulting precipitate, gas evolution, odor generation, evolution or absorption of heat.

*Demonstrations:*

• Collection "Oil and oil products".

*Demonstration experiments*

• Separation of a mixture of sulfur powder and iron filings.

• Separation of a mixture of sulfur powder and sand.

• Separation of a mixture of water and vegetable oil using a separatory funnel.

*Laboratory experiments*

• Adsorption of odorous substances by cornsticks.

*Home Experiences*

• Separation of a mixture of milk powder and river sand.

• Sedimentation of the powder suspension for cleaning dishes in water and its decantation.

• Adsorption with activated charcoal of pepsi-cola colorants.

• Dissolution of Aspirin USBA tablet in water. "

*Practical work number 2.* The growth of salt crystals (home experiment).

*Practical work number 3.* Cleaning of table salt.

*Practical work 4.* Studying the process of corrosion of iron (home Experiment).

**Section III. Chemistry + mathematics (9 hours).**

Study of chemical terminology on this topic in English. Relative atomic and molecular masses. Relative atomic mass of the element. Molecular mass. Determination of the relative atomic mass of chemical elements according to the table of DI Mendeleyev. Finding the relative molecular weight from the formula of the substance as the sum of the relative atomic masses that make up the substance of the chemical elements. Mass fraction of an element in a complex substance. The concept of the mass fraction of a chemical element (w) in a complex substance and its calculation by the formula of a substance.

Composition of atmospheric air and natural gas. Mass fraction of substance in solution. Solvent and solute. Calculation of the mass of the solute by the weight of the solution and the mass fraction of the dissolved substance. The concept of pure matter and impurities. Mass fraction of the impurity (w) in the sample of the starting material. The main substance.

Demonstrations.

• A collection of different types of marble and products from it.

• A mixture of river and granulated sugar and their separation.

• Collection of oil and oil products.

• Diagram of atmospheric air composition. The diagram of the composition of natural gas.

• Collection "Minerals and rocks" (samples of substances and materials containing a certain proportion of impurities)

Practical work number 5. Preparation of a solution with a given mass fraction of a dissolved substance.

**Section IV. Stories in chemistry (3 hours). Student Conference**

- "Outstanding scientists-chemists". On the life and work of M.V. Lomonosov, D. I. Mendeleyev, A. Butlerov, domestic and foreign scientists (at the choice of students).

-Contact of students' messages.

"My favorite chemical." On the discovery, receipt and significance of the selected chemical.

- Competition of student projects (dedicated to the study of chemical reactions.)

**As a result of studying the sections of the course, the students of grade 7**

**learn to:**

-Write symbols of elements and pronounce them in English

- Characterize the properties of matter;

-define the qualitative and quantitative composition of the substance;

-define the home address of the element by the PCA;

-modify binary compounds and give them names in English;

-determine chemical phenomena and physical phenomena;

- to make a molecular scheme of transformation;

- to define transformations;

- plan and conduct chemical research;

- use reagents and laboratory utensils in accordance with their purpose and properties described in the instructions for use (in English);

- to observe demonstrated and independently conducted experiments, chemical reactions taking place in nature and in everyday life;

- observe the rules of TB when working with chemicals. substances.

Students will have the opportunity to learn:

-basis of reflexive reading of chemical literature in 2 languages;

- put the problem, argue its relevance;

- Under the guidance of the teacher to conduct observations and studies of chemical processes, put chemical experiments, explain the stages of their actions, the causes and purpose of their actions;

- Promote hypotheses and organize research to test hypotheses;

- rules of work in the study of chemistry, chemical instruments and tools;

**Bibliography:**

*Recommended literature for teachers:*

1. Aleksinsky V.N. "Entertaining experiments in chemistry": A book for teachers. - 2 nd ed., Rev. - Moscow: Education, 1995.

2. Alikberova L.Yu. "Entertaining Chemistry": A book for students, teachers and parents. - Moscow: AST-PRESS, 1999.

3. Demonstration experiments on general and inorganic chemistry: Proc. A manual for university students (BD Stepan, L.Yu. Alikberova, I. S. Rukk, E. Savinkina .- M .: VLADOS, 2003.)

4. Lebedev O.E. The role of elective courses in creating a new generation of teaching materials / http://www.college.ru/. (11.11.11)

5. https://kahoot.com

6. http://periodicvideos.com

7. http://www.triventy.com

8. <https://www.plickers.com>

*Recommended literature for students:*

1. Funny chemistry (D. Shkurko .- M.: VLADOS, 1996).

2. Chemistry in leisure hours (YS Lyalikov.-Kishinev .: Shtiintsa, 1998.)

3. E.Grosse, H. Weismannel, "Chemistry for the Curious" .- Moscow: Chemistry, 1985-392 with B.D. Stepin, L.Yu. Alikberova "Entertaining tasks and effective experiments in chemistry." - M .: DROFA, 2008 - 210

4. <http://periodicvideos.com>

**Approximate Thematic Planning**

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| --- | --- | --- | --- | --- |
| **№** | **Name of section/**  **Lesson Topic** | **Hours** | **Timing** | **Нomework** |
|  | **Chemistry at the center of natural science** | **11** |  |  |
| 1 | Chemistry subject | 1 |  |  |
| 2 | Observation and experimentation as methods for studying the natural sciences and the chemistry of the surrounding world. | 1 |  |  |
| 3 | *Practical work number 1*.Leisure with laboratory equipment | 1 |  |  |
| 4 | Chemical signs and formulas | 1 |  |  |
| 5-6 | Designation, pronunciation of chemical symbols. Chemical formulas of substances. | 2 |  |  |
| 7 | Chemistry and Geography | 1 |  |  |
| 8 | Chemistry and Physics | 1 |  |  |
| 9 | Chemistry and biology. | 1 |  |  |
| 10-11 | Qualitative reactions in chemistry. Recognizing substances using | 2 |  |  |
|  | **Substances and their transformations** | **11** |  |  |
| 12 | Pure substances and mixtures | 1 |  |  |
| 13 | Separation of mixtures. Methods for separation of mixtures and purification of substances | 1 |  |  |
| 14 | Filtration. Understanding of the filtrate | 1 |  |  |
| 15 | Adsorption. The concept of adsorption and adsorbents | 1 |  |  |
| 16 | Distillation, or distillation | 1 |  |  |
| 17 | Crystallization or evaporation | 1 |  |  |
| 18 | Chemical reactions and conditions of their course. | 1 |  |  |
| 19 | Catalyst. Inhibitor | 1 |  |  |
| 20-21 | Signs of chemical reactions | 2 |  |  |
| 22 | *Practical work number 3*. « Cleaning of table salt.» | 1 |  |  |
|  | **Chemistry + Mathematics** | **9** |  |  |
| 23 | Relative atomic mass | 1 |  |  |
| 24 | Molecular mass. | 1 |  |  |
| 25 | The determination of the relative molecular weight by the formula of the substance | 1 |  |  |
| 26 | The notion of mass share | 1 |  |  |
| 27 | Mass fraction of an element in a complex substance | 1 |  |  |
| 28 | Calculation of the mass fraction by the formula | 1 |  |  |
| 29 | Mass fraction of substance in solution. | 1 |  |  |
| 30 | Mass fraction of impurity (w) | 1 |  |  |
| 31 | *Practical work* №4 «Preparation of a solution with a given mass fraction of a solute" | 1 |  |  |
|  | **Stories in Chemistry** | **3** |  |  |
| 32 | "Outstanding scientists-chemists." | 1 |  |  |
| 33 | "My favorite chemical." | 1 |  |  |
| 34 | Competition of student projects | 1 |  |  |