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Use of Didactic Games in Teaching Chemistry

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Abstract: *This article deals with the materials about the use of didactic games during the chemistry.*

Keywords: *chemistry, didactic games, "positives and negatives", "extra the third", "the third is needed", "chemical pyramid", "chemical chainword", "numbers with games", "chemical rebus".*

INTRODUCTION

Didactic games are tasks used to acquire knowledge by creating a game situation in order to solve learning problems when teaching a subject. They strengthen the logical thinking and resourcefulness of schoolchildren and students, increase their interest in science and news. It is known that such games are effective in teaching chemistry[1].

Unfortunately, chemistry teachers in most general education schools do not know how to create scenarios for such games and put them into practice. Therefore, the proposed didactic games are designed to teach a general education course in chemistry, and the main purpose of their use is to show students' talent, interest, knowledge and self-awareness, creativity and logical thinking, the formation of a culture of collective creativity and communication.

In this article, we present several examples of didactic games that can be used in teaching chemistry**.**

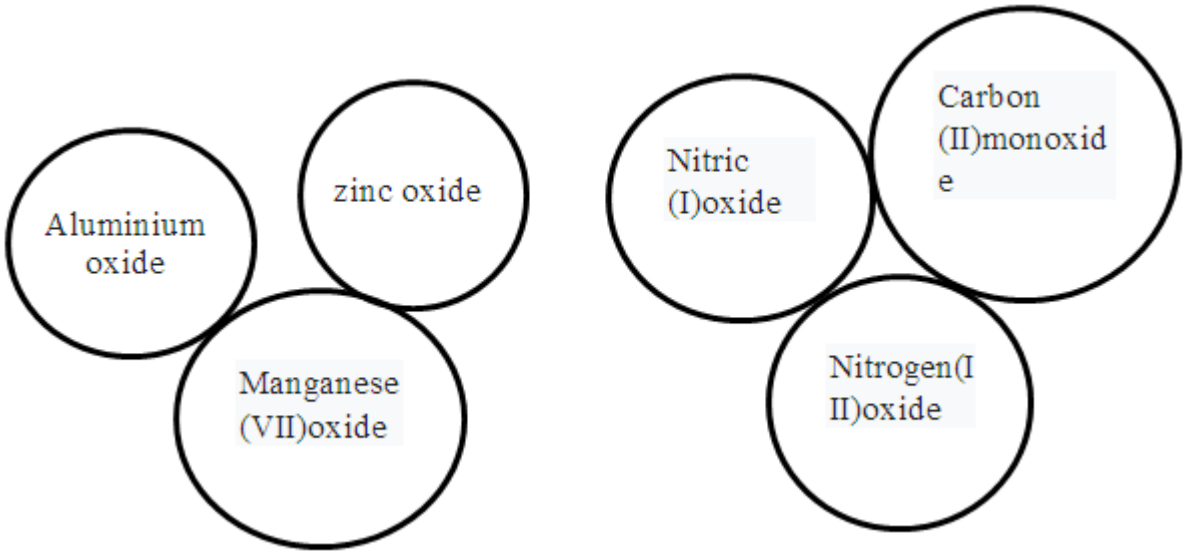
"Pros and cons" Students are offered options with names and series of substances and are invited to write formulas of substances and mark which substances in these options with a "+" sign and which ones with a "-" sign and explain why they did so. The student with the fastest and correct answer will be declared the winner. For example,1) Of the following substances, designate basic oxides with a "+" sign, and acid oxides with a "-" sign and write the formulas corresponding to them:

a) nitrogen (III) oxide; calcium oxide; chromium (VI)-oxide; b) manganese (VI) oxide; magnesium oxide; manganese (VII)-oxide; c) sodium oxide; copper (I)-oxide; sulfur oxide (VI); d) (V)-phosphorus oxide; nitrogen (V)-oxide; potassium oxide; e) iron (III) oxide; iron(II) oxide; nitrogen (III)-oxide; f) barium oxide; sulfur oxide (IV); copper(II) oxide.

Answers: a) -N_2O_3; +CaO; -CrO_3; (the first and third substances are acidic, and the second substance is a basic oxide); b) – MnO_3; + MgO; -Mn_2O_7; (the first and third substances are acidic, and the second substance is a basic oxide); c) +Na_2O; +Cu_2O; -SO_3; (the first and second of these substances are basic oxides, and the third substance is an acidic oxide); d) –P_2O_5; - N_2O_5; +K_2O; (if the first and second substances are acidic oxides, then the third substance is the basic oxide);

f) +Fe_2O_3; +FeO; -N_2O_3; (the first and second substances are basic, and the third is an acidic oxide); e) +BaO; -SO_2; + CuO; (barium and copper oxides are basic oxides, while sulfur(IV) oxide is an acidic oxide.

Third Plus. Students are given triple rings with the names of three different substances. For example,



They will have to put a “+” sign, “foreign”, i.e. "excess" and "-" for analogues of substances in these triplets and write the corresponding formulas of substances. The student with the fastest and correct answer will be declared the winner. For example,1) aluminum oxide; zinc oxide; manganese (VII)-oxide; 2) nitrogen (I)-oxide; carbon (II)-oxide; nitrogen (III)-oxide; 3) sulfuric acid; orthophosphoric acid; Hydrochloric acid; 4) chromium (III) oxide; manganese (VI)-oxide; manganese (VII)-oxide; 5) iron (III) hydroxide; aluminum hydroxide; zinc hydroxide; 6) sodium bicarbonate; calcium bicarbonate; potassium dihydrogen phosphate; 7) copper (I) oxide; sulfur oxide (VI); carbon (IV)-oxide; 8) phosphorus (V)-oxide; nitrogen (V)-oxide; potassium oxide; 9) iron (III) oxide; iron(II) oxide; nitrogen (III)-oxide; 10) barium oxide; sulfur oxide (IV); copper(II) oxide.

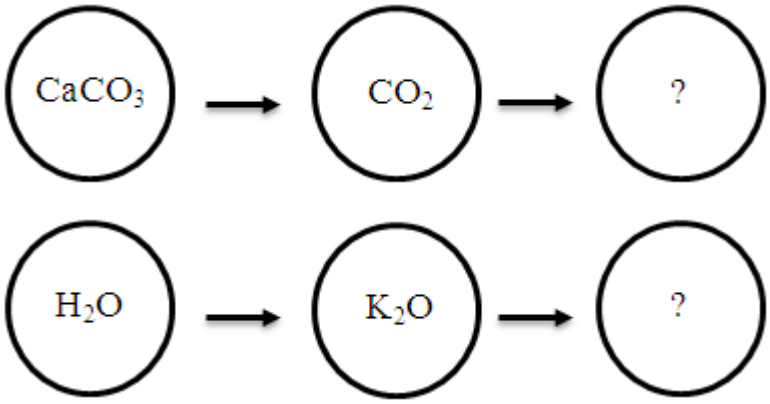
Answers:

1) +Al_2O_3; +ZnO; -Mn_2O_7; (aluminum and zinc oxides are amphoteric oxides, manganese (VII) oxide is an acidic oxide);
2) +N_2O; + CO; -N_2O_3; (nitrogen (I)-oxide and carbon (II)-oxide - neutral oxides; nitrogen (III)-oxide - acidic oxide);
3) +H_2SO_4; +H_3PO_4; -HF; (sulfate and orthophosphate acids are oxygen-containing acids; uric acid is an oxygen-free acid);
4) -Cr_2O_3; +MnO_3; +Mn_2O_7; (chromium (III) oxide is a basic oxide, while manganese (VI) oxide and manganese (VII) oxide are acidic oxides);
5) -$Fe(OH)_3$; +$Al(OH)_3$; +$Zn(OH)_2$; (iron (III) hydroxide - basic oxide, aluminum and zinc hydroxides - amphoteric);
6) +$NaHCO_3$; +$Ca(HCO_3)_2$; -X_2PO_4; (the first and second of them are monohydrogen salts, and the third is a dihydrogen salt);
7) -Cu_2O; +SO_3; +CO_2; (the first of them is the basic oxide, the second and third are acid oxides);
8) +P_2O_5; +N_2O_5; -K_2O; (if the first and second substances are acidic oxides, then the third substance is the basic oxide);
9) +Fe_2O_3; +FeO; -N_2O_3; (iron oxides are basic oxides; (III)-nitric oxide is an acidic oxide);
10) +BaO; -SO_3; + CuO; (barium and copper oxides are basic oxides, and sulfur (VI) oxide is an acidic oxide).

"The third must be found" Students are given three adjacent circles. Two of them contain formulas, and the third contains a question mark. Students answer by thinking logically and writing

down the formula of the substance that will react or be released as a result of the reaction in the third circle.

For example,



1) $CaCO_3$, (?) , CO_2 ; 2) K_2O , H_2O , (?) ; 3) P_2O_5 , $3H_2O$, (?) ;

4) $+OH)_2$, (?) , H_2O ; 5) N_2O_3 , H_2O , (?) ; 6) $2Al(OH)_3$; Al_2O_3 ; (?).

Answers:1) $CaCO_3$ $CaO+CO_2$; 2) $K_2O + H_2O$ $2KOH$;

3) $P_2O_5 + 3H_2O$ $2H_3PO_4$; 4) $Cu(OH)_2$ t $CuO +H_2O$;

5) $N_2O_3 + H_2O$ $2HNO_2$; 6) $2Al(OH)_3$ t $Al_2O_3+3H_2O$;

"Chemical Pyramid". This game is based on the observation of students based on the knowledge gained. The task at hand requires a search for an answer by summarizing such aspects as composition, structure, properties, classification, methods of preparation, distribution in nature and the use of substances.

For example, in one of the following pyramids there are tasks related to the solubility of substances in water, in the second - with the classification of inorganic substances, and in the third - with the distribution (meeting) of chemical elements on the Earth's surface (lithosphere, hydrosphere and atmosphere). Based on the available knowledge, it is necessary to “walk” from the base of the pyramid to its top “step by step” through the neighboring (adjacent) cells [2].

For example, "Pyramid associated with the solubility of oxides, bases, acids and salts in water." Through the soluble substances (potassium oxide, calcium oxide, sodium oxide) of the row at the base of this pyramid, he "climbs" to the second row (step). He "climbs" to the third row (stairs) through the sodium bicarbonate (sodium bicarbonate) soluble there. At the same time, the 4th and 5th rows (stairs) “rise”, that is, the pyramid submits:

Pyramid-1:

NaOH

HNO_3 H_2SiO_3

KOH $Cu(OH)_2$ $Al(OH)_3$

$BaSO_4$ $NaHCO_3$ $MgCO_3$ $CaCO_3$

CuO PbO_2 Na_2O CaO K_2O

Pyramid-2:

H_2SO_4

$Al(OH)_3$ HNO_3

$BaSO_4$ $MgCO_3$ HNO_2

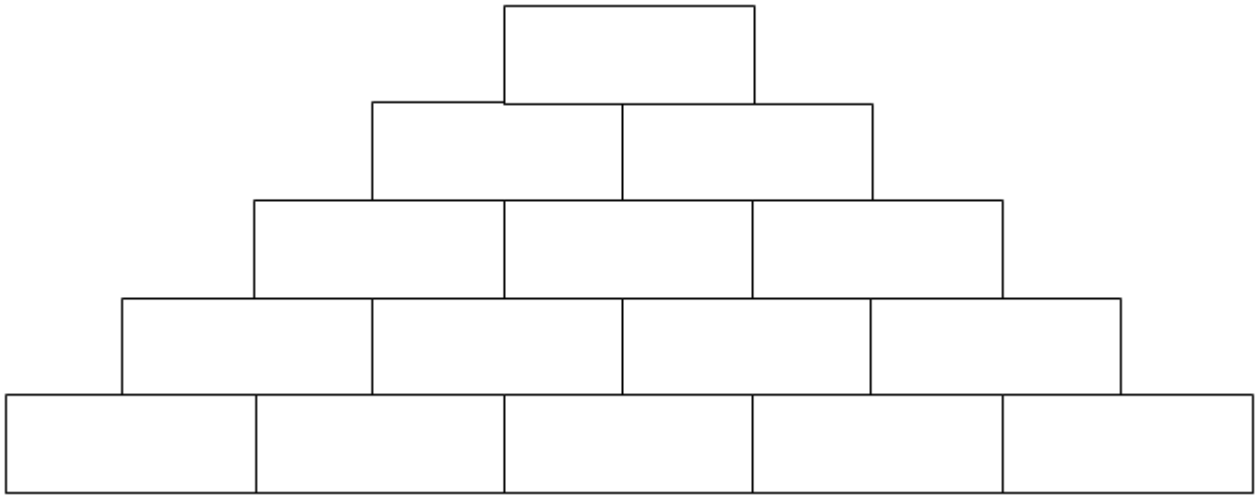
NaOH KOH CuOH HF

KCl $LiCl$ $NaNO_3$ $CuSO_4$ H_2SiO_3

BeO CaO BaO Cr_2O_3 H_3PO_4 $Ni(NO_3)_2$

Answer: In this pyramid, a task was given on the classification of inorganic compounds, and in order to “get out” of its base to the top, it is necessary to use representatives of acids. Selected phosphoric acid in the bottom row. From the rows above, silicic acid, fluoric acid, nitric acid, and nitric acid "gradually pass" into sulfuric acid.

Below is the "skeleton" for the pyramids. Formulas of substances are written in its cells and distributed to students.



"Chemical puzzle". In this game, you find substances that interact or form as a result of a reaction and write their formulas instead of question marks. For example, in the following rebus, it is necessary to select substances corresponding to the serial number of question marks, and write their formulas in the appropriate places:

Task: Instead of a question mark (?), write the formulas of the corresponding substances.

Answers: a) substances: 1.NaOH; 2.NaCl; 3.CaO; 4.$Ca(NO_3)_2$; 5.$Cu(OH)_2$; 6.Na; 7.H_2; 8.H_2SO_4; 9.Na_2SO_4; 10.$CaSO_4$; 11.H_2O; 12.O_2.

б) reaction equations:

$CaCl_2+2NaOH \longrightarrow Ca(OH)_2+2NaCl$

$2NaOH+CuCl_2 \longrightarrow 2NaCl+Cu(OH)_2 \downarrow$

$Ca(OH)_2\,(t) \longrightarrow CaO+H_2O$

$CaO+2HN \longrightarrow Ca(NO_3)_2+H_2O$

$2H_2O+2Na \longrightarrow 2NaOH+H_2$

$2NaCl+H_2SO_4 \longrightarrow Na_2SO_4+2HCl$

$H_2SO_4+CaCO_3 \longrightarrow CaCl_2+CO_2+H_2O$

$2H_2O$ D.C. $\longrightarrow 2H_2+O_2$ [3].

In the process of performing such creative tasks, it is possible to achieve educational goals for consolidating the acquired knowledge, their systematization and use in practice. The fullest use of their capabilities is an urgent pedagogical task.

In conclusion, it should be noted that the role and significance of these didactic games are incomparable in raising students' interest and desire for science, which is one of the most important problems of the modern process of chemical education, in cultivating a sense of self-confidence in independent work.

List of references:

1. Pak M.S. Didactics of chemistry. – Moscow: Vlados, 2004. - p.315
2. Manolov K. Great chemists. -T.2. -Moscow: Mir, 1985. -p.p.134-165.
3. Gabrielyan O.S., Lysova G.G. Chemistry. Grade 11. Textbook for educational institutions. – Moscow: Drofa, 2005. - p.363.