

TO THE SUBJECTS TAUGHT IN GENERAL SECONDARY SCHOOLS CLASSIFICATION OF APPLIED GRAPHIC IMAGE TYPES

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SUMMARY

The article examines the application of the above classification of types of images by teachers of general education schools in the natural and independent application of the above classification of images under the guidance of a drawing teacher.

Key words: *Graphic images, classification, planar contour image, graph, diagram, projection, complex drawing, perspective image.*

Demonstrative education in the system of didactic principles of education is one of the main means of quality assurance. That is why every science teacher is educated in his pedagogical activity

as one of the important factors in improving quality and efficiency

uses visual aids. Visual aids, objects, posters, various images, maps and diagrams brought to the lesson increase the didactic potential of education and help students

creates a conducive environment for them to fully understand the lesson topic.

After all, visual aids help students to understand the material being taught, and make it easier for the teacher to explain the material. Importantly, visual aids activate the learning process, increase students' interest in science, the teacher-student relationship increases the level of awareness, the quality of education as a result of increasing the level of awareness of the process of mastering teaching materials directly related to the subject.

Images used in lessons taught in school are usually included in the category of graphic images. Because pen, ink, dream and chalk

Line, barcode and dot images performed using are called graphic images.

School education involves introducing students to graphic images of different statuses. Such images are taught to students not only in drawing lessons, but also in mathematics, physics, geometry, technology, chemistry, geography, computer science and other subjects.

materials. For example, in geometry classes, mainly flat-planimetric images, in algebra classes, various graphs, diagrams in the Cartesian coordinate system at right angles, diagrams and schematic drawings in physics lessons and axonometric images -

images of curved angular frontal dimetry and right-angled isometry occur. In addition, there are diagrams, stereometric images, tables, and images consisting of a single projection of an object. In chemistry classes, mainly diagrams and schematic drawings

occupied many places. These account for 26.5% of all images.

Slightly less of them - various items (flasks, jars, various tools)

perspective images. In the context of some disciplines, there are also images (with clippings) with a single projection of the object. Following them, following the rules of the state standard in drawing will help students to strengthen their knowledge of drawing and increase their level of graphic literacy, as well as a deeper understanding of the educational purpose assigned to them as graphic images based on certain laws. Therefore,

the analysis of graphic images in the content of subjects taught in general secondary schools and the development and classification of their pedagogical classification are of great pedagogical importance.

Analyses have shown that drawing-related images are used in computer science classes. The images encountered consist mainly of flat planimetric images, schematics, and stereometric images.

Perspective drawings with tables and photographs are also used. So, a computer science teacher is aware of image types

should be. To do this, it is advisable for the computer science teacher to work with the drawing teacher based on the educational opportunity. Geography lessons also use images that are common in drawing. A science teacher needs to know some of the rules that are studied in drawing so that they can read, understand, and follow them correctly. Images used: graphics, diagrams, location maps, single-plane projection of the object, perspective image, diagram, table and photo images. To read and do these, you need to know the standard rules that the teacher needs - formats, scales, line types, views, clippings, sizing, choosing the right main view. In other words, it is necessary to have sufficient knowledge of the laws of relation to drawing, theoretical foundations, educational and practical mechanisms. Almost all types of images used in school education are widely used in technology classes. Since the technology teacher has mastered the sciences of drawing and descriptive geometry during his professional training, there are no difficulties in understanding and performing the types of images. These are: single-plane projection of the detail, sketch of the detail and its desired cuts, clear images of the detail - isometry or frontal dimetry, technical drawing, perspective drawing, technological map, assembly drawing, etc. These images have a positive effect on teaching while the technology science teacher collaborates with the drawing teacher as an expert to explain them more clearly to the students. Graphic images, as noted above, are widely used in a number of academic subjects in school education. In order to calculate the graphic images used in some subjects in grades 8-9, to determine their types and quantities, seven of the main subjects taught - geometry, algebra, physics, chemistry, computer science, geography and technology.

Table 1.1

The use of graphic images in textbooks for some subjects taught in grades 8-9

№	Types of science	The number of graphic images	
		8th grade	9th grade
1.	Geometry	245 та	453 та
2.	Algebra	118 та	124 та
3.	Physics	295 та	192 та
4.	Chemistry	145 та	110 та
5.	Informatics	160 та	145 та
6.	Geography	170 та	74 та
7.	Technology	116 та	107 та

As can be seen from the table, about 2,500 graphic images are used in the content of these academic disciplines. Therefore, it is necessary to classify them based on their form, content and educational functions.

Classification is derived from the French word "classification", which means the classification of an object (in our example, graphic images) according to its property, feature, function, or other parameters. It also means classification (lat. Classis - category and facio - I will be). Hence, due to the widespread use of graphic types of images in the content of concrete and natural sciences taught in general secondary schools, it is important pedagogical to classify them in order for teachers of these subjects to have a more complete knowledge of image types. The analysis of textbooks classifying according to the types of graphic images in general secondary schools results as follows

gave.

1. Flat planimetric image (planimetric - Latin planum flat surface). A plane image of various flat geometric shapes was defined as a planimetric image. It is used as an illustrative material in the study of the properties of shapes and in solving problems related to shapes and the relationship between other geometric elements in the plane. Such images are increasingly used in geometry and algebra. Flat planimetric images, with their simple depiction, do not evoke feelings of artificial tension and boredom in students. This, in turn, makes it easier for teachers of drawing, geometry, and other subjects to assimilate graphic competencies, allowing students to achieve positive results.

2. Graphic (German Graphik <Greek graphikos - drawing). Used to show the quantitative dependencies of different events

The graph is called a graph. Such graphs are also used in the study of any process associated with the mastery of the learning material. Graphs in this sense are common to all sciences. But more often they are used in textbooks of algebra, physics and partly in computer science and geography. Hence, a drawing teacher is required to be more careful in giving teachers of algebra, physics, computer science, and geography an understanding of the type of graphic representation.

3. Diagram (fr. Diagramme, nem. Diagramm <Greek diagramm - a picture, a drawing. An image representing the ratios of some sizes (units)). An image showing the division of a particular quantity into components. Such an image is found mainly in the sciences of geography, chemistry, and partly in computer science. The diagram is given in the form of a specific table in chemistry textbooks, in the form of quantitative growth of numbers in geography textbooks, in the form of a single projection in the plane in computer science textbooks. The drawing teacher should pay attention to the specific aspects of the diagram depiction aspects in the understanding of other science teachers and students.

4. Table. Some information can be placed in a column or row. The multiplication table, gear parameters, etc. are examples of this. Such tables are common in almost all disciplines. Including in algebra - a table of changes in any function

method. Similar changes are observed in physics, chemistry and others in the sciences can be shown in tabular form. The table is a specific image type orderly placement of the given information and "aesthetic" serves to raise the level.

5. A single projection of the object in the plane (with a cut).

The image of the view of a dimensional object from one side will be a single projection in a single plane. It is sometimes depicted with a cut in order to show its internal appearance, or the piece is conditionally is considered transparent. Taking advantage of such an opportunity of a graphic image is an object for the reader, about the learning material being mastered

allows for a broader perspective.

6. A complex drawing (with a cut) consisting of 2 or 3 views (projections) of the object. When the three-dimensional view of an object is depicted in a single plane according to the rule of placing the visible views on both sides, a complex drawing consisting of two views of the object is formed. Shears are also provided if necessary.

It is well known that based on the principle of teaching from simple to complex, depicting an object first with 2 views, then with 3 views and a complex drawing with a cut plays an important role in expanding the scope of imagination for students. In turn, for the teachers themselves creates specific conveniences.

7. Sketch of the item with a cut (sketch fr. Esquisse, lat. Schedium - the first draft). One, two or three projections of the object are drawn by hand and eye, regardless of size and scale.

is called a sketch of the item. This graphical method is used by a number of science teachers as an additional tool to supplement and clarify the description of the teaching material.

8. Assembly drawing of the assembly unit (with shear). A drawing that contains all the information needed to assemble an assembly unit is called an assembly assembly. With the complexity of this type of image, it can present specific challenges to other science teachers. But if teachers of other subjects do not allow delays in pedagogical cooperation with the teacher of drawing, a single graphic order will have a positive effect on the mastery of this complex enumerated element by students.

9. Rectangular isometric projection. A type of right-angled axonometric projections. In this case, the angles between the axonometric axes are equal to and equal to 120° , and the coefficients of distortion along the axes are also equal to each other, in the given case $X_k = Y_k = Z_k = 1$. Here X, Y, Z are the coordinate axes, and the model (detail) is obtained in its natural size when projected on these axes. Students will gain an understanding of this type of image, mainly in drawing lessons. In order to create a unified graphic environment, it is advisable for the drawing teacher to give teachers of the exact and natural sciences an initial understanding of this type of image.

10. Frontal dimetric projection with a curved angle (frontal - fr. Frontal - straight, from the front). Curved angle is a type of axonometric projection, the angles between the axonometric axes are as follows:

$XOZ = 90^\circ$, $XOY = \text{SUMMER} = 135^\circ$, $X_k = Z_k = 1$, $Y_k = 0.5$. Here X, Y, Z are coordinate axes, and the model (detail) is obtained in its natural size when projected on these axes. But the Y axis is projected to be twice its natural size. In the science of drawing, the frontal dimetric projection with a curved angle plays a special role in revealing the nature of the detail. Drawing is one of the most important activities of a teacher in providing students and teachers of other subjects with an understanding of this type of graphic representation.

11. Perspective image (perspective - fr., German. Perspective, lat. Perspectiva - distance perceived by the eye). The science of perspective is based on the rules of central projection. In this case, the object is described as it looks to the human eye. This type of image is widely used in general secondary education subjects. Like teachers of drawing or fine arts, it is important that teachers of science and natural sciences have an understanding of perspective types of images in the formation of a graphic environment in school.

12. Technical drawing. In order to make it easier to read different drawings, an axonometric image drawn without drawing tools, quickly drawing the shape of a newly invented object by hand and maintaining the proportions of the object, is called a technical drawing. Technical drawing is of particular importance in

developing students' graphic knowledge and increasing their spatial imagination. The model (detail) made in the technical drawing is "alive" in the eyes of the reader.

When decorating a detail in a technical drawing (barcode, shrafirovka, tushevka)

When the techniques are used in place, the image is aesthetically perfect output is achieved.

13. Photo image. An image created by the method of photography. This type of image is certainly not mastered in general secondary schools.

However, the images provided by the photo image increase the level along with the interesting depiction of the materials. This type of teachers

and given that students encounter many in daily life

a specific verbal understanding is given.

14. Topographic image (topography; Greek topos - place). Image of the earth's surface (projections denoted by numbers). Geography teachers, like drawing teachers, were familiar with this type of image, albeit briefly during their student years. When a geography teacher assists a drawing teacher in explaining the practical importance of a topographic image to explicit and natural science teachers,

has a positive effect on the formation of the graphical environment.

15. Location map (about geographical, political, land resources, etc.). Administrative - territorial, geographical, land resources, political, etc. maps. This type of image is very common in people's daily lives. With this in mind, non-specialist teachers will also have a basic understanding. If students have a basic understanding of geographic maps and their symbols in Grade 5, come to Grades 8-9.

17. Schemes. The components of an object, their relative positions and interrelationships are conditional - using graphic images

the specified design documents are called schematics.

In everyday life, this type of image is more common in boys than in girls. For example, production machines, home appliances

(TV, radio, cell phones, various vacuum cleaners, etc.)

The parts will be composed of different schemes. Types of these schemes

(kinematic, hydraulic, pneumatic) in drawing on paper

based on the knowledge gained.

18. Stereometric clear image. An image made according to the rules of isometric or frontal dimetric projection on axes in an arbitrary direction that facilitates the understanding of the problem condition. An analysis of 8th grade textbooks revealed that this type of image is used in physics, chemistry, and computer science textbooks, and in 9th grade geometry, algebra, physics, and technology textbooks.

Hence, it is advisable for these science teachers to be aware of the stereometric clear image type.

19. Drawings in the Cartesian coordinate system at right angles. In geometry, it is accepted to determine the position of any point and figure in space with respect to a system of three coordinate planes perpendicular to each other. This method is called the Cartesian coordinate system because it was invented by the French mathematician and philosopher Rene Descartes (1596-1650). In this system, the position of a point in space is determined by its x, y, and z coordinates. For example, in the science of drawing, when creating parabola, hyperbola, and similar images studied as local curves, their characteristic points are determined in a system of coordinate planes, and the drawings have a specific "value".

20. Different images. Images other than those listed above. From the analysis of the types and quantities of drawings used in the teaching of various subjects, it became clear that they provide for the widespread use of drawings used in drawing. Their main ones are planimetric drawings of flat shapes, one-plane projection of the object, two- and three-plane projections depending on the shape of the object, sketch or drawing, axonometric image or technical drawing, assembly drawing and so on. This factor advances the following didactic requirements of ensuring a single graphical order.

First, the teacher must have an appropriate level of graphic knowledge in order to use a graphic image, regardless of which subject he or she teaches. Indeed, the knowledge includes general knowledge used for all images, and there is also some specific knowledge depending on each type of image, and they must be taken into account in the educational process.

Second, almost all of this knowledge is acquired by students in drawing lessons (except for photography with perspective drawing). For example, when using each image type (when describing and reading it), line types are followed. If all the lines of the drawing are done in the same thickness and in the same shape, it is impossible to read and understand correctly what is depicted in the drawing. Depending on the line types, we cannot distinguish which line is the visible contour line and which is the invisible contour line. Although the size and thickness of the arrow lines are the same, they perform essentially different functions. Teach them to do exactly the right thing in the right place

and learning is required. The classification of graphic images used in the subjects taught in general secondary education institutions has the following content and form in tabular form (Table 1.2). This means that the knowledge acquired by students in drawing classes should be applied to other areas of education as much as possible. To do this, the science teacher must follow a single graphical order. The current graphic procedure requires science teachers to have a specific set of knowledge related to drawing.

1.2-жадвал

График тасвир турларининг классификацияси

№	График тасвир тури	Қўлланиладиган ўқув фани соҳаси
1.	Текис планиметрик тасвир	Геометрия, алгебра, физика, кимё, информатика
2.	График	Алгебра, физика, информатика, география
3.	Диаграмма	Кимё, информатика, география
4.	Жадвал	Геометрия, алгебра, физика, кимё, информатика, география
5.	Буюмнинг текисликдаги битта проекцияси (қирқими билан)	Геометрия, алгебра, информатика,

6.	Буюмнинг 2 та ёки 3 та кўриниши (проекцияси)дан иборат комплекс чизмаси (қирқими билан)	Асосан чизмачиликда
7.	Буюмнинг эскизи қирқими билан	Геометрия, технология
8.	Йиғма бирликнинг йиғиш чизмаси (қирқими билан)	Физика, информатика, технология
9.	Тўғри бурчакли изометрик проекция	Геометрия, алгебра, физика, информатика, технология
10.	Қийшиқ бурчакли фронтал диметрик проекция	Геометрия, алгебра, физика, информатика, технология
11.	Перспектив тасвир	Барча фанларда
12.	Техник расм	Физика, кимё, технология
13.	Фото тасвир	Геометрия, алгебра, физика, кимё, информатика, география
14.	Топографик тасвир	География
15.	Жой харитаси (географик, сиёсий, ер бойликлари ва ҳоказолар ҳақида)	Геометрия, география
16.	Технологик карта	Технология
17.	Схемалар	Геометрия, физика, кимё, информатика, география, технология
18.	Стереометрик яққол тасвир	Геометрия, алгебра, физика, технология
19.	Тўғри бурчакли Декарт координаталар системасидаги чизмалар	Геометрия, алгебра, информатика
20.	Турли тасвирлар	Геометрия, алгебра

For example, about fonts. They differ from each other by the difference in the ratio of the letter line thickness “d” to the letter height N. Type A is equal to $d = 1 / 14H$ and type B is equal to $d = 1 / 10H$. Depending on the size of the drawing, the font NN₀ can be selected anywhere from 1.8 to 14.

Teachers of science and natural sciences must have theoretical knowledge and practical skills within the following didactic requirements on the basis of a single graphical order, depending on their field:

- The font used in the comments on the drawings and its types

to know;

- be able to draw mutually parallel or perpendicular lines;
- be able to divide a straight line, a circle into equal parts;
- be able to correctly choose the most necessary projections of the detail;
- be able to use the symbols used correctly;
- correct and appropriate use of shears and cuts;
- set the dimensions of the drawing correctly;
- determine the types of axonometric projections based on the characteristics of the object;
- have the skills to perform technical drawings, etc. k.

In addition to the above, students must have the following practical and graphic skills:

- draw the direction of axonometric axes; draw a clear image (in isometry or dimetry) using the projections of the detail;
- draw circular curves instead of ellipses with isometric and dimetric projections of a circle;
- be able to perform practical work, such as trimming to show the internal structure of the product and hatching it according to the material, the use of light and shadow and engraving to show the shape of the product in volume. Therefore, it is necessary to classify graphic material (images) in the context of the exact and natural sciences.

Pedagogical classification is the classification of pedagogical phenomena into groups according to certain important features. Also, the pedagogical classification provides for the separation of graphic images by field, essence, type. Thus, the classification of graphic images refers to the graphic materials in the structure of the exact and natural sciences in the general secondary education system. In particular, the schematic image is used in physics, chemistry, technology classes. Circuits are divided into kinematic, hydraulic, pneumatic and radio-electric types. Details in schematic representations are sometimes conditional graphic representations as well as prefabricated units

their symbols are used. Therefore, the teacher who used the schemes used conditional images, symbols in the types of schemes

should know. With the help of diagrams it is possible to explain not only the structural structure of a device, but also its working principle, process. If we analyze the images encountered in some disciplines, the following can be admitted. For example, in the science of geometry, mainly flat-planimetric images are used. Through such images the properties of various flat geometric figures are studied and the problems connected with them are solved. This means that in order to create such images, the teacher must be aware of different geometric construction methods. That is, to draw mutually parallel and mutually perpendicular straight lines, to divide straight lines and circles into equal parts, to try different curves, to round angles, to connect a straight line with a circle and two circles with an arc of a given radius (inner and outer), to be three and four, and so on. The stereometry section of geometry includes tutorials on making vivid images of various objects. Therefore, the

teacher should have knowledge of right-angled isometric and curved-angled dimetric projections as well as stereometric clear images. Stereometric clear image is an image based on isometric or dimetric rules on axonometric axes in an arbitrary direction. The purpose of arbitrarily changing the directions of the axonometric axes is to increase the sharpness of the images and to facilitate problem processing. The most common images in algebra classes consist of graphs of various functions as well as diagrams in the Cartesian coordinate system at right angles. In these graphs, the ability to show its position in a graphical representation of the given coordinates of the points, as well as the change of the coordinates of the point as a result of a certain rule the trajectory formed in the drawing is made. More types of drawing and pictures related to drawing are used in physics lessons. The most common in this field of education are the single-plane projection of the object, its desired cuts, and various electrical and optical circuits. There are also a variety of graphics and perspective images. Rules for creating projections, line types, cuts and sections, their definition and placement, as well as cut-outs for making projections of a product in a single plane

depending on the material, and for reading and describing schematics

it is necessary to know the conditional images or symbols of the various item elements. The perspective image shows a variety of objects, tools, and devices. In doing so, the teacher needs to have specific concepts and certain skills and abilities. Including:

- compositionally correct placement of the image size and position relative to the given location;
- be able to correctly determine the proportions of the parts in the image relative to each other;
- correctly determine the point of view (angle) with respect to the object;
- The correct use of methods of hatching, shading and shadowing in order to exaggerate the volume. To do this, the teacher must have sufficient knowledge of the rules of perspective and the theory of shadows.

Drawings are more widely used in the field of technology within the fields of education. They include a single-plane image of a detail or item, sometimes a complex drawing or sketch of two or three planes, technical image and process maps are used. Also collection

drawings and diagrams are common. To make these images or ready

requires reading to be aware of all the rules in the drawing course

are given. It is not enough to know these only in theory, but also to be able to apply the rules in practice.

Various schemes, tables and diagrams are widely used in chemistry. Projections in the same plane are also common. Hence, the chemistry teacher's graphic knowledge must be appropriate to these images. In computer science classes, flat-planimetric images, tables, and photographic images are more commonly used. In geography - mainly diagrams, tables, photo images and location maps are used.

Summarizing the above points, it should be noted that general secondary school teachers of science and technology and technology independently master the above classification of image types under the supervision of a drawing teacher and apply it to their pedagogical activities. This, in turn, will be the basis for ensuring a uniform schedule in schools.

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