

Integrative Approach to Strengthening Elementary School Students' Knowledge of Mathematics

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ABSTRACT

The article analyzes various aspects of the integration of mathematics with other areas. The author of the article considered the integrative links between mathematics and cooking (technology lesson) in the educational and extracurricular activities of children of primary school age.

An integrative approach in education is expressed through the unity of all stages of the pedagogical process - a clear and thoughtful definition of goals, objectives, ways to implement them, the implementation of the pedagogical process and analysis of the effectiveness of the final results. The basic and determining stage in achieving the effectiveness of education is the stage of its design. Describing this stage of pedagogical practice, I.E. Alikbekova writes: "Designing education as an integrative (synthesizing, polyparadigm) ensures the organic integrity of the educational process (content, principles, methods, forms of learning, all components of a holistic activity: goal-setting, planning, practical activities, self-control, correction), implements consistency in combining tasks, elements of content, methods, technologies, etc. The system-forming priority ideas for designing education as an integrative education are the personal orientation of learning, generalized subject structures and methods of activity, meaning-forming motives in learning, consistency in learning, problematic learning, dialogue, reflection of activity" [2].

One of the goals of teaching mathematics is the formation of cognitive activity in children, which underlies the independent acquisition of knowledge by schoolchildren. Therefore, the learning process should be organized competently and interestingly. Children should have a need to acquire new knowledge. A significant area in the life of any person is cooking - the activity of cooking. At the same time, children will get acquainted with cooking and housekeeping at the proper level in grades 5-6, but the foundation should be laid already at primary school age.

The use of various standard and non-standard life tasks related to cooking in mathematics

lessons will not only prepare children for the formation of a generalized way of solving problems [1], but will also contribute to the formation of ideas about everyday issues related to cooking and, possibly, will stimulate love for this process.

Establishing integrative links between mathematics and cooking is possible not only in the classroom, but also in extracurricular activities. Interesting events, competitions, tasks related to mathematics and cooking at the same time will cause a positive attitude and interest in the study of mathematics in order to competently apply the knowledge gained in life situations and please loved ones with a delicious dish made according to the recipe.

Establishing integrative links between mathematics (subject area "Mathematics and Informatics") and cooking (subject area "Technology") was the goal of the study presented in this article.

"Mathematics is the queen of all sciences..." This expression belongs to Carl Friedrich Gauss and makes us understand that mathematics surrounds us everywhere, it is necessary for humanity. In everyday life, we often encounter mathematics, but due to illiteracy or misunderstanding, we are not always aware of this, and possible errors due to the inept use of mathematics can be very "expensive" [3].

Scientists and methodologists of past years emphasized the importance of studying mathematics by younger students. They were looking for ways to show the applicability of mathematics in everyday life, integrated mathematical knowledge with other subject areas.

Integration implies the connection into a single whole of some disparate parts or elements. The closest integration between the lessons of mathematics and computer science, since the birth of computer science took place within mathematics itself. This is directly the study of such issues as numbering and number systems, as well as familiarizing children with the "correct" work with data (tables and charts), innovative technologies, as well as searching for correct information on the Internet [3]. The integrative links between mathematics and the Uzbek or foreign language are not so obvious, but contribute, on the one hand, to the formation of a culture of students' speech [1], and, on the other hand, allow students to form research skills within the framework of organizing linguistic research of mathematical concepts [4].

The integration of mathematical and natural science knowledge is also relevant, which helps to form a holistic and open perception and awareness of the world around [5]. Mathematics and the creative sphere are also inextricably linked. When creating a postcard, the child uses various techniques (origami, scrapbooking, etc.) and thereby applies mathematical knowledge: analyzes geometric shapes, learns to arrange them harmoniously on a sheet of paper, gets acquainted with symmetry, asymmetry, thereby expanding his knowledge in the field of mathematics.

It is difficult for a younger student, due to his age, to understand the significance of mathematics in real life. Compliance with proportions when cooking, selecting dishes for cooking, calculating the calorie content of a dish - all this requires mathematical knowledge. Involving a child in an interesting process of cooking or preparing for cooking can explain the significance of mathematics in real life.

What knowledge is needed to acquire culinary skills? These are units of time to measure the duration of cooking, and units of mass, volume to determine the required number of products, and the skills associated with calculating the funds needed to purchase products.

The first acquaintance with the culinary theme in connection with mathematics is already possible with the use of mathematical and culinary coloring pages (Fig. 1). They will not only help develop the rules for performing arithmetic operations, but also instill a love for the aesthetics of the dish, consolidate knowledge about the color of vegetables, fruits and other products.

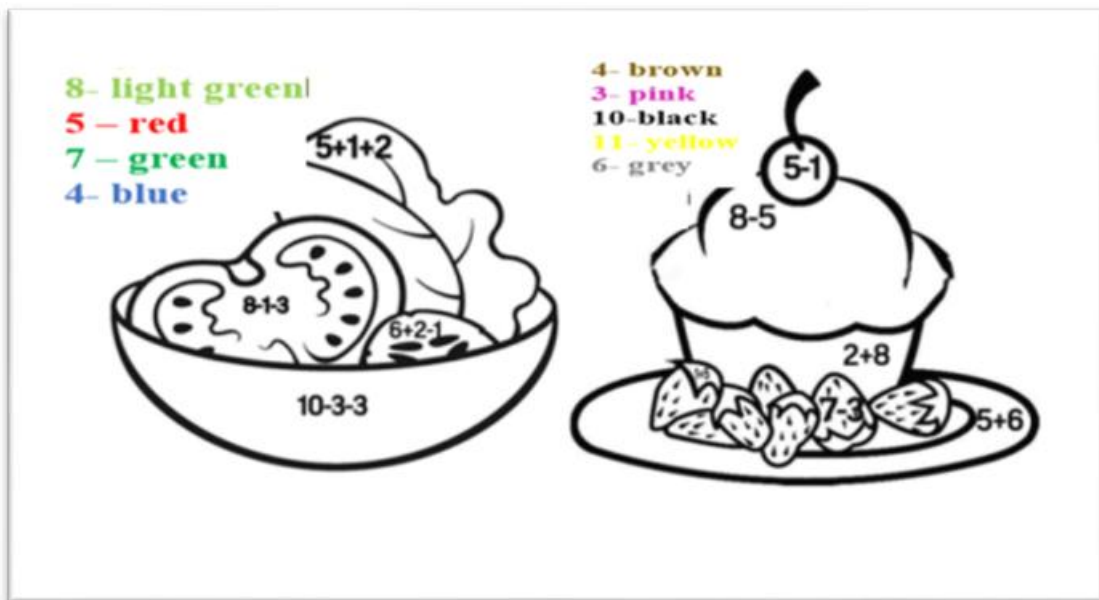


Fig. 1. Coloring pages.

The use of puzzles with food in the classroom helps to consolidate counting skills, develop the logic of the child's thoughts, serves as an occasion to talk about proper nutrition, and also introduces elements of entertainment (Fig. 2).

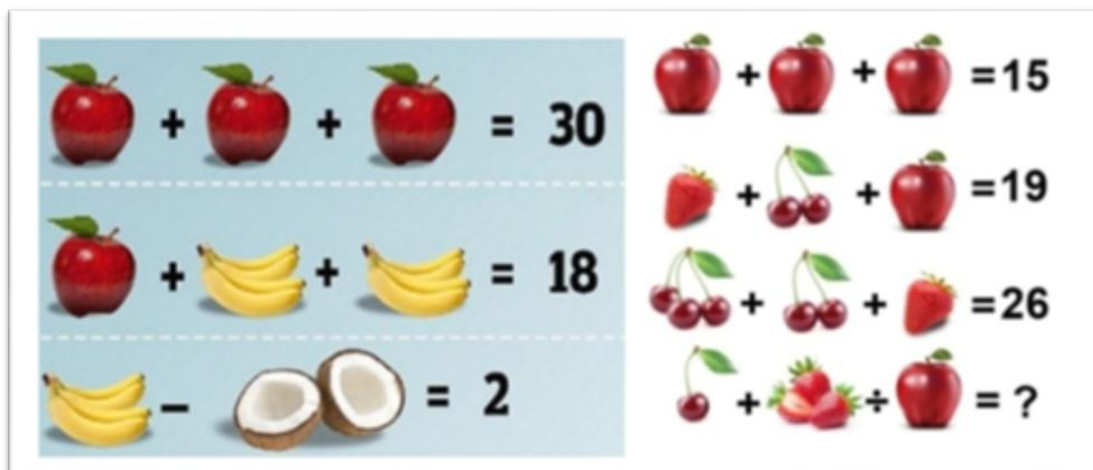


Fig. 2. Puzzle.

When getting acquainted with proportional values, you can invite children to make tables of the ratio of certain products during cooking. For example, how much water and cereals (rice, buckwheat, pasta) should be used when cooking. Partial tasks are very often directly related to culinary creativity.

The cookbook says that to make raspberry jam, you need to take 2 parts of sugar for 3 parts of berries. How much sugar should be taken for 9 kg of berries?

A 4-eggs pie requires 200 g flour, 120 g sugar and 80 g butter. How many ingredients are needed for a 3-eggs pie?

Knowing the units of time, the student will be able to plan his day. Accuracy in measuring time intervals is also important when cooking. To understand this fact, we can propose a non-standard problem.

You can hold 3 cheesecakes in a frying pan. Fry the cheesecake on one side for 4 minutes, but the cheesecake must be fried on both sides. What is the shortest time it takes to fry 6

cheesecakes?

The use of mathematical knowledge is important when introducing a child to proper and balanced nutrition. Recalculation for weekly or annual consumption of products can be carried out in the course of project activities. As a supplement, children can also calculate the amount of money they need for a week's purchase and create a menu.

Thus, individual elements of addressing culinary topics are possible during mathematics lessons in elementary school. At the same time, a more significant part of the appeal to this topic can also be implemented in extracurricular activities.

In the form of project activities, the preparation and organization of a holiday dedicated to the International Chef's Day (October 20) can be implemented. Not every child knows about such a holiday, but he certainly understands the full responsibility of this profession and the role of mathematics in this difficult matter.

In addition, timed to coincide with this event, you can make a video report with younger students from the dining room "What cooks say about the benefits of mathematics!" and show your film at the celebration. After all, children do not often express words of gratitude to cooks, sometimes they do not even fully understand the complexity of their profession. Therefore, this holiday can become unusual and very bright, especially if you organize a photo exhibition "Mathematics and Cookery" or "In the world of mathematical cooking" with children and their parents.

Together with schoolchildren, you can develop and perform culinary and mathematical master classes (Fig. 3), which will bring a creative positive character and help cheer you up.



Fig. 3. Application "Pizza"

Thus, integrative links between cooking and mathematics exist. Cooking (technology lesson) is not only a labor activity, but also a creative one. Undoubtedly, there are children who actively manifest themselves in the creative field, and mathematics is given to them with difficulty, then integration comes to the rescue. Or vice versa, the child loves mathematics, but is completely unsuited to self-service. Involving a child in a new world for him (cooking or mathematics), you should rely on his interest in the second area. In general, there will be a synergistic effect when the child becomes more successful in both areas, improves his knowledge, both in the field of mathematics and in the field of cooking. In addition, an elementary school student develops imagination, memory, logic, improves fine motor skills of the hands, and also replenishes vocabulary, and most importantly, the child joins independence and self-organization.

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