

THE SIGNIFICANCE OF MATHEMATICAL KNOWLEDGE IN SOLVING PROBLEMS IN BIOLOGY

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ANNOTATION: *The article deals with the problems of improving the quality of mathematical knowledge in solving problems in biology, their solutions and prospects, including the improvement of curricula, the design of training, in accordance with the requirements of the time, the use and development of operations of logical thinking, etc.*

Key words: *science efficiency, digital economy, interests and abilities, quantitative mathematics, mathematical models, objective characteristics, modeling, mathematical methods.*

In the modern era of the rapid development of science and technology, the formation of modern knowledge is of great importance. In addition, modern teaching technologies and related methodological approaches create favorable conditions for the deep and lasting formation of important patterns and many fundamental concepts. Teaching biology requires the rational use of innovative educational technologies, the effectiveness of organized lessons, the provision of teaching each subject using pedagogical and information technologies for better learning by students[1,2,3,4,5].

One of the urgent tasks is the introduction of education based on a competency-based approach to learning, the ability of students to apply their knowledge in life, choosing a profession, independent learning, and developing educational competencies.

The development of chemical and biological sciences in our country, improving the quality of education and scientific efficiency in these areas are among the priorities of the State Program "Year of Science, Education and Digital Economy".

In order for the quality of teaching biology in a comprehensive school to meet modern requirements, it is necessary to pay special attention to teaching methods, practical exercises and laboratory exercises.

The President of the Republic of Uzbekistan Sh. As Mirziyoyev stated in Resolution No. PQ-4805 dated August 12. 2020 "Radically improving the quality of education in chemistry and biological sciences, introducing a completely new system of teaching these subjects in secondary schools, education to provide institutions with modern laboratories, textbooks and other educational equipment, attract qualified teachers and instructors in these areas, train personnel and use the results of science in education, science and production, it is necessary to establish close dialogue and cooperation[6,7,8,9,10,11,12,13,14].

Today, it is important for general education schools to have mathematical knowledge in teaching biology in order to achieve high results by enrolling high school students in the field of biology in

higher educational institutions. Schools organize separate lessons in science and natural sciences, and then students are selected and trained in accordance with the chosen profession, interests and abilities.

To live in the world, we need secular science and knowledge, and a nation without modern science and knowledge will be a trample on others.

Mahmudhoja Behbudi

The ladder of time is endless, and successive generations are only going up the ladder. Each generation will pass on the accumulated experience to the next generation, which will develop and enrich it.

Abu Rayhon Beruniy

The above ideas of great scientists give a complete picture of the role and significance of mathematics in all spheres of human life.

For other sciences, mathematics is as important as logic. The role of mathematics lies in the construction and analysis of quantitative mathematical models, as well as in the study of structures that obey formal laws.

The level of development of mathematical methods in biology serves as an objective characteristic of the depth of knowledge about the discipline.

Mathematical knowledge is used to help students solve problems, mainly related to genetics and breeding, and to perform calculations in practical and laboratory classes in the science of man and his health. The topics of arithmetic, multiplication, proportion and percentage in mathematics are important for solving problems related to genetics and selection in biology to ensure an effective learning process.

Mathematical knowledge is used to help students solve problems, mainly related to genetics and breeding, and to perform calculations in practical and laboratory classes in the science of man and his health. The topics of arithmetic, multiplication, proportion and percentage in mathematics are important for solving problems related to genetics and selection in biology to ensure an effective learning process [15,16,17,18,19,20,21].

That is, $x + a = b$, in which the numbers a and b are real numbers,

and x is an unknown number.

The concept of proportion is called the equality of two ratios. The proportion is found by the following formula.

$$a/b=c/d$$

The concept of percentage is often used in mathematics to solve problems in biology. The percentage is one hundredth of a number and is defined as (%) and given by the following formulas.

$$1\% = 0.01$$

$$p\% \quad \text{find the numbers } a$$

$$| a - 100\% |$$

$$| x - p\% | \quad x = a \times p / 100$$

$$a \times 1/100 ; \quad a/b \times 100 ;$$

For example:

Task: The hairlessness of the cotton stalk dominates the pubescence. On the experimental plot, when mixing plants of the Bb x Bb genotype, 6800 plants were obtained. The genotype of several stem hairs is heterozygous.

(B-b = 40%) Solution method.

cotton stalk

So B = 70% b = 30%

> hairless - B

> hairy - b

Denote by B(x)-b(y) B-b=100%

$x + y = 100$ a - $y = 40$ $2x - 140$ a; = 70 g = 30

hairless bb

B -70%

hairless bb

b -30%

B -70%

b - 30%

BB 70 - 70 - = 49% 100 BB 70 30 - = 21% 100

BB 70 30 - = 21% 100 bb 30-30 - = 9% 100

6800 ---- 100%

2856 = x ---- 42%

Answer: There are 2856 stemless heterozygous organisms.

Task: If the fat content of the Rano diet is 1.2 times less than the protein content and the carbohydrate content is 1.4 times the fat content, then the Rano body weight is 60 kg, and the main ingredients If the energy expended on metabolism is 72.144 . % of total energy, calculate the energy (kkal) released from carbohydrates in food Early.

Decision:

70 kg --- 1680 kkal

60 kg ---1440 kkal

1440 : 0,72144% = 1996 kkal total energy from food

$4,1 \times 1,2 = 4,92$

$4,1 \times 1,4 = 5,74$

$9,3x + 4,92x + 5,74x = 1996$

$19,96 = 1996$

X= 100 rp. fats

$100 \times 1,2 = 120$ gm. squirrels

$100 \times 1,4 = 140$ gm. carbohydrates

$140 \times 4,1 = 574$ kkal

Answer: 574 kkal

Task: Find the amount of fat consumed (g) per day, if the energy released from the daily diet of a person is 4280 kg, and the percentage of energy released from protein is 28% less than the percentage of fats and carbohydrates, and 2% more, than carbohydrates.

Solution: protein (x), fat (y) and carbohydrates (z) = 100%.

x.

$$x+y = 100\% \quad x+28 = y$$

$$100-28 = 72$$

$$72/2 = 36$$

36 (fats)

$$36+28 = 64$$

$$36-2 = 34 \text{ (carbohydrates)}$$

$$64-34 = 30 \text{ (fats)}$$

$$4280 \div 100$$

$$1284 = x \div 30$$

$$1284/38,9 = 33 \text{ gm (fats)}$$

Answer: 33 gm

II Method

fats (x) fats and carbohydrates (y)

$$x+y = 100$$

$$y-x = 28$$

$$x = 36$$

$$36-2 = 34 \text{ ((carbohydrates)}$$

$$36+34 = 70$$

$$100\% - 70\% = 30\text{(fats)}$$

$$4280 \div 100\%$$

$$1284 = x \div 30\%$$

$$1284/38,9 = 33 \text{ gm}$$

Answer: 33 gm

Task: if the number of hydrogen bonds in DNA is 331 more than the number of phosphodiester bonds in RNA, and 451 more than the number of peptide bonds, find the number of thymines.

$$2x + 3y = x + y - 1 + 331$$

$$2x + 3y = x + y$$

$$\text{-----} -1 + 451$$

3

$$2x + 3y = x + y = 330$$

$$x + 2y = 330$$

$$2x + 3y = 0,3333x + 0,333y = 450$$

$$1,66666x + 2,66666y = 450$$

$$x + 2y = 330. / 1,666x$$

$$1,666x + 2,666y = 450$$

$$0,66666y = 100$$

$$y = 150$$

$$x = 30$$

Answer: 30

In a word, the level of development of mathematical methods in biology, while acting as an objective characteristic of the depth of knowledge about the discipline. Mathematical models describing phenomena in physics, biology and chemistry are very complete, as a result of which these sciences reach a high level of theoretical generalization. Although simple processes of physiological and mathematical modeling are now common, their solution is easily achieved using arithmetic operations, equations, percentages, and proportions.

Based on the implementation of these tasks, it is necessary to develop new approaches to the organization of training in educational institutions. Since the educational process is the main area of pedagogical creativity, it must be organized and managed, an innovative approach allows you to acquire knowledge, independence, creativity, initiative, cooperation, deepening professional competencies, pays attention to the quality of education

Overcoming existing shortcomings and problems in improving the quality of education, clearly defining goals and objectives in this direction, using world experience, using information technologies in combination with pedagogical technologies to improve the quality of professional training of future specialists. specialists serves to improve, which increases the efficiency of the process.

Clarification of educational goals, the use of various technologies and methods used in the process of teaching and learning, attention to content leads to the development and improvement of the activities of educational institutions.

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