
SPECIFIC ASPECTS OF DEVELOPING CREATIVE COMPETENCIES OF FUTURE BIOLOGY TEACHERS THROUGH PROBLEM AND EXERCISE SOLVING

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ABSTRACT: Specific aspects of developing creative competencies of future biology teachers by solving problems and exercises from biology are highlighted.

KEYWORDS: Creativity, creative competence, problem, exercise, mitosis and meiosis division, chromosome, DNA, population.

INTRODUCTION

In the education system of our country, large-scale research and development work is being carried out on the fundamental reform of the training system of independent and free-thinking, competitive personnel who meet the competency requirements. In this regard, in the Development Strategy for the further development of the Republic of Uzbekistan, "Further improvement of the continuing education system, increasing the possibilities of quality education services, continuing the policy of training highly qualified personnel in accordance with the modern needs of the labor market" is defined as a priority task. Therefore, it is important to carry out scientific and practical research on the improvement and implementation of practical methods and means of developing creative competence of future biology teachers based on solving biological problems and performing exercises.

The concepts of "creativity" and "creative" are taken from the English language and mean "creative ability", "creativity". D. Simpson, S. Kaplan, Dj. Researched by Renzulli, R. Sternberg, A. Tannenbaum, Dj. Feldhusen, K. Heller and other scientists.

"Creativity is the ability of a person to come up with new unexpected non-standard, creative thinking, decisions, flexible thinking process and new ideas; sensitivity to the imbalance of existing knowledge, sensitivity of a person to problems and finding convenient ways to solve them.

Our research shows that the creativity of a person is manifested in his thinking, communication culture, feelings, solving problems and performing exercises, in problematic situations. Creativity represents a person as a whole or his specific features, mental sharpness. Also, creativity is clearly visible as an important factor of talent.

The problem is to achieve a certain result by applying the knowledge acquired by the student in finding a solution to the problem.

The exercise is a set of actions aimed at strengthening and developing the knowledge acquired by the student [2].

Based on the above ideas, let's pay attention to some aspects of developing creative competence by solving biological problems and performing exercises in the preparation of future biology teachers. In this regard, it is necessary to form a system of assignments that reflects the content of biological education. In most of the topics included in the biology textbook, it is possible to create problems and exercises that serve to form creative competencies. In particular, creative competencies can be developed through the following exercises in the process of teaching the subject of reproduction methods of the organism.

Based on the information about the human karyotype based on the process of mitosis, the following? complete the exercise by filling in the marked box.

Interfaza G ₁	2n?n	Interfaza G ₁	2n2c
Interfaza S	2n4c	Interfaza S	?n4c
Interfaza G ₂	2n4c	Interfaza G ₂	2n?c
Profaza	?n4c	Profaza	2n4c
Metofaza	? ?	Metofaza	2n4c
Anafaza	4n4c	Anafaza	4n4c
Telofaza	2n2c	Telofaza	? ?

Based on the information about the human karyotype based on the process of meiosis, the following? complete the exercise by filling in the marked box.

reduction	nabor	in chromatin	reduction	nabor	in chromatin
Profaza I	2n4c	92	Profaza II	n2c	46
Metofaza I	?	?	Metofaza II	n2c	46
Anafaza I	2n4c	92	Anafaza II	?	?
Telfaza I	n2c	46	Telofaza II	nc	46

By performing the above exercises, future biology teachers will have a basis for fully understanding the specific aspects of the types of mitosis and meiosis.

Solving issues related to genetics and selection is considered to be of great practical importance in the development of creative competencies of future biology teachers. Because it requires the ability to combine several laws and theories while solving the given problems. For example, in the Shorthorn cattle breed, yellow is dominant over white. Red-colored hybrids were obtained when yellow-skinned and white-skinned cattle were crossed. 4,169 yellow, 3,780 red and 756 white colored cattle were registered in the region where shorthorn breed is specially bred. Find the gene frequency of yellow and white cattle in this region.

In the process of solving this problem, students should have the competence to use the previously acquired knowledge in new unexpected situations. Problems related to population genetics are solved based on the Hardy-Weinberg law.

Given:	Solving:
AA – yellow.	$2D + H$
aa – white	$p = \frac{\quad}{2N} = 0,7$
Aa– red	$H + 2R$
D = 4169	$g = \frac{\quad}{2N} = 0,3$
H = 3780	
R = 756	
p – ?	
g – ?	

Answer: the frequency of the yellow gene is 0.7, and that of the white gene is 0.3.

Another aspect of developing creative competencies of future biology teachers is to solve problems related to crossover and double crossover.

If the crossover frequency is 10% between genes C and E, 1% between genes C and A, 9% between genes A and E, 6% between genes B and E, 3% between genes A and B, and 2% between genes B and D, E and D genes are known to be 4%, then make a genetic map of the chromosome harboring the A, B, C, D, E genes?

Solution to the problem:

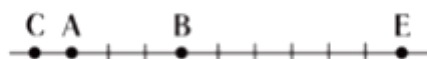
1) We identify the outermost genes of the chromosome and place them on the chromosome map. C and E genes have the highest crossover frequency, so these genes are located on the outermost part of the chromosome.



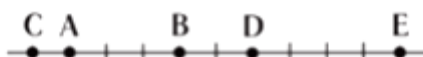
2) We determine the location order of the remaining genes. The crossover frequency of the A gene is 1%. The distance between it and the E gene is 9 morgandi. So gene A is located between genes C and E.



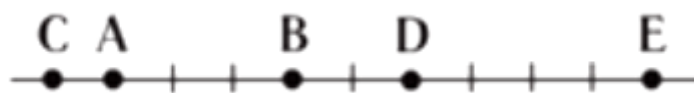
3) The distance between gene B and gene A is 3%, and with gene E is 6%. So, gene B is located between genes A and E.



4) The distance between D gene and B gene is 2%, and 4% with E gene.



Answer: Chromosomal map:



In short, in order to form biological knowledge in the minds of students, the future biology teachers should first develop their creative competencies. In this regard, problems and exercises from biology occupy the leading place.

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