

To a Procedure of Studying of a Topic: “The Influence of Abiotic Factors on the Living Organisms”

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Abstract: Independent, research work on a topic: “The Influence of Abiotic Factors on the Living Organisms” is presented. The work stages are the following: organizational, experimental, summarizing. The experimental stage includes execution of three independent research works to the following topics: The influence of color on bean growth and development; Is there a color influence on a cat at the food choice? How does the color influence a person? The third stage includes the following: the conclusion (color influences on the living organisms). The general conclusions: -red and orange colors promote the growth of bean seed; - a favorite color of the majority of cats is red; - based on interrelation of the attitude to color and temperament type, the following dependence was revealed: sanguine and choleric people – red, yellow; phlegmatic and melancholic people – green, blue. Practical recommendations (for acceleration of bean seeds germination, it is possible to use a cotton cloth of red or orange color, the dishes for cats' meal shall be red, in educational institutions green and dark blue tones of color shall be used, toys in childcare centers shall have various coloring).

Key words: Color % Tone % Range

INTRODUCTION

Participation of students of non-biological specialties in scientific research work on Ecology, in our opinion, allows to fulfill a number of important educational and methodical functions. Here belong the increase of ecological education and the ability to evaluate the environmental state objectively, the receipt of skills in the search of possibilities to improve the environment [1]. As per the credit technology, 45 hours are provided for the study of the subject "Ecology and Sustainable Development": 15 hours of lectures, 10 hours of practice and 15 hours of SIWT classes (the student's individual work under the teacher's guidance). Due to lack of the study time, special attention is paid to SIWT classes [2]. At SIWT classes one of the effective forms of work to study the ecological problems is the practical research activity. Let us give an example: at the present time it is proved that each color can influence on the human state. To get positive results, the color is widely used in color therapy, design and art [3-11]. Based on the

abovementioned, in the topic "The influence of abiotic factors on living organisms" the students in their individual research works are offered to reveal the main variants of color impact on plants, animals and people. Work plan on the topic is discussed by the teacher together with the students. Main stages of the work and timing for each staged are determined. For instance. **1. Organizational stage.** Work in classroom (1 hour). Discussion of the plan for individual work. Here two main stages are included:

- C Work with the teacher: precis-writing of the experimental procedure, selection of investigation objects, plan of report preparation on the carried out experiments;
- C Individual work: study of literature, compilation of literature review, work in laboratory.

Experimental Stage: Work in the laboratory or at home (time is not normalized). Here is included the execution of three individual experimental works on the following topics:

1,2,3.



4.



Photo 1: Constituents of the plastic bottle, used in the experiment:

1. Bottle top part; 2. Bottle bottom cut part; 3. Bottle top part with the glued colored sheet of paper; 4. Bean seeds, wrapped in orange cotton cloth.

- C The influence of color on bean growth and development;
- C Is there a color influence on a cat at the food choice?
- C How does the color influence on a person?

The Stage of Summary

Individual-Experimental Work

Work Procedure: The following things are used in the investigations:

- C Plastic bottles for 1,5 ml. For this 5 sm is measured from the bottle base and evenly cut from the top part. Near the base of the cut top part the 4 cuts by scissors 3 sm each are done. For the top part to be easily placed on the base;
- C Chromatic color tones are used as the object for investigation: red, orange, dark blue, lilac, green.
- C Color sheets of paper of red, orange, lilac and green colors, which are glued to the bottle top part as a wide strip. On the bottom (bottle base) there is put a cotton cloth of the same color, as a bottle top part, which has a glued color sheet of paper of the definite color range;
- C Big seeds of the ordinary bean for planting - Phaseolus vulgaris;
- C Cotton cloth of red, orange, dark blue, lilac and green color;

Four bean seeds are wrapped to the cotton cloth of the definite color. They are closed by the top part of the bottle, unscrew the top and sprout at temperature of 12 -15°C., watering when dry. The experiment is held in four-fold replication (Photo 1) [3].

The Obtained Results and Conclusions: In the experiment the following results were obtained:

- C High growth rates lengthways the radicle of the common bean are recorded in the germination chambers of red color range; This rate is a little lower in the germination chambers with orange color range;
- C Average results are recorded in the germination chambers of lilac and dark blue color (photo 2).

After treatment of the obtained data, we came to the following conclusions:

- C Red and orange colors promote the bean growth, green color has the converse value;
- C To speed up the bean seeds germination, it is possible to use the covering or wrapping of the seeds into red or orange cloth.
- C Individual - experimental work (is executed at home within a week)

Work Procedure: Domestic cats take part in the experiment (Felis catus L., 1758). The color is Tigrine tabby (or Mackerel tabby). An obligatory condition, which shall be observed when executing this work:

- C All sheets shall be of the same size, but different color;
- C The same food in equal proportions is put on all sheets;
- C The order of sheets varies with each feeding.

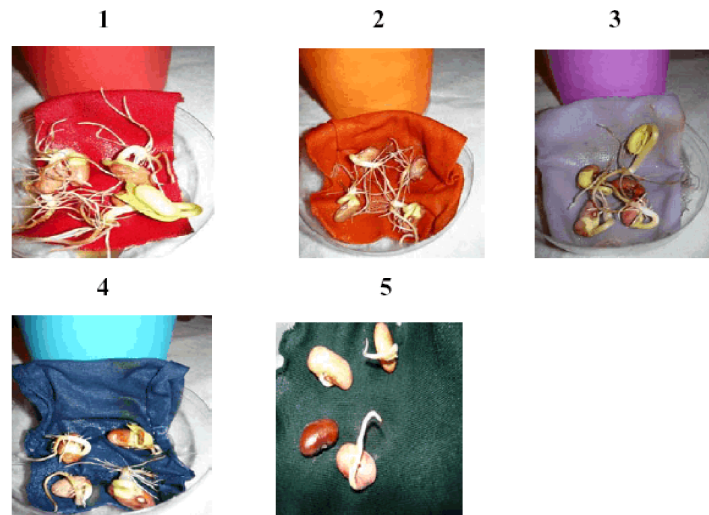


Photo 2: Bean germination on the cotton cloth of the following color:

1.Red; 2. Orange; 3. Lilac; 4. Blue; 5. Green.

Main conclusion of the work:



Photo 3: Cat selectivity of equal food on different in color sheets.

The Obtained Results and Conclusions: The experiment with the cat on selectivity of equal food on the sheets, different in color, showed that in 90% from 100 the cats selected red sheets, where the food was put (Photo 3).

Individual - Experimental Work: (work with students for 2 hours)

Work Procedure: The purpose of investigation of the third individual work is the study of the color on psychophysiology and psychology of the students.

The work includes two main stages:

- C The revealing of the color influence on the volume of short-time memory;
- C The second task, solved at the second stage, was the possible revealing of interconnection between the relation to color and type of temperament.

In the first stage the students were offered to do tests, the results of which showed, how different colors influence on the volume of short-time memory. For this test people executed four types of tasks (five minutes for each task) on sheets of different colors: red, orange, dark blue, green.

Work Progress:

- C During a minute the students read the suggested text on the interactive board;
- C In one minute a suggested text is closed and the students write the words, which they managed to remember, in any order;
- C The suggested text is shown again on the board: the students verify the number of the written words, estimating each word by a point;
- C Based on the sum of points and the table, they determine the category, to which their memory belongs in one or another task. **Determination of memory volume based on the points.**

The best color environment for mental work of a person is green and blue.



Photo 4: The revealing of color preferences of the first year students.

m	Quantity of points	Memory characteristics
1	6 and less	Memory volume is extremely low
2	7 - 12	Memory volume is just below the average
3	13 - 17	Memory volume is good
4	18 - 21	Memory volume is excellent
5	More than 22	Memory is phenomenal

Task: Possible words of the text: hay, plane, train, picture, month, singer, radio, grass, passage, car, hart, bouquet, pavement, centenary, film, scent, mountains, ocean, immobility, calendar, man, woman, abstraction, helicopter [12].

Task: Possible words of the text: apple, cloth, nettle, samovar, violin, trousers, scooter, milk, textbook, cigarettes, horse, veil, roses, landscape, city, cap, saucer, carrot, sun, truck, cobra, leaf, berry, baptistry.

Task: Possible words of the text: tribute, optics, yoke, raven, dock, memory, signal, football, newspaper, luxury, rocket, mouse, pace, incognito, rice, stone, teacher, asp, lake, translation, glasses, flask, weight-scales, warrior.

Task: Possible words of the text: sword, spoonbill, priestess, ford, brew, microbe, gates, undershirt, decimal, refrigerator, melancholy, catamaran, report, pine, rebellion, henhouse, skittles, puppet, wood fuel, sofa, sportsman, monk, ocean, destiny.

The Obtained Results and Conclusions: The best points (18-21) for the tests were obtained where the students executed the tasks on the sheets of green and dark blue color. The points within 13 to 17 were obtained on the sheets of red and orange color (photo 4).

During the second stage, the prevailing temperament types of the students-participants in the experiment were revealed as per A. Belov methodology (1971)[13].

Work Progress: All students, participated in the experiment, were divided based on the temperament type. As a result, there were 4 groups: sanguine, choleric,

phlegmatic and melancholic people. The experiment was carried out particularly for each group based on temperament, for this:

- C The parts of yellow, red, green and blue color were put on the table; it was necessary to make up a toy from them.

The Obtained Results and Conclusions: The color of the toy parts was selected as per the group of temperament: sanguine people chose yellow; choleric people chose red, phlegmatic people chose green and melancholic people chose blue. *Preference of one or another color is connected with the temperament type of the person.*

After all works are finished, the teacher asks the students to write a conclusion and practical recommendations. Each student reads his own variant. The audience selects the best variants.

For instance, based on **the successful conclusion** it is possible to choose the following variant:

Color belongs to abiotic factors that influence on the living organisms. Color impact on the living organisms is different, for instance, for plants some colors speed up growing, the others slow down; color is directly connected with food for cats. Color impact is very actively shown in a man; it affects the emotions, temperament type and thinking.

Based on General Conclusions:

- C Red and orange colors actively promote the growth of bean seeds;
- C Lilac and blue colors promote the growth of bean seeds a little bit less than red and orange colors;
- C Green color is bad for bean seeds growth promotion;
- C Cats' favorite color is red;
- C Blue and green colors influence positively on the short-time memory of a person;

- C Based on the interconnection between the relation to color and temperament type, the following dependency is revealed: sanguine and choleric people - red, yellow; phlegmatic and melancholic people - green, blue respectively.

Based on Practical Recommendations:

- C To speed up the germination of bean seeds it is possible to use covering or wrapping of seeds into the cotton cloth of red and orange color;
 C Cats' dishes for food shall be red;
 C In educational institutions green and blue tones of color shall be used;
 C Toys in childcare centers shall have various coloring.

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