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## **PROGRAM SETUP FOR PROTECTION AND RESCUE FROM NATURAL DISASTERS IN PRIMARY UPBRINGING AND EDUCATION**

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**Abstract:** *The purpose of this paper is aimed at a content analysis of the curricula and textbooks from the first to the fifth grade, through which the representation of teaching topics in the field of protection and rescue from natural disasters is investigated. The theoretical analysis focuses on the compulsory subjects Society and Natural Sciences, as well as on the free elective subjects Environmental Education and Dealing with Natural Disasters. The results are obtained through the analysis of the methodical-didactic structure of the curricula, in the section of: individual teaching topics, contents, terms and standards for evaluating students in the field of protection and rescue from natural disasters. In the teaching practice, there is a need for greater representation of the researched topic within extracurricular activities, as well as the organization of appropriate sections. At the same time, there is a need to apply interactive techniques and methods so that the students can have the opportunity to develop appropriate skills through the practical application of knowledge. There is a need to develop awareness among children and young people, as well as organize pedagogical promotion of topics of protection and rescue from natural disasters during classes, extracurricular time and students' free time.*

**Keywords:** *Curriculum and program, Natural sciences, Society, free elective subjects, protection and rescue.*

### **Introduction**

Improving the quality of curricula and programs, as well as teaching in primary education is a current problem that can be investigated from several aspects. Despite the fact that reforming the concept of primary education is a relatively dynamic process, which implies a high degree of analysis in a national and international context in terms of program layout, organization and

implementation of teaching and extracurricular activities, it seems that the process of planning and implementation still leaves room for serious scientific and practical revision. Many questions that have a universal pedagogical character remain open.

Of particular importance is the issue of the implementation of topics and contents in the field of protection against and dealing with natural disasters, which longitudinally monitored have different treatment in extent and intensity in primary education curricula and programs. It is equally important to consider the issue of the type of knowledge that students should acquire, its methodical approach, the complexity level of its distribution by classes, and especially the ability of students for its practical application, which is significant in everyday life. In addition, the issue of the undergraduate education of future teachers is crucial.

Taking into consideration the importance of the teaching profession, with all its multiple meanings in relation to many significant segments of the social sphere of life, the problem on which this paper focuses is in close and direct correlation with the search for many answers on how to improve the education of future teachers.

Given the universality of the basic "didactic triangle", which has for decades experientially consisted of the three basic elements: student - teacher - parent (Scheme 1), nowadays, expressed in mathematical terminology, is already turning into a "didactic polygon" (Scheme 2).



Scheme 1: Didactic triangle

The student placed in the central position in the "didactic polygon" in the modern context of living is in a dialectical relationship with the family, the school, the environment in which he/she lives and a direct connection with the topics he/she studies. (Scheme 2)



Scheme 2: Didactic Triangle - Redirected to "Circular Flow" for the need for protection and rescue from natural disasters

According to some, relatively more modern sources, interaction is specifically placed in the function of teaching. Interactive teaching means a dynamic process of mutual relations between two or more persons whose experience and behavior are mutually conditioned and dependent. "This means that during the teaching process, situations are created in which the student as an individual enters into direct contacts and relationships, perceives the activities of his/her classmates, the teacher and the environment in general and reacts to them. During these processes, interdependence comes to expression, which is identified as the reaction of the individual to the actions of others, during which positive changes occur, that is, there is positive interdependence and mutual support of the subjective factors in teaching. Since these relationships take place in learning processes and in a strictly defined social space (group, class), we speak of the interactional dimension of learning, that is, of interactive learning." (Томевска-Илиевска, 2020: 13-14)

### Main part

Basic upbringing and education is structured in three educational cycles (from the first to the third grade; from the fourth to the sixth grade and from the seventh to the ninth grade). This paper analyzes the curriculum and programs of grade-level teaching, covering from the first to the fifth grade. It should be noted that the choice for the analysis of the curriculum and programs was made according to the criterion of representation of teaching topics, contents and concepts that are closely correlated with the field of protection and rescue from natural disasters. An overview is presented in Table 1.

Table 1. Overview of representation of protection and rescue from natural disasters in teaching subjects<sup>1</sup>

grade school			
grade	subject name	subject status	
I grade	Society	compulsory subject	
II grade	Society	compulsory subject	
III grade	Natural sciences	compulsory subject	
	Society	compulsory subject	
IV grade	Natural sciences	compulsory subject	
	Environmental education	free elective subject	
	Dealing with natural disasters	free elective subject	
V grade	Natural sciences	compulsory subject	
	Environmental education	free elective subject	
	Dealing with natural disasters	free elective subject	
Total:	10 teaching subjects	6 compulsory subjects	4 free elective subjects

In the grade-level teaching in basic upbringing and education, which is carried out from the first to the fifth grade, the teaching subjects have the status of compulsory subjects, in addition to which, there are also free elective subjects. The paper gives a structural analysis of the curricula and programs from the first to the fifth grade for the subjects which include contents related to protection and rescue from natural disasters. According to the analyzed curricula, it can be concluded that this type of teaching content is represented in several teaching subjects, namely: in the compulsory teaching subject Society from first to the third grade, in the teaching subject Natural Sciences, which has the status of a compulsory subject and the contents are represented from the third, fourth and fifth grade. Meanwhile, in the fourth and fifth grade, students have the opportunity to choose one of the free electives, that is, they choose between Environmental Education and Dealing with Natural Disasters.

Table 2. Overview of teaching topics, contents and terms in teaching subjects that deal with protection and rescue from natural disasters<sup>2</sup>

<sup>1</sup> Наставен план за основното образование за учебната 2024/25 година (2024) Скопје: Биро за развој на образованието

<sup>2</sup> Наставна програма Еколошко образование (слободен изборен предмет) (2023) Скопје: Министерство за образование и наука на Република Северна Македонија и Биро за развој на образованието.

Наставна програма Општество за прво одделение (2021) Скопје: Министерство за образование и наука на Република Северна Македонија и Биро за развој на образованието.

grade school		
grade/subject	Teaching topic	Contents (and terms)
I grade / Society	The place where I live	<ul style="list-style-type: none"> <li>Ambulance, fire and police (police/ambulance, ambulance/ambulance vehicle, policeman, police car, fire department, fireman ...).</li> </ul>
II grade / Society	In the home	<ul style="list-style-type: none"> <li>Protection from natural disasters (natural disaster, fire, flood, earthquake).</li> </ul>
III grade/ Society	I take care of myself and my surroundings	<ul style="list-style-type: none"> <li>How to recognize dangers in the environment and protect myself from them (risk, safety, protection, dangerous objects, danger from insects and other animals, danger from plants, danger from strangers, chemicals, electric shock, lightning strike, poisoning, abduction, abuse).</li> </ul>
III grade/ Natural sciences	Changes to materials	<ul style="list-style-type: none"> <li>Burning</li> <li>Fires and fire prevention and protection (burning, fire)</li> </ul>

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Наставна програма Општество за второ одделение (2021) Скопје: Министерство за образование и наука на Република Северна Македонија и Биро за развој на образованието.

Наставна програма Општество за трето одделение (2022) Скопје: Министерство за образование и наука на Република Северна Македонија и Биро за развој на образованието.

Наставна програма Природни науки за трето одделение (2022) Скопје: Министерство за образование и наука на Република Северна Македонија и Биро за развој на образованието.

Наставна програма Природни науки за четврто одделение (2021) Скопје: Министерство за образование и наука на Република Северна Македонија и Биро за развој на образованието.

Наставна програма Природни науки за петто одделение (2021) Скопје: Министерство за образование и наука на Република Северна Македонија и Биро за развој на образованието.

Наставна програма Справување со природни катастрофи (слободен избран предмет) (2023) Скопје: Министерство за образование и наука на Република Северна Македонија и Биро за развој на образованието.

IV grade/ Natural sciences	Physical characteristics of the Earth	<ul style="list-style-type: none"> <li>• <b>Earth's mantle (spheres)</b> (Earth shells/spheres, rocky shell/lithosphere, water shell/hydrosphere, air shell/atmosphere, plant and animal life/biosphere, underground water, spring, river, lake, sea, natural phenomena, earthquakes, volcanoes, clouds, precipitation, rain, snow, hail).</li> </ul>
	Electricity and magnetism	<ul style="list-style-type: none"> <li>• <b>Electric current in a closed circuit</b> (particle, electric current, electrical energy, light energy, thermal energy, sound energy).</li> </ul>
V grade / Natural Sciences	Natural-geographic characteristics of the continents	<ul style="list-style-type: none"> <li>• <b>Relief of the continents</b> (relief, internal forces, tectonic movements, mountains, valleys, external forces, erosion, accumulation, volcano, eruption, lava, magma, volcanic cone, crater, volcanic vent, geyser, earthquake, hypocenter, epicenter, tsunami, layered rock, volcanic rock, altered rock, volcanic relief, sea relief, lake relief, glacial relief, desert relief)</li> </ul>
IV/V grade/ Environmental education	Natural phenomena on the planet Earth, their measurement and protection	<ul style="list-style-type: none"> <li>• <b>Volcano</b> (volcano, eruption, magma, volcanic cone, crater, volcanic vent)</li> </ul>
IV/V grade / Dealing with natural disasters	Earthquakes	<ul style="list-style-type: none"> <li>• <b>How earthquakes occur</b> (earthquake, shaking, tectonic plates, hypocenter, epicenter)</li> </ul>
		<ul style="list-style-type: none"> <li>• <b>Consequences of earthquakes</b> (ruins, panicked behavior, trapped)</li> </ul>
		<ul style="list-style-type: none"> <li>• <b>How to protect ourselves during earthquakes</b> (appropriate and inappropriate actions, safe and unsafe places)</li> </ul>

	Fires	<ul style="list-style-type: none"> <li>• <b>How and where fires start</b>– sources of fire (fire, forest fire, arson, social pressure)</li> </ul>
		<ul style="list-style-type: none"> <li>• <b>Consequences of the fires</b> (burnt objects, burns, smoke, fire)</li> </ul>
		<ul style="list-style-type: none"> <li>• <b>How to protect ourselves from fires</b> (fire protection, 193, covering the body/mouth/nose)</li> </ul>
	Floods	<ul style="list-style-type: none"> <li>• <b>Causes and consequences of floods</b> (flood, rising water, overflow of water from the trough, torrential rain, landslide, flooded areas)</li> </ul>
		<ul style="list-style-type: none"> <li>• Protection during floods and storms (CUK - Crisis Management Center, climbing to the highest place)</li> </ul>
	Extreme weather	<ul style="list-style-type: none"> <li>• <b>Hot weather</b> (heat wave, high temperatures, water, sunglasses, sunscreen)</li> </ul>
		<ul style="list-style-type: none"> <li>• <b>Cold weather</b> (low temperatures, cold, freezing, slipping, frost)</li> </ul>

The methodological-didactic structure of the curricula for the compulsory subjects is composed of: teaching topics that specify the learning outcomes that the students should achieve in the respective grade, the lesson fund for each teaching topic, contents and key terms of the topic that will be studied, standards according to which students' knowledge will be valued and evaluated, and examples of activities in the lessons.

The content analysis in the paper focuses on the contents and concepts, as well as the assessment standards from the teaching topics by the teaching subjects (Table 2) which are correlated with the area that is the subject of this paper.

### Content analysis of the curriculum from the subject Society

The subject Society is studied in the first educational cycle, that is from the first to the third grade. During the analysis of the curricula for this subject, it can be concluded that in each class one teaching topic can be extracted in accordance with the teaching content and concepts related to the field of protection and rescue from natural disasters.

Thus, within the teaching topic "The place I live in" (first grade) (Наставна програма Општество за прво одделение, 2021: 12-13) in which contents and

terms of the type of ambulance, fire department and police are represented, students should know the telephone numbers of the ambulance, police and fire department, as well as explain their roles and relate them to specific situations.



Figure 1: Vehicles with Priority, phone numbers and employees<sup>3</sup>

In the second grade, within the teaching topic "At home" in the teaching subject Society, the following teaching contents and concepts are studied: protection from natural disasters (natural disaster, fire, flood, earthquake). The indicators in the evaluation standards include the recognition of natural disasters and naming the most common natural disasters (earthquake, flood and fire), whereby students are expected to describe what should be done in earthquake, flood and fire situations. (Наставна програма Општество за второ одделение, 2021: 10-11)

<sup>3</sup> Камчевска, Б., Ристовска, Ж., Трифуновска Стојанова, А., Јошеска, М., Пантова, И. (2023) Општество за прво одделение во деветгодишно основно образование. Скопје: Министерство за образование и наука на Република Северна Македонија.



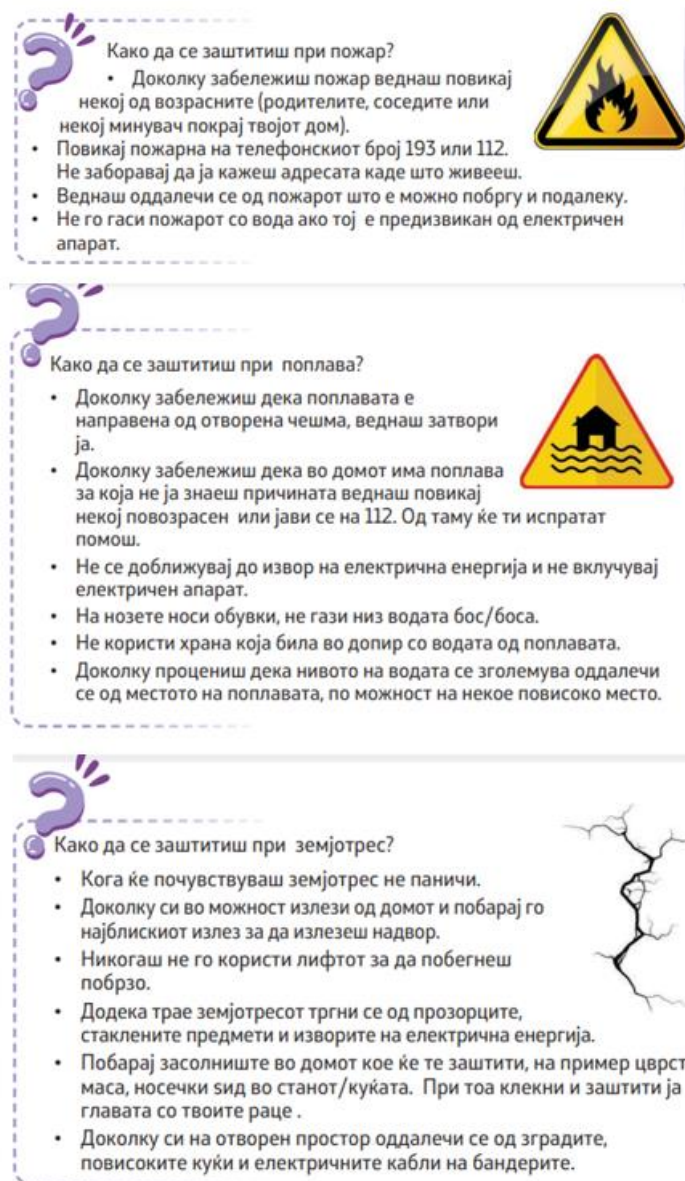


Figure 2: Protection against natural disasters<sup>4</sup>

Teaching contents and concepts in the area of protection and rescue from natural disasters can also be identified in the teaching topic "I take care of myself and my environment" in the teaching subject Society in the third grade. "How to

<sup>4</sup> Илиоска, Г. (2023) Општество за второ одделение. Скопје: Министерство за образование и наука на Република Северна Македонија.

recognize dangers in the environment and protect myself from them (risk, safety, protection, dangerous objects, danger from insects and other animals, danger from plants, danger from strangers, chemicals, electric shock, lightning strike, poisoning, abduction, abuse)." (Наставна програма Општество за трето одделение, 2022: 12-13) are the teaching contents and concepts studied in the specified teaching topic. After studying this teaching topic, students are expected to be able to list potentially dangerous objects and phenomena in the home and in their surroundings and to be able to describe different situations related to them, as well as to explain through examples how they should avoid the risk of dangerous objects and phenomena.

### **Content analysis of the curriculum from the Natural Sciences subject**

The teaching subject Natural Sciences with the status of a compulsory subject in grade-level teaching is studied from the first to the fifth grade. The results of the content and structural analysis of the Natural Sciences curriculum indicate that in the third, fourth and fifth grade, four teaching topics are identified that correspond to some of the contents of protection and rescue from natural disasters. Thus, in the third grade, through the separate teaching topic entitled "Changes in materials" (Наставна програма Природни науки за трето одделение, 2022: 13-14), students acquire knowledge about the concepts of burning, fires, prevention and protection from fires. Specific criteria that are used to evaluate the students, related to this teaching topic, are: "identifies burning as an irreversible change; lists materials that can burn; recognizes the danger of fire in the home and surroundings; and identifies and lists fire prevention and protection measures."

### ОПАСНОСТИ ОД ПОЈАВА НА ПОЖАР ВО ДОМОТ



### ОПАСНОСТИ ОД ПОЈАВА НА ПОЖАР ВО ОКОЛИНАТА



Figure 3: Fire hazards in the home and in the surrounding area<sup>5</sup>

In the fourth grade, there are two teaching topics through which students acquire knowledge and develop skills in the field of protection and rescue from natural disasters. The teaching topic "Physical characteristics of the Earth" (Наставна програма Природни науки за четврто одделение, 2021: 6) includes teaching contents related to Earth's shells (spheres), (stone shell/lithosphere, water shell/hydrosphere, air shell/atmosphere, plant and animal life/biosphere, underground water, spring, river, lake, sea, natural phenomena, earthquakes, volcanoes, clouds, precipitation, rain, snow, hail). After studying the subject, students should be able to name the Earth's shells/spheres, explain the characteristics of each of them, connect natural phenomena (earthquakes, volcanoes, rivers, lakes, precipitation) with the Earth's shells/spheres, as well as be able to connect the characteristics of the Earth's shells/spheres with the existence of life on planet Earth.

Within the framework of the second teaching topic represented in the teaching subject Natural sciences in the fourth grade "Electricity and magnetism", students acquire knowledge about electric current in a closed circuit, and they become familiar with the following concepts: particle, electric current, electrical

<sup>5</sup> Кирковска, С., Слезенкова-Никовска, Н. (2023) Природни науки 3: учебник за трето одделение во деветгодишното основно образование. Скопје: Министерство за образование и наука на Република Северна Македонија.

energy, light energy, heat energy, sound energy (Наставна програма Природни науки за четврто одделение, 2021: 15-16). From the analysis of the standards for evaluating the students, it can be concluded that they are required to perceive the transformation/conversion of electrical energy into light energy, heat energy and sound energy, they should be able to give examples of how electrical energy /current makes our life easier, but also to recognize the danger of improper handling of electrical devices.

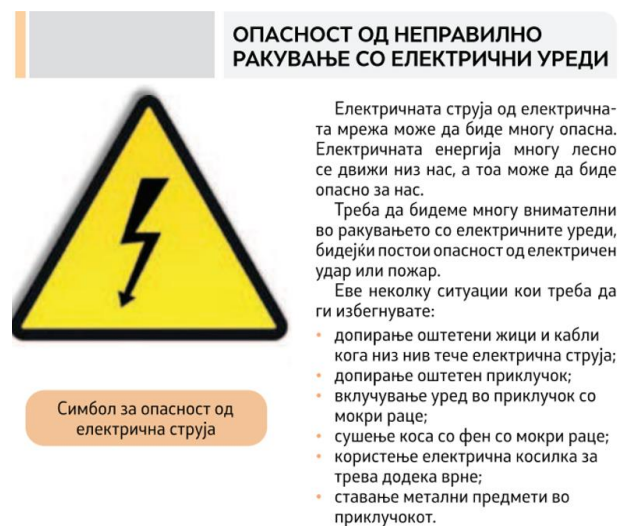


Figure 4: Dangers of improper handling with electrical devices<sup>6</sup>

"Natural-geographic features of the continents" is the next teaching topic from the subject of the same name, which is studied in the fifth grade. In the framework of this teaching topic, students study the relief of the continents using the basic concepts of: relief, internal forces, tectonic movements, mountains, basins, external forces, erosion, accumulation, volcano, eruption, lava, magma, volcanic cone, crater, volcanic vent, geyser, earthquake, hypocenter, epicenter, tsunami, layered rocks, volcanic rocks, altered rocks, volcanic relief, sea relief, lake relief, glacial relief, desert relief (Наставна програма Природни науки за петто одделение, 2021: 6-7). During the analysis of the content of the standards that are applied in the process of evaluating the students' knowledge, higher expectations from them are noted, such as: explanation of internal and external natural forces and their influence on relief formation; explanation of the origin of volcanoes and earthquakes and their elements; naming different types of rocks and explaining how they are formed; naming different types of relief and relating the type of relief and the natural force that forms it; identifying and explaining the major landforms of the continents.

<sup>6</sup> Слезенкова-Никовска, Н. (2022) Природни науки за четврто одделение. Скопје: Министерство за образование и наука на Република Северна Македонија.

### **Content analysis of the curriculum from the Free elective subjects**

In the structure of the current curricula for the primary nine-year education, more specifically in the second educational cycle from the fourth to the sixth grade, apart from the compulsory subjects, there are also elective subjects which are divided into three categories, namely: Second foreign language, Free elective subjects, Language of the community, Albanian language and Language and culture of the Roma, Language and culture of the Vlachs, Language and culture of the Bosniaks, Language and culture of the Turks and Language and culture of the Serbs. (Наставен план за основното образование за учебната 2024/25 година, 2024: 2-3) Through the content analysis of the optional subjects, it is concluded that out of the many subjects that students can choose in the fourth and fifth grade, two of them include teaching topics and contents that are correlated with protection and rescue from natural disasters. Namely, the subjects Environmental Education and Dealing with Natural Disasters are offered as optional subjects in the fourth and fifth grade, from which the student can choose only one in the specified grades, according to their interests and affinities to study content from the specified area.

An integral part of the teaching subject Environmental Education (fourth and fifth grade) is the teaching topic "Natural phenomena on the planet Earth, their measurement and protection". (Наставна програма Еколошко образование, 2023: 9) The central content is a volcano and terms that are closely related: "volcano, eruption, magma, volcanic cone, crater, volcanic vent". In contrast to this subject, in the elective subject "Dealing with natural disasters" (fourth and fifth grade) (Наставна програма Справување со природни катастрофи, 2023: 3-13), the subject of study are all natural disasters categorized into four teaching topics: Earthquakes, Fires, Floods and Extreme Weather. Within the teaching topic Earthquakes, students learn about how earthquakes occur and are familiarized with the terms earthquake, shaking, tectonic plates, hypocenter, epicenter. Furthermore, they acquire knowledge about the consequences of earthquakes, such as: debris, panic behavior, trapped. In the safety section, they learn about ways how to protect themselves during earthquakes (appropriate and inappropriate procedures, safe and unsafe places). When studying the teaching topic Fires, students acquire knowledge about how and where fires occur - sources of fires (fire, forest fire, arson, social pressure). Some of the contents refer to the consequences of fires (burnt objects, burns, smoke, fire) and how to protect themselves from fires (fire protection, 193, covering the body/mouth/nose). Teaching contents and concepts studied in the teaching topic Floods are the following: Causes and consequences of floods (flood, rising water, overflow of water from the trough, torrential rain, landslide, flooded areas); Protection during floods and storms (CMC - Crisis Management Center, climbing on the highest place). Through the teaching topic entitled "Extreme Weather", students learn about hot and cold weather. In the context of this teaching topic, the following terms are mentioned: heat wave, high temperatures, water, sunglasses, sun cream, low temperatures, cold, freezing, slipping, frost.

## **Conclusion**

From the data obtained from the analyzed curricula and programs and textbooks from the first to the fifth grade, it can be concluded that there are topics in the field of protection and rescue from natural disasters in several subjects, namely in the compulsory subjects Society and Natural Sciences and in the free elective subjects Environmental Education and Dealing with Natural Disasters. Their representation is ascertained through the analysis of the methodical-didactic structure of the curricula, in the section of: individual teaching topics, contents and concepts and in the evaluation standards. In the analyzed textbooks from the listed compulsory teaching subjects, didactic elements expressed through appropriate illustrations, questions, guidelines for student activities, as well as the provision of additional information are reviewed.

But the conclusion is that there are teaching topics, contents and concepts in the teaching subject Natural Sciences in the fourth and fifth grade that do not correspond to the developmental characteristics of students of that age and are at a higher complexity level.

In primary education, it is necessary for the teaching topics and activities in the field of protection and rescue from natural disasters to be more represented within extracurricular activities, which should be organized through the use of interactive techniques and methods so that students have the opportunity to develop appropriate skills through practical implementation of their knowledge.

It is methodologically correct to point out that there is a possibility for this scientific analysis to be extended to other curricula, textbooks and literature for children and young people, which are considered to have elements that correspond to the central research issue.

## **What next? – Recommendations:**

- To analyze the standards and procedures for radiological, biological and chemical protection of educational institutions. (according to Article 87 of the Law on Protection and Rescue)
- To analyze the content and the way of conducting self-defense training in educational institutions. (Article 119)
- Revising targeted curricula from the first to the fifth grade.
- To implement educational objectives in the field of protection and rescue from natural disasters.
- To have a greater representation of curricular and extracurricular activities with an interactive character in the field of protection and rescue from natural disasters.
- There is a need to organize sections in primary schools in this area.
- Preparation of protocols for protection and rescue from natural disasters in preschools, primary and secondary schools and in higher education institutions and their compulsory display in visible places.

- Organization of presentations by relevant institutions and experts for protection and rescue from natural disasters (staff from the Protection and Rescue Directorate, firefighters, policemen, Red Cross, etc.).
- Preparation of promotional materials for children and youth for protection and rescue from natural disasters.
- Production of literature for children and youth on protection and rescue from natural disasters, such as illustrated books, books and magazines (printed and electronic) and adapting them for students with learning difficulties.
- Organization of trainings for adults (parents, teachers and professional services) for protection and rescue from natural disasters.
- Organization and opening of a children's museum in which interactive content and activities with simulations from the mentioned area will be represented.
- Media and pedagogical promotion of contents related to protection and rescue from natural disasters.

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