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Plastic materials in the context of reuse in teaching in the fifth grade

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Abstract

The aim of this article is to describe the theoretical part of the assigned issue from available sources and research activities and at the same time its continuity with the practical side usable at elementary school within the framework of work skills, aesthetic, civic and environmental education. The procedures used in the acquisition of the topic and skills are the basics of frontal and demonstration teaching in connection with individual practical skills at the level of primary school pupils – specifically the fifth grade. We deal with the appropriate use of plastic and residual plastic materials and their creative use. In conclusion, we come to the idea of developing pupils' diligence in conjunction with technical skills and their creative activity as one of the probable future positive impacts on the environment.

Keywords: plastics, materials, residual materials, reuse, environment

Introduction

This article contains a summary and reflection on the issue of plastic materials in the context of the impact of their processing and disposal on the environment. Individual chapters deal with the history of plastics, their origin, development, and their primary purpose of use. Furthermore, their impact on the environment, to a certain extent the solution of this problem in the form of recycling and sorting of these materials, including a brief introduction of this topic among elementary school pupils and, finally, we discuss the possibility of further use of plastics in combination with the development of creative activities and creativity of pupils based on reshaping and adding aesthetic value.

History of plastic materials

The first artificial plastics were not as we know them today, they were created based on research on the replacement of one less available substance with another – more accessible. The term "plastic" appeared in the 30s of the 20th century and remains to this day. The very first was Parkesin (1862), which got its name from its inventor Alexander Parkes. The composition of this plastic is based on a part of the cell wall of the plant (specifically cellulose), it was transparent, formable, and even after cooling it retained its shape. It was introduced as a matter that can create anything. Then celluloid (1865) – an attempt to replace ivory. Rayon (1891) – a substitute for silk. Bakelite (1907) – synthetic plastic. Cellophane (1912) – created by a Swiss chemist who tried to create a waterproof tablecloth. Vinyl (20s of the 20th century) – polyvinyl chloride (PVC) – a substitute for natural rubber, used even today in the construction industry and others. Polyethylene – plastic bottles or bags. Finally, nylon – a substitute for silk in clothing. Polyester (1950), polypropylene (50s of the 20th century), Polystyrene – polystyrene foam (1954). Further use and consumption of plastic materials, including their surplus, is a problem in terms of waste generation, especially in less developed countries (Creative Saplings, 2020).

Plastic materials versus the environment or where the mistake was made

Plastic materials today are an essential part of human life. We have many types of plastic products that are all around us and we use them every day, but the big problem is their underuse. Most of the plastics we do not currently use do not lose value, but people throw them away and companies dispose them in many ways.

Today's common landfills are flooded with plastics as more of them are produced than used. Plastic does not easily decompose in natural landfills, like other materials since its durability is quite long-term. If we burn plastics outside factories designed for this activity, for example in the home environment, toxic and harmful substances escape into the air, and it is not safe for the environment. So, what can we do with them?

Recycling and sorting of plastic materials

Already pupils in primary school are taught to put plastics into yellow containers that are designed for this. That they should not throw plastic anywhere on the street or in the natural environment. Most of the time, however, they may not know that thanks to the sorting of plastics, they can be recycled and can become a renewable resource. That is, from the primary plastic we can form a secondary plastic material and from it a tertiary plastic material. We are therefore dealing here with the reuse of raw materials that are contained in "waste". However, the issue of excess plastics remains, so we can not only teach pupils in general about recycling and sorting these materials, but we can also teach them how unused material (alleged waste) can independently transform into something nice and develop their work skills, aesthetic feeling, and the science of improving the state of the environment. How do we achieve this?

Creativity and work of pupils with plastic materials as one of the means of improving the environmental situation - Throw away or transform?

In the case of work activities at elementary schools, we often encounter work with paper, natural products, modeling materials, but less with work with plastics, wood, and various technical tools. Most teachers are afraid that pupils will not be able to work with certain materials or equipment or will get injured. This is the reason why teachers avoid giving them much space for their own technical activities. The inspiration for working with plastics is countless, due to their good formability and machining. These activities promote fine motor skills, technical abilities, creativity, economic and ecological understanding (saving X waste of available resources) and, most importantly, also contribute in part to improving the quality of the environment. For example, we can build a car from plastic and residual plastic materials that has its own drive, or create jewelry, decorative vases, mnemonic aids, and other objects for long-term use from plastic bottles (Honzíková, 2002).

Issues of Education Levels Abroad - Czech School System

Within the framework of basic schools, the Czech school system is divided into the primary education (1st - 5th grade), which includes pupils in the age range from 6 to 11. Then there is the lower secondary education (6th - 9th grade), where we have pupils in the age range from 11 to 15. There may also be age differences due to postponement of school attendance. Each school has its own School Education System, in which it has structured topics of subjects, according to individual grades. In general, this is included in the Framework Education System, which contains what the pupils should be able to manage in individual

subjects and in certain grades, including individual approaches regarding to the possibilities of pupils.

In the framework educational program in the category People and the World of Work, we deal with the already mentioned materials and their involvement in educational content both at the 1st and 2nd parts of elementary education. We can find in it work with small materials, construction activities, cultivation work and food preparation. At the second level, we are dealing with technical materials, design and construction, operation, and maintenance of the home and other industries (Ministry of Education, 2021).

Conclusion

In conclusion, we can say that the issue of plastic materials is still a current topic today. It is mostly based on the excess of these materials and remediation due to sorting and recycling. However, if we start to include plastic and residual plastic materials in work and art activities at primary schools, we can also develop children's thinking in the context of the environment, technical or artistic creation and individual skills of pupils. At the same time, we will also reduce an "economic crack" in the waste of these materials when we turn them into sources of reuse for appropriate practical manual activities.

References

- Dostál Jiří. (2017). *Technical education at primary schools in the context of social and technological changes*. Palacký University of Olomouc.
- Creative Saplings: *A history of plastics*. (2020). <https://creativesaplings.com/cs/historie-plastu/>
- Honzíková, Jarmila. (2002). Working with plastics. In: *Kafomet*. Třebíč: Infra.
- Honzíková, Jarmila. (2006). *Materials for work activities at the first level of elementary school* (1st edition). Pilsen: University of West Bohemia.
- Ministry of Education, Youth and Sports (2021). *Framework Educational Program for basic education: People and the world of work*. <https://www.msmt.cz/vzdelavani/skolstvi-v-cr/vzdelavaci-soustava>
- Šafránková, Dagmar. (2019). *Pedagogy* (2nd updated and extended edition). Grada.

