

## Bulgaria

## SETTING UP A SCIENTIFIC SCHOOL PROJECT AS A METHOD OF INCREASING STUDENTS' MOTIVATION FOR STUDYING NATURAL SCIENCES AND ECOLOGY

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### Abstract

The paper reports the experiment of a team from the Aprilov National High School to increase the motivation of students interested mainly in the humanities for the natural science subjects through the development of a school project. The aim of the project entitled "Science from Granny's Chest Drawers" is to build a bridge between present days' science and technology and the history of Bulgarian crafts of the mid and the late 19th century. The old technology of braiding and dyeing woolen threads is interpreted attractively and unconventionally on modern scientific level. The project activities include the use of the authentic "chark" equipment for braiding woolen threads. It has been restored to the way it looked in the 19th century when it was used. Woolen threads are coloured with natural dyes obtained from plants and herbs gathered by the project participants. A small model of the wool-braiding workshop shows how the equipment works driven by the mechanical force of water.

### "Science from Granny's Chest Drawers"

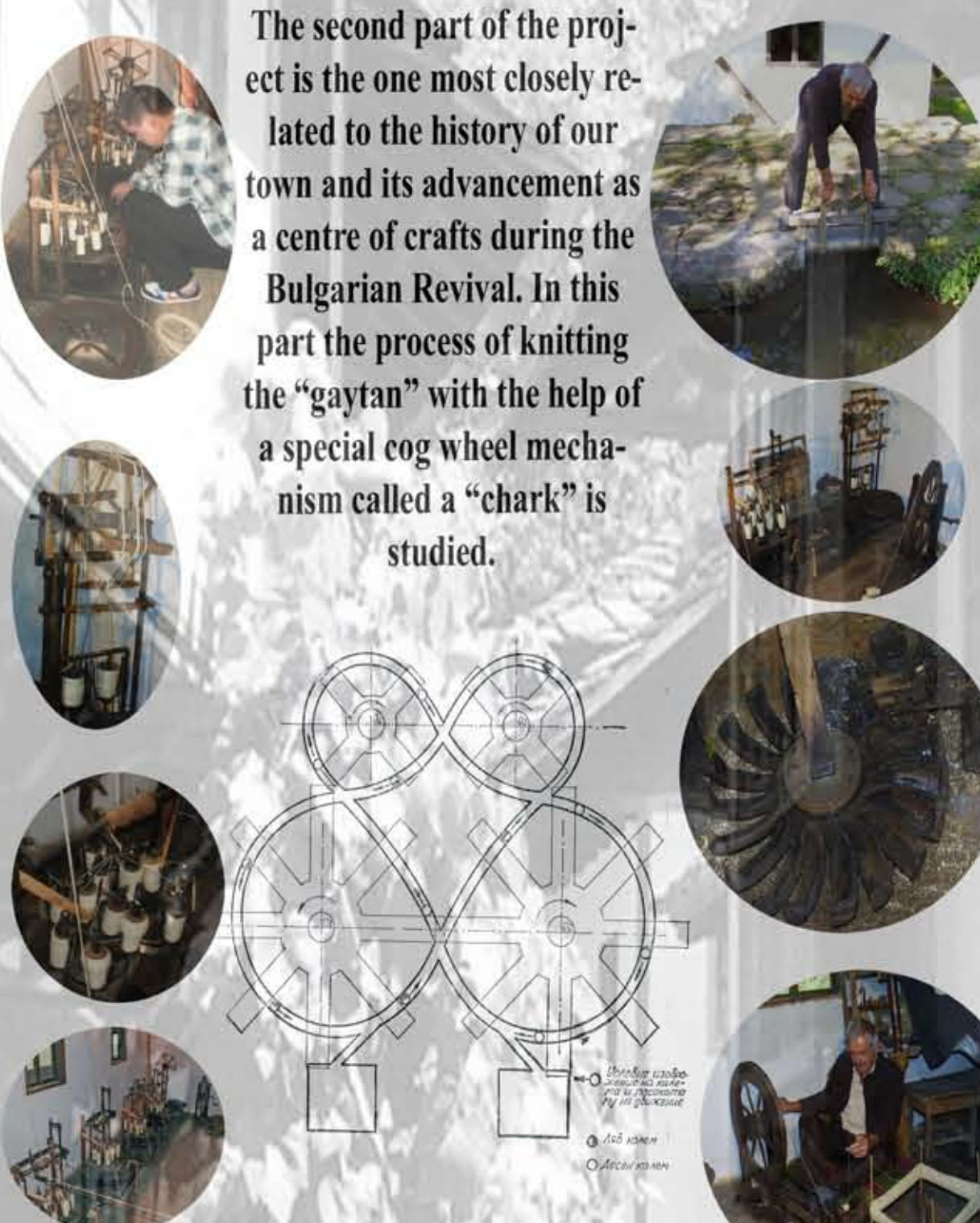
<http://projectsosnag.uni.me/en/>

#### Granny Had Been Spinning



In the first part, Granny Had Been Spinning, the students got acquainted with the types of threads, and especially with wool as a biopolymer of animal origin. The content and structure of the woolen thread were thoroughly researched, as well as the physical and mechanical properties that determine its usage. In the chemical properties an emphasis was put on the methods of wool dyeing and the possibilities for having chemical bonds between the fiber and the dyeing substance. The technology of wool spinning (forming of threads) with distaff and spinning wheel was researched and tested by the students participating in the project. The latter were encouraged by their physics teacher to describe scientifically the movement of the spindle and the spinning wheel. Consequently, the students learned about the spinning of a solid body around its axis as well as about circular movements.

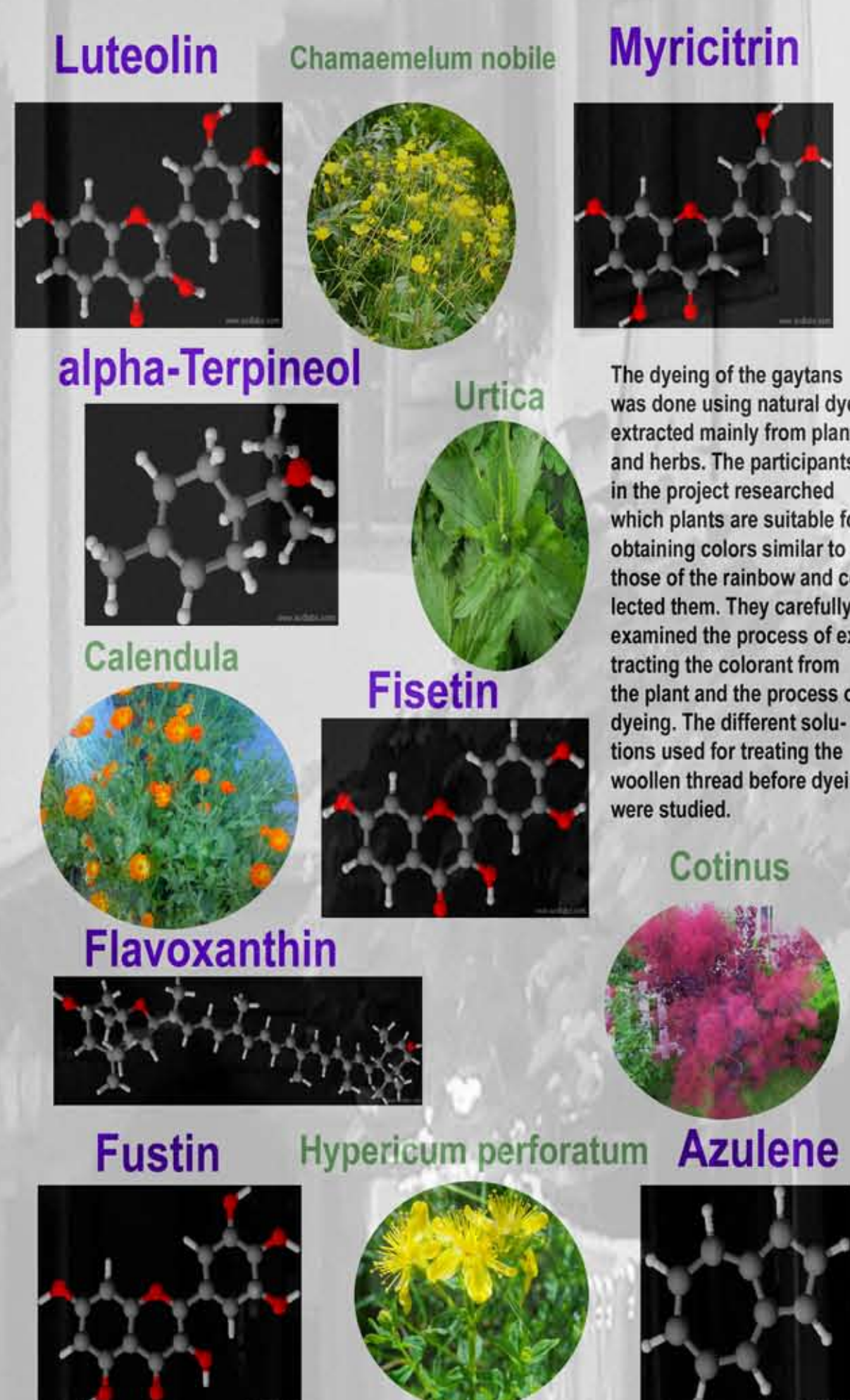
#### The Heart of the Chark



The second part of the project is the one most closely related to the history of our town and its advancement as a centre of crafts during the Bulgarian Revival. In this part the process of knitting the "gaytan" with the help of a special cog wheel mechanism called a "chark" is studied.

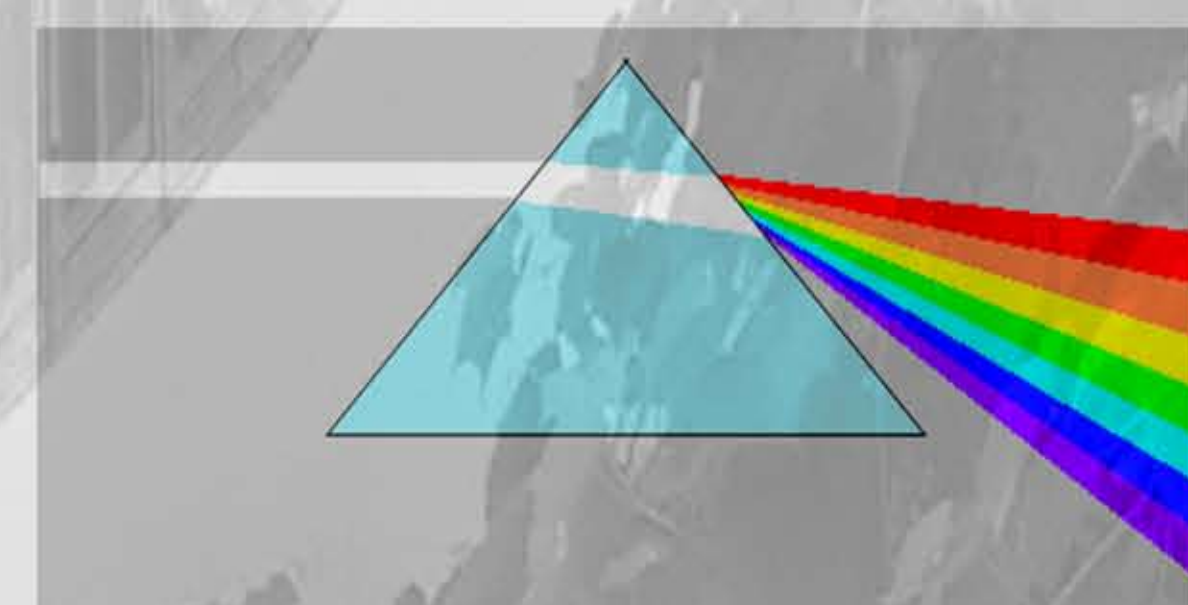
The students showed great interest for this craft as working with the chark is quite fascinating. The whole technology of gaytan knitting was studied – from winding the yarn on the spools with the help of a spinning wheel, threading the slips and then arranging them on the chark and setting it in motion with the power of water. The students first knitted a gaytan in a unique gaytan workshop in the museum "Etar" and afterwards they restored an old chark from the museum fund

#### Dyes from nature



The dyeing of the gaytans was done using natural dye, extracted mainly from plants and herbs. The participants in the project researched which plants are suitable for obtaining colors similar to those of the rainbow and collected them. They carefully examined the process of extracting the colorant from the plant and the process of dyeing. The different solutions used for treating the woolen thread before dyeing were studied.

#### The Rainbow Kingdom



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### Scientific project outcome:

The project proved to be a good practice in the Aprilov National High School, Gabrovo, and a successful method of enhancing students' motivation and altering their attitude towards natural sciences and ecology.

#### Students:

- developed ability to deal with scientific literature independently and applied what they had learnt to making multimedia products and posters
- extended their knowledge of chemistry, which helped them acquire skills necessary to explore and practise old traditional crafts
- appreciated the importance of natural sciences for everyday life in the past and in the present as well
- changed their own and their peers' attitude into ecology-friendly behaviour
- acquired knowledge, skills and competences that will benefit their future development

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**We would like to express our thanks for the help of our partners from Architectural ethnographic complex "Etar"!**